CHAPTER 1

PRINCIPLES OF FLIGHT

- **Airplane**
- **Four forces of flight**
- **Aerodynamics of Maneuvering Flight**
- **Stability**

TEST PREP 2011
PRIVATE PILOT

1. One of the main functions of flaps during the approach and landing is to

   A. Decrease the angle of descent without increasing the airspeed.
   B. Provide the same amount of lift at a slower.
   C. Decrease lift, thus enabling a steeper-than-normal approach to be mad.

Answer **(B)** is correct.
DISCUSSION: Extending the flaps increases the wing camber, the wing area (some types), and the angle of attack of the wing. This allows the wing to provide the same amount of lift at a slower airspeed.

2. The angle of attack of a wing directly controls the:

   A. Angle of incidence of the wing.
   B. Amount of airflow above and below the wing.
   C. Distribution of pressure acting on the wing.

Answer **(C)** is correct.
DISCUSSION: The angle of attack of an airfoil directly Controls the distribution of pressure below and Above it . when a wing is at low but positive angle of attack, most of the lift is due to the wing's negative pressure (upper surface) and downwash.
NOTICE: Negative Pressure is any pressure less than atmospheric, and positive pressure is pressure greater than atmospheric.

3. Frost covering the upper surface of an airplane wing usually will cause

   A. The airplane to stall at an angle of attack that is higher than normal.
   B. The airplane to stall at an angle of attack that is lower than normal.
   C. Drag factors so large that sufficient speed cannot be obtained for take-off

Answer **(B)** is correct.
DISCUSSION: Frost on the surface of a wing interferes with the smooth flow of air over the wing surface; i.e., parasite drag is increased.
The air flowing over the wing is thus disrupted and stalls at a lower angle of attack (a higher speed) when there is frost on the wing surface.

4. By changing the angle of attack of a wing, the pilot can control the airplane's

   A. Lift, airspeed, and drag.
   B. Lift, airspeed, and CG
   C. Lift and airspeed, but not drag.

Answer **(A)** is correct.
DISCUSSION: The pilot can control the airplane's lift, Airspeed, and drag by changing the angle of attack of the wing. As the angle of attack is increased, the lift increases to the critical angle of attack, airspeed decrease and induced drag increases with the increase in lift.

5. The angle of attack at which a wing stalls remains constant regardless of

   A. Weight, dynamic pressure, bank angle, or pitch attitude.
   B. Dynamic pressure, but varies with weight, bank angle, and pitch attitude.
   C. Weight and pitch attitude, but varies with dynamic pressure and bank angle.

Answer **(A)** is correct.
DISCUSSION: The angle of attack at which a wing stalls is constant regardless of weight, bank, pitch, etc.

6. Stall speed is affected by

   A. Weight, load factor, and power.
   B. Load factor, angle of attack, and power.
   C. Angle of attack, weight, and air density

Answer **(A)** is correct.
DISCUSSION: Stall speed may vary under different circumstances. Factors such as weight, load factor, power, centre of gravity, altitude, temperature, and the presence of snow, ice, or frost on the wings will affect an aircraft's stall speed.

7. An airplane will stall at the same

A. Angle of attack regardless of the attitude with relation to the horizon.
B. Airspeed regardless of the attitude with relation to the horizon.
C. Angle of attack and attitude with relation to the horizon.

Answer **(A)** is correct
DISCUSSION: An airplane will always stall at the same angle of attack. The airplane's attitude with relation to the horizon has no significance to the stall.

8. In a rapid recovery from a dive, the effects of load factor would causes the stall speed to

A. Increase.
B. Decrease.
C. Not vary.

Answer **(A)** is correct.
DISCUSSION: In a rapid recovery from a dive, the load factor would be increased because of the rapid change in the angle of attack, since gravity and centrifugal force would prevent the airplane from immediately altering its flight path. Because the relative wind is opposite the flight path, the critical angle of attack will be reached at a higher airspeed.

9. The stalling speed of an airplane is most affected by

A. Changes in air density
B. Variations in flight altitude.
C. Variations in airplane loading.

Answer **(C)** is correct.
DISCUSSION: Indicated stall speed is most affected by the gross weight and how it is distributed within the airplane.

10. Recovery from a stall in any airplane becomes more difficult when its

A. Centre of gravity moves aft.
B. Centre of gravity moves forward.
C. Elevator trim is adjusted nose down.

Answer **(A)** is correct.
DISCUSSION: The recovery from a stall in any airplane becomes progressively more difficult as the airplane's centre of gravity moves aft. This difficulty is due to the decreasing stability in pitch, which results in the decrease of elevator effectiveness in lowering the nose.

11. In small airplanes, normal recovery from spins may become difficult if the

A. CG is too far rearward, and rotation is around the longitudinal axis.
B. CG is too far rearward, and rotation is around the CG.
C. Spin is entered before the stall is fully developed.

Answer **(B)** is correct.
DISCUSSION: Because rotation is around the CG in spin with a rearward CG, the control arm at the rudder is sufficiently. shortened that it may make spin recovery difficult, if not impossible. intuitively, if there is too much weight near the tail it is also hard to get the nose down to produce an angle of attack below the critical angle.

12. Which statement is true relative to changing angle of attack ?

A. A decrease in angle of attack will increase pressure below the wing, and decrease drag.
B. An increase in angle of attack will increase drag.
C. An increase in angle of attack will decrease. pressure below the wing, and increase drag.

Answer **(B)** is correct.
DISCUSSION: As the angle of attack is increased, up to the critical angle of attack, the greater the amount of lift is developed and the greater the induced drag.

13. To generate the same amount of lift as altitude is increased, an airplane must be flown at

A. The same true airspeed regardless of angle of attack.
B. A lower true airspeed and a greater angle of attack.
C. A higher true airspeed for any given angle of attack.

Answer **(C)** is correct.
DISCUSSION: At an altitude of 18,000 ft, MSL, the air has one-half the density of air at sea level. thus, in order to maintain the same amount of lift as altitude increases, an airplane must be flown at a higher true airspeed for any given angle of attack.

14. As the angle of bank is increased, the vertical component of lift

A. Decreases and the horizontal component of lift increases.
B. Increases and the horizontal component of lift decreases.
C. Decreases and the horizontal component of lift remains constant.

Answer **(A)** is correct.
DISCUSSION: In level flight, all lift is vertical (upwards). as bank is increased, however, a portion of the airplane's lift is transferred from a vertical component to a horizontal component. thus the vertical component the vertical component of lift decreases and the horizontal component of lift increases as the angle of bank is increased.

15. Which is true regarding the forces acting on an aircraft in a steady-state descent? The sum of all

A. Upward forces is less than the sum of all downward forces.
B. Rearward forces is greater than the sum of all forward forces.
C. Forward forces is equal to the sum of all rearward forces.

Answer **(C)** is correct.
DISCUSSION: In any steady-state flight, whether level flight, climbs, or descents, the sum of all forward forces is equal to the sum of all rearward forces, and the upward forces equal the rearward downward forces.

16. What changes in airplane longitudinal control must be made to maintain altitude while the airspeed is being decreased?

A. Increase the angle of attack to produce more lift than drag.
B. Increase the angle of attack to compensate for the decreasing lift.
C. Decrease the angle of attack to compensate for the increasing drag.

Answer **(B)** is correct.
DISCUSSION: As airspeed decreases, the airfoils generate less lift. Accordingly, to maintain altitude, the angle of attack must be adjusted to compensate for the decrease in lift.

17. Which is true regarding the force of lift in steady, un-accelerated flight ?

A. At lower airspeed the angle of attack must be less to generate sufficient lift to maintain altitude.
B. There is a corresponding indicated airspeed required for every angle of attack to generate sufficient lift to maintain altitude.

Answer **(B)** is correct
DISCUSSION: Different angles of attack provide different lift, any given angle of attack has a corresponding airspeed to provide sufficient lift to maintain altitude.

C. An airfoil will always stall at the same indicated airspeed; therefore, an increase in weight will require an increase in speed to generate sufficient lift to maintain altitude.

18. In theory, if the airspeed of an airplane is double while in level flight, parasite drag will become

A. Twice as great.
B. Half as great
C. Four times great

Answer **(C)** is correct.
DISCUSSION: Tests shows that lift and drag vary as the square of the velocity. The velocity of the air passing over the wing in flight is determined by the airspeed of the airplane. Thus, if an airplane doubles its airspeed, lift and drag will be four times greater.(assuming that the angle of attack remains the same).

19. As airspeed decreases in level flight below that speed for maximum lift/drag ratio total drag of an airplane

A. Decreases because of lower parasite drag.
B. Increases because increased induced drag.
C. Increases because of increased parasite drag.

Answer **(B)** is correct.
DISCUSSION: Total drag is at a minimum for the maximum lift/drag (L/Dmax) ratio at one specific angle of attack and lift coefficient. As airspeed decreases, the induced drag will increase because a greater angle of attack is required to maintain level The amount of induced drag varies inversely as the square of the airspeed.

20. In theory, if the angle of attack and other factors remain constant and the airspeed is doubled, the lift produced at the higher speed will be

A. The same as the lower speed.
B. Two times greater than at the lower speed.
C. Four times greater than at the lower speed.

Answer **(C)** is correct.
DISCUSSION: If the angle of attack and other remain factors remain constant, lift is proportional to the square of the airplane's velocity For example, an airplane travelling at 200 kt. . has four times the lift as the same airplane travelling at 100 knots.

22. An aircraft wing is designed to produce lift resulting from a difference in the

A. Negative air pressure below and a vacuum above the wing's surface
B. Vacuum below the wing's surface an greater air pressure above the wing's surface.
C. Higher air pressure below the wing's surface and lower air pressure above the wing's surface.

Answer **(C)** is correct.
DISCUSSION: An airplane's lift is produced by a pressure differential resulting from relatively lower (i.e., less than atmospheric) pressure above the wing and higher the wing and higher(i.e., greater than atmospheric) pressure below the wing's surface.

23. Lift on a wing is most properly define as the

A. Force acting perpendicular to the relative wind.
B. Differential pressure acting perpendicular to the chord of the wing.
C. Reduce pressure resulting from a laminar flow over the upper chamber of an airfoil which acts perpendicular to the mean camber.

Answer **(A)** is correct
DISCUSSION: Lift opposes the downward force of weight, is produced by the dynamic effect of the air acting on the wing, and acts perpendicular to the relative wind through the wing's centre of lift.

24. (Refer to Figure 1) At an airspeed represented by point B, in steady flight, the pilot can expect to obtain the airplane's maximum

A. Endurance.
B. Glide range.
C. Coefficient of lift.

Answer **(B)** is correct
DISCUSSION: Point B (Figure 1) is the intersection of the parasite and induced drag curves, which is the point where the total drag is at its minimum (also known as the point of maximum L/D ratio). L/D max is the airspeed at which the pilot of either at jet or a propeller-driven airplane can expect to obtain that airplane's.

25. (Refer to Figure 1) At the airspeed represented by point A, in steady flight, the airplane will

A. Have its maximum L/D ratio.
B. Have its minimum L/D ratio.
C. Be developing its maximum coefficient of lift.

Answer **(A)** is correct
DISCUSSION: Point A (Figure 1) is at the minimum point on the total drag curve. By definition, this is the point of maximum L/D ratio. Note that airspeed is on the horizontal axis and drag is on the vertical axis.

26. On a wing, the force of lift acts perpendicular to and the force of drag acts parallel to the

A. Chord line.
B. Flight path
C. longitudinal axis

Answer **(B)** is correct.
DISCUSSION: Lift acts perpendicular to the relative wind, which is opposite the flight path. Drag acts parallel to the flight path.

27. Which statement is true regarding the opposing forces acting on an airplane in steady-state level flight?

A. These forces are equal.
B. Thrust is greater than drag and weight and lift are equal
C. Thrust is greater than drag and lift is greater than weight.

Answer **(A)** is correct.
DISCUSSION: In steady-state level flight, the sum of the opposing forces is equal to zero.

28. An airplane leaving ground effect will

A. Experience a reduction in ground friction and require a slight power reduction.
B. Experience an increase in induced drag and require more thrust.
C. Require a lower angle of attack to maintain the same lift coefficient.

Answer **(B)** is correct
DISCUSSION: An airplane leaving ground effect (a height greater than the wingspan) will:
1. Require an increase in angle of attack to maintain the same lift coefficient,
2. Experience an increase in induced drag and thrust required,
3. Experience a decrease in stability and a nose-up change in moment, and
4. Produce a reduction in static source pressure and increase in indicated airspeed.

29. To produce the same lift while in ground effect as when out of ground effect, the airplane requires

A. A lower angle of attack.
B. The same angle of attack.
C. A greater angle of attack.

Answer **(A)** is correct.
DISCUSSION: In ground effect, induced drag decreases due to a reduction in wingtip vortices (caused by a reduction in the wing's downwash), which alters the span wise lift distribution and reduces the induced angle of attack .Thus, The wing will require a lower angle of attack in ground effect to produce the same lift as when out of ground effect.

30. If the same angle of attack is maintained in ground effect as when out of ground effect, lift will

A. Increase, and induced drag will decrease.
B. Decrease, and parasite drag will increase.
C. Increase, and induced drag will increase.

Answer **(A)** is correct.
DISCUSSION: In ground effect induced drag decreases due to a reduction in wingtip vortices (caused by a reduction in the wing's downwash), which alters the span wise lift distribution and reduces the induced angle of attack. Thus, if an airplane is brought into ground effect with a constant angle of attack, an increase in lift will result.

31. Longitudinal stability involves the motion of the airplane controlled by its

A. Rudder.
B. Elevator.
C. Ailerons.

Answer **(B)** is correct.
DISCUSSION: Longitudinal stability is the quality which makes an airplane stable about its lateral (i.e., pitch) axis. This motion is controlled by the elevators

32. If the airplane attitude remains in a new position after the elevator control is pressed forward and released, the airplane display

A. Neutral longitudinal static stability.
B. Positive longitudinal static stability.
C. Neutral longitudinal dynamic stability.

Answer **(A)** is correct.
DISCUSSION: When an airplane's attitude is momentarily displaced and it remains at its new attitude, it is said to have neutral longitudinal static stability. Longitudinal stability is the quality which makes an airplane stable about its lateral axis (pitch)

33. If the airplane attitude initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays

A. Positive dynamic stability.
B. Positive static stability.
C. Neutral dynamic stability.

Answer **(B)** is correct
DISCUSSION: When an airplane's elevator control is pressed forward and released and its attitude initially tend to return to its original position, the airplane displays positive static stability.

34. If an airplane is loaded to the rear of its CG range, it will tend to be unstable about it.

A. Vertical axis.
B. Lateral axis.
C. Longitudinal axis.

Answer **(B)** is correct.
DISCUSSION: As the CG is move rearward, it may move behind the centre of lift, in which case the airplane is said to have negative stability about its lateral axis. Recall that the CG should be forward of the centre of lift and that the tail surface is designed to have negative lift.

35. If airspeed is increased during a level turn, what action would be necessary to maintain altitude? the angle of attack

A. And angle of bank must be decreased.
B. Must be increased or angle of bank decreased.
C. Must be decreased or angle of bank increased.

Answer **(C)** is correct.
DISCUSSION: To compensate for the added lift what would result if the airspeed were increased during a turn ,the angle of attack must be decreased, or the angle of bank increased, to maintain a constant altitude.

36. If a standard rate turn is maintained, how long

Answer **(B)** is correct.

would it take to turn 360°

A. 1 minute.
B. 2 minutes.
C. 3 minutes.

DISCUSSION: A standard rate turn is one during which the heading changes at a rate of 3°/sec. Thus, a 360° turn would take 2min. (360°÷ 3°/sec = 120 sec., or 2 min)

37. While maintaining a constant angle of bank and decreased load factor.

A. Loss of the vertical component of lift
B. Loss of horizontal component of lift and the increase in centrifugal force.
C. Rudder deflection and slight opposite aileron throughout the turn.

Answer **(B)** is correct.
DISCUSSION: When in a constant bank in a coordinated turn, and increase in airspeed will decrease the rate of turn . Because the bank is held constant, there will be no change in load factor.

38. Why is it necessary to increase back elevator pressure to maintain altitude during a turn? to compensate for the

A. Loss of the vertical component of lift.
B. Loss of the horizontal component of lift and the increase in centrifugal force.
C. Rudder deflection and slight opposite aileron throughout the turn.

Answer **(A)** is correct.
DISCUSSION: As you enter a turn, lift is divided into horizontal and vertical components. This division reduces the amount of lift which is opposing weight and thus the airplane loses altitude unless additional lift is created. This is done by increasing back elevator pressure increase the angle of attack until the vertical component of lift is equal to the weight to maintain maintain altitude without a change in thrust.

39. To maintain altitude during a turn, the angle of attack must be increased to compensate for the decrease in the

A. Forces opposing the resultant component of drag.
B. Vertical component of lift.
C. Horizontal component of lift.

Answer **(B)** is correct.
DISCUSSION: As you enter a turn, lift is divide into horizontal and vertical components. This division reduces the amount of lift which is opposing weight and thus the airplane loses altitude unless additional lift is created. This is done by increasing back elevator pressure increase the angle of attack until the vertical component of lift is equal to the weight to maintain maintain altitude without a change in thrust.

40. The ratio between the total air load imposed on the wing and the gross weight of an aircraft in flight is known as

A. Load factor and directly affects stall speed.
B. Aspect load and directly affects stall speed.
C. Load factor and has no relation with stall speed.

Answer **(A)** is correct
DISCUSSION: A load factor is the ratio of the total air load acting on the airplane to the gross weight of the airplane. For example, if the air load imposed on the wing is twice the actual weight of the airplane, the load factor is said to be 2Gs and the stall speed increase.

41. Load factor is the lift generated by the wings of an aircraft at any given time

A. Divide by the total weight of the aircraft.
B. Multiplied by the total weight of the aircraft.
C. Divide by basic empty weight of the aircraft

Answer **(A)** is correct.
DISCUSSION: Since the load factor is the ratio between the total air load imposed on the wing and the gross weigh of the airplane, the load factor is the lift generated by the wings divided by the total weight of aircraft. For example , an airplane weighing 2,000 lb. of the wings. Thus, the load factor of 2.0 would require 4,000 lb. of lift by the wings. Thus ,the load factor of 2.0 is equal to the 4,000 lb. of wing lift divided by the gross weight of 2,000 lbs.

42. For a given angle of bank, in any airplane, the load factor imposed in a coordinated constant altitude turn

A. Is constant and the stall speed increases.
B. Varies with the rate of turn.
C. Is constant and the stall speed decreases.

Answer **(A)** is correct.
DISCUSSION: In any airplane at any airspeed, if a constant altitude is maintained during the turn, the load factor for a given degree of bank is the same, which is the resultant of weight and centrifugal force. Because of the increased load factor in a turn the stall speed is also increased in proportion the square root of the load factor.

43. Airplane wing loading during a level coordinated turn in smooth air depends upon the

A. Rate of turn.
B. Angle of bank.
C. True airspeed.

Answer **(B)** is correct.
DISCUSSION: The load factor for a given airplane during a level coordinated turn is determined solely by the angle of bank.

44. (Refer to figure 3) If an aircraft with a gross weight of 3,000 pounds was subjected to a 60° constant-altitude bank, the total load would be

A. 3,000 pounds.
B. 6,000 pounds.
C. 12,000 pounds.

Answer **(B)** is correct.
DISCUSSION: In a constant-altitude, 60°bank turn, the wings are loaded at 2 Gs. Therefore, the total load of a 3,000-lb. airplane is 6,000 lb. (3,000 x 2).

45. (Refer to figure 3) If the airspeed is increased From 90 knots to 135 knots during a level 60° banked turn, the load factor will

A. Increase as well as the stall speed.
B. Decrease and the stall speed will increase.
C. Remain the same but the radius of turn will increase.

Answer **(C)** is correct.
DISCUSSION: Since the only determinant of load factor in level, coordinated turns is the amount of bank a change in airspeed does not change the load factor. When airspeed is increased, however, the rate of turn decreases and the radius of turn increases.

46. Baggage weighing 90 pounds is placed in a normal category airplane's baggage compartment which is placard at 100 pounds. If this airplane is subjected to a positive load factor of 3.5 Gs, the total load of the baggage would be

A. 315 pounds and would be excessive.
B. 315 pounds and would not be excessive.
C. 350 pounds and would not be excessive.

Answer **(B)** is correct.
DISCUSSION: Since 90 lb. is less than the amount of placard weight (100 lb), there is no problem with the weight. The positive load factor of 3.5 Gs is within the normal operational limit of 3.8 Gs of normal category airplanes. The placard weight does not have to be divided by the design load factor of the airplane. When 100 lb. was set as baggage limit in this particular case, the designers recognized subjected to 3.8 Gs, i.e., 380 pounds. . The baggage weight of90 lb. is multiplied by 3.5 Gs to get a load of 315 pounds.

47. Which factor below is the best indication of positive or negative Gs in an aircraft?

A. Change in the amount of pressure by the pilot needed on the controls.
B. Change in how heavy or light you feel in your seat.
C. Change in control-surface effectiveness.

Answer **(B)** is correct.
DISCUSSION: Positive or negative load factor is mostly easily observed by considering how heavy or light you feel in the seat. This effect is one of the primary considerations in the design of the structure for all airplanes.

48. (Refer to Figure 2) The acute angle A is the Angle of

A. Incidence.
B. Attack.
C. Dihedral.

Answer **(B)** is correct.
DISCUSSION: The angle of attack is the acute angle between the relative wind and the chord line of the wing.

49. The term “angle of attack” is defined as the angle

A. Between the wing chord line and the relative wind.
B. Between the airplane’s climb angle and the horizon.
C. Formed by the longitudinal axis of the airplane and the chord line of the wing.

Answer **(A)** is correct.
DISCUSSION: The angle of attack is the acute angle between the relative wind and the chord line of the wing.

50. The angle between the chord line of an airfoil and the relative wind is known as the angle of

A. Lift.
B. Attack.
C. Incidence.

Answer **(B)** is correct.
DISCUSSION: The angle of attack is the acute angle between the chord line of the wing and direction of wind. the relative

51. Angle of attack is defined as the angle between the chord line of an airfoil and the

A. Direction of the relative wind.
B. Pitch angle of an airfoil.
C. Rotor plane of rotation.

Answer **(A)** is correct.
DISCUSSION: The angle of attack is the angle between the chord line of the airfoil and the direction of the relative wind.

52. Which statement relates to Bernoulli’s principle?

A. For every action there is an equal and opposite reaction.
B. An additional upward force is generated as the lower surface of the wing deflects air downward.
C. Air travelling faster over the curved upper surface of an airfoil causes lower pressure on the top surface.

Answer **(C)** is correct.
DISCUSSION: Bernoulli’s principle states in part that the pressure of a fluid (liquid or gas) decreases at points where the speed of the fluid increases.

53. An airplane said to be inherently stable will

A. Be difficult to stall.
B. Require less effort to control.
C. Not spin.

Answer **(B)** is correct.
DISCUSSION: A stable airplane will tend to return to the original condition of flight if disturbed by a force such as turbulent air. This means that a stable airplane is easy to fly.

54. What determines the longitudinal stability of an airplane?

A. The location of the CG with respect to the

Answer **(A)** is correct.
DISCUSSION: The location of the centre of gravity with respect to the centre of lift determines to a great extent the longitudinal stability of an airplane. Centre of

centre of lift.
B. The effectiveness of the horizontal stabilizer, rudder and rudder trim tab.
C. The relationship of thrust and lift to weight and drag.

gravity aft of the centre of lift will result in an undesirable pitch-up moment during flight. An airplane with centre of gravity forward of the centre of lift will pitch down when power is reduced.

55. Changes in the centre of pressure of a wing affect the aircraft's

A. Lift/drag ratio.
B. Lifting capacity
C. Aerodynamic balance and controllability.

Answer **(C)** is correct.
DISCUSSION: The centre of pressure of an asymmetrical airfoil moves forward as the angle of attack is increased and backward as the angle of attack is decreased. The backward and forward movement of the point at which lift acts, affects the aerodynamic balance and the controllability of the aircraft.

56. What causes an airplane (except a T-tail) to pitch nose-down when power is reduced and controls are not adjusted?

A. The CG shift forward when thrust and drag are reduced.
B. The downwash on the elevators from the propeller slipstream is reduced and elevator effectiveness is reduced.
C. When thrust is reduced to less than weight, lift is also reduced and the wings can no longer support the weight.

Answer **(B)** is correct.
DISCUSSION: The location of the centre of gravity with respect to the centre of lift determines to a great extent the longitudinal stability of an airplane. centre of gravity aft of the centre of lift will result in an undesirable pitch-up moment during flight. an airplane with the centre of gravity forward of the centre of lift will pitch down when power is reduced. This will increase the airspeed and the downward force on the elevators will bring the nose up , providing positive stability. The farther forward

57. An airplane has been loaded in such a manner that the CG is located aft of the aft CG limit. One undesirable flight characteristic a pilot might experience with this airplane would be.

A. A longer take off run.
B. Difficulty in recovering from a stalled condition.
C. Stalling at higher-than-normal airspeed.

Answer **(B)** is correct.
DISCUSSION: Loading in a tail-heavy condition can reduce the airplane's ability to recover from stalls and Spins .tail-heavy loading also produces very light stick forces, making it easy for the pilot to inadvertently Overstress the airplane.

58. Loading an airplane to the most aft CG will cause the airplane to be

A. less stable at all speeds.
B. less stable at slow speeds, but more stable at high speed.
C. less stable at high speeds, but more stable at low speeds.

Answer **(A)** is correct.
DISCUSSION: Loading in a tail-heavy condition can reduce the airplane's ability to recover from stalls and spins. tail-heavy loading also produces very light stick forces at making it easy for the pilot to Inadvertently all speed ,overstress the airplane.

59. (Refer to Figure 3) If an airplane weights 4,300 pounds, what approximate weight would the airplane structure be required to support during a 60°banked turn while maintaining altitude ?

A. 2,300 Pounds.
B. 3,400 Pounds.
C. 8,600 Pounds.

Answer **(C)** is correct.
DISCUSSION: Use the following steps :

1. Enter the chart at a 60°angle of bank and proceed upward to the curved reference line. From the point of intersection ,move to the left side of the chart and read a load factor of 2 Gs
2. Multiply the aircraft weight by the load factor:
4,300 x 2 = 8,600 lbs
or, Working from the table :
4,300 x 2.0 (load factor) = 8,600 lb

60. (Refer to Figure 3) If an airplane weighs 3,300 pounds, what approximate weight would the plane structure be required to support during a 30◦ banked turn while maintaining altitude ?

A. 1,200
B. 3,100
C. 3,960

Answer **(C)** is correct.
DISCUSSION: Use the following steps :

1. Enter the chart at a 60°angle of bank and proceed upward to the curved reference line. From the point of intersection ,move to the left side of the chart and read a load factor of 1.2 Gs

2. Multiply the aircraft weight by the load factor:
3,300 x 1.2 = 3,960 lbs
or, Working from the table :
3,300 x 1.154 (load factor) = 3,808 lbs
Answer C is the closest.

61. (Refer to Figure 3) If an airplane weighs 4,500 pound's what approximate weight would the airplane structure required to support during a 45°banked turn while maintaining altitude ?

A. 4,500 pounds.
B. 6,700 pounds.
C. 7,200 pounds.

Answer **(B)** is correct.
DISCUSSION: Use the following steps :

1. Enter the chart at a 45°angle of
to the curved reference line. From bank and proceed upward.
the point of intersection move to the left side of the
2. Multiply the aircraft weight by the load factor:
4,500 x 1.5 = 6,700 lbs
or, Working from the table :
4,500 x 1.141 (load factor) = 6,750 lbs
Answer B is closest.

62. The amount of excess load that can be imposed on the wing of an airplane depends upon the

A. Position on the CG.
B. Speed of the airplane.
C. Abruptness at which the load is applied.

Answer **(B)** is correct.
DISCUSSION: At slow speeds, the maximum available lifting force of the wing is only slightly greater than the amount necessary to support the weight of the airplane. However, at high speeds, the capacity of the elevator controls, or a strong gust, may increase the load factor beyond safe limits.

63. Which basic flight manoeuvre increases the load factor on an airplane as compared to straight-and-level flight?

A. Climbs.
B. Turns.
C. Stalls.

Answer **(B)** is correct.
DISCUSSION: A change in speed during straight flight will not produce any appreciable change in load, but when a change is made in the airplane's flight path, an additional load is imposed upon the airplane structure. This is particularly true if a change in direction is made at high speed with rapid, forceful control movements.

64. What force makes an airplane turn?

A. The horizontal component of lift.
B. The vertical component of lift.
C. Centrifugal force.

Answer **(A)** is correct.
DISCUSSION: As the airplane is banked, lift acts horizontally as well as vertically and the airplane is pulled . around the turn

65. During an approach to a stall, an increased load factor will cause the airplane to

A. Stall at a higher airspeed.

Answer **(A)** is correct.
DISCUSSION: Stall speed increases in proportion to the square root of the load factor. Thus, with a load factor will stall at a speed which is of 4, an

B. Have a tendency to spin.
C. Be more difficult to control.

aircraft double the normal stall speed.

66. As altitude increase the indicated airspeed at which a given airplane stalls in a particular configuration will

A. Decrease as the true airspeed decreases.
B. Decrease as the true airspeed increases.
C. Remain the same regardless of altitude.

Answer **(C)** is correct.
DISCUSSION: An increase in altitude has no effect on the indicated airspeed at which an airplane stalls at altitudes normally used by general aviation aircraft. This means that the same indicated airspeed should be maintained during the landing approach regardless of the elevation or the density altitude at the airport of landing.

67. In what flight condition must an aircraft be placed in order to spin ?

A. Partially stalled with one wing low.
B. In a steep diving spiral.
C. Stalled.

Answer **(C)** is correct.
DISCUSSION: A spin results when a sufficient degree of rolling or yawing control input is imposed on an airplane in the stalled condition. If the wing is not stalled, a spin cannot occur.

68. During a spin to the left, which wing(s) is/are stalled ?

A. Both wings are stalled.
B. Neither wing is stalled.
C. Only the left wing is stalled

Answer **(A)** is correct.
DISCUSSION: One wing is less stalled than the other, but both wings are stalled in a spin.

69. The angle of attack at which an airplane wing stalls will

A. Increase if the CG is move forward.
B. Change with an increase in gross weight.
C. Remain the same regardless of gross weight.

Answer **(C)** is correct.
DISCUSSION: When the angle of attack is increased to between 18°and 20°(critical angle of attack) on most airfoils , the airstream can no longer follow the upper curvature of the wings because of the excessive change in direction .the airplane will stall if the critical angle of attack is exceeded. the indicated airspeed at which stall occurs stall angle of attack is the same.

70. One of the main functions of flaps during approach and landing is to

A. Decrease the angle of descent without increasing the airspeed.
B. Permit a touchdown at a higher indicated airspeed.
C. Increase the angle of descent without increasing the airspeed.

Answer **(C)** is correct.
DISCUSSION: Flaps increase drag, allowing the pilot to make steeper approaches without increasing airspeed.

71. What is one purpose of wing flaps ?

A. To enable the pilot to make steeper approaches to a landing without increasing the airspeed.
B. To relieve the pilot of maintaining continuous pressure on the controls.
C. To decrease wing area to vary the lift.

Answer **(A)** is correct.
DISCUSSION: Flaps increase drag, allowing the pilot to make steeper approaches without increasing airspeed.

72. What must a pilot be aware of as a result of ground effect ?

A. Wingtip vortices increase creating wake turbulence problems for arriving and departing aircraft
B. Induced drag decreases; therefore, any excess speed at the point of flare many cause considerable floating.
C. A full stall landing will require less up elevator deflection than would a full stall when done free of ground effect.

Answer **(B)** is correct.
DISCUSSION: The reduction of the wing-tip vortices , due to ground effect, alters the span wise lift distribution and reduces the include angle of attack, and induced drag causing.

73. Ground effect is most likely to result in which problem ?

A. Setting to the surface abruptly during landing.
B. Becoming airborne before reaching recommended Take-off speed.
C. Inability to get airborne even through airspeed is sufficient for normal take-off needs.

Answer **(B)** is correct.
DISCUSSION: Due to the reduced drag in ground effect, the airplane may seem capable of take-off well below the recommended speed. It is important that no attempt be made to force the airplane to become airborne with a deficiency of speed. The recommended take-off speed is necessary to provide adequate initial climb performance.

74. What is ground effect ?

A. The result of the interference of the surface of the earth with airflow patterns about an airplane
B. The result of an alteration in airflow patterns increasing induced drag about the wings of an airplane
C. The result of the disruption of the airflow patterns about the wings of an airplane to the point where the wings will no longer support the airplane in flight.

Answer **(A)** is correct.
DISCUSSION: Ground effect is the result of the interference of the surface of the Earth with the airflow patterns about an airplane.

75. Floating caused by the phenomenon of ground effect will be most realized during an approach to land when at

A. Less than the length of the wingspan above the surface
B. Twice than length of the wingspan above the surface.
C. A higher-than-normal angle of attack.

Answer **(A)** is correct.
DISCUSSION: When the wing is at a high equal to its span, the reduction in induced drag is only 1.4%. however, when the wing is at a high equal to one-fourth its span, the reduction in induced drag is 23.5% and when the wing is at a height equal to one-tenth its span, the reduction in induced drag is 47.6%

76. When landing behind a large aircraft, which procedure should be followed for vortex avoidance ?

A. Stay above its final approach flight path all the way to touch down.
B. Stay below and to one side of its final approach Flight path.
C. Stay well below its final approach flight path and land at least 2,000 feet behind.

Answer **(A)** is correct.
DISCUSSION: When landing behind a large aircraft, stay at or above the large aircraft's final approach path. Note its touch down point and land beyond it.

77. How does the wake turbulence vortex circulate around each wingtip.

A. Inward, upward, and around each tip.
B. Inward, upward, and counter clockwise.
C. Outward, upward, and around each tip.

Answer **(C)** is correct.
DISCUSSION: The vortex circulation is outward, upward , and around the wing tips when viewed from either ahead or behind the aircraft.

78. When talking off or landing at an airport where heavy aircraft are operation, one should be particularly alert to the hazards of wingtip vortices because this turbulence tends to

A. Rise from a crossing runway into the take-off or landing path.
B. Rise into the traffic pattern area surrounding the airport.
C. Sink into the flight path of aircraft operation below the aircraft generating the turbulence.

Answer **(C)** is correct.
DISCUSSION: Flight tests have shown that the vortices from large aircraft sink at a rate of about 400 to 500 feet per minute. they tend to level off at a distance about 900 feet below the path of the generating aircraft.

79. The greatest vortex strength occurs when the generating aircraft is

A. Light, dirty, and fast.
B. Heavy, dirty, and fast.
C. Heavy, clean, and slow.

Answer **(C)** is correct.
DISCUSSION: The strength of the vortex is governed by the weight, speed and shape of the wing of the generating aircraft .the greatest vortex strength occurs when the generating aircraft is heavy clean and slow.

80. Wingtip vortices created by large aircraft tend to

A. Sink below the aircraft tend to
B. Rise into the traffic pattern.
C. Rise into the take-off or landing path of a crossing runway.

Answer **(A)** is correct.
DISCUSSION: Flight tests have shown that the vortices from large aircraft sink at a rate of about 400 to 500 feet per minute .they tend to level off at a distance about 900 feet below the path of the generating aircraft.

81. The wind condition that requires maximum caution when avoiding wake turbulence on landing is a

A. Light ,quartering headwind.
B. Light, quartering tailwind
C. Strong headwind.

Answer **(B)** is correct.
DISCUSSION: A tailwind condition can move the vortices of a preceding aircraft forward into the touchdown zone. A light quartering tailwind requires maximum caution. pilots should be alert to large aircraft upwind from their approach and take off flight paths.

82. When landing behind a large aircraft, the pilot should avoid wake turbulence by staying

A. Above the large aircraft's final approach path and landing beyond the large aircraft ; touchdown point.
B. Below the large aircraft ; final approach path and landing before the large aircraft's touchdown point.
C. Above the large aircraft's final approach path and landing before the large aircraft's touchdown point.

Answer **(A)** is correct.
DISCUSSION: when landing behind a large aircraft stay at or above the large aircraft's final approach path. Note its touchdown point and land beyond it.

83. When departing behind a heavy aircraft, the pilot should avoid wake turbulence by

Answer **(B)** is correct.
DISCUSSION: When departing behind a large aircraft,

manoeuvring the aircraft.

A. Below and downwind from the heavy aircraft.
B. Above and upwind from the heavy aircraft.
C. Below and upwind from the heavy aircraft.

note the large aircraft ; rotation point, rotate prior to it, continue to climb above it and request permission to deviate upwind of the large aircraft's climb path until turning clear of the aircraft wake.

84. The four forces acting on an airplane in flight are

A. Lift, weight, thrust, and drag.
B. Lift, weight, gravity, and thrust.
C. Lift, gravity, power, and friction

Answer **(A)** is correct.
DISCUSSION: lift, weight, thrust, and drag, are the four basic aerodynamic forces acting on an aircraft in flight.

85. What is the relationship of lift, drag, thrust, and weight when the airplane is in straight-and-level-flight?

A. Lift equals weight and thrust equals drag.
B. Lift, drag, and weight equal thrust.
C. Lift and weight equal thrust and drag.

Answer **(A)** is correct
DISCUSSION: Lift and thrust are considered positive force, while weight and drag are considered negative force and the sum of the opposing forces is zero that is, lift = weight and thrust = drag

86. What is the purpose of the rudder on an airplane ?

A. To control yaw.
B. To control overbanking tendency.
C. To control roll.

Answer **(A)** is correct.
DISCUSSION: The purpose of the rudder is to control yaw.

87. When are the four forces that act on an airplane in equilibrium ?

A. During un-accelerated flight.
B. When aircraft is accelerating.
C. When the aircraft is at rest on the ground.

Answer **(A)** is correct.
DISCUSSION: in un-accelerated (steady state) flight the opposing forces are in equilibrium.

88. What the relationship of lift , drag ,thrust ,and weight when the airplane is in straight-and-level flight?

A. Lift equals weight and thrust equals drag.
B. Lift Drag and weight equal thrust.
C. Lift and weight equal thrust and drag.

Answer **(A)** is correct
DISCUSSION: the four aerodynamic forces are lift , weight , Thrust , and drag . They are in equilibrium during straight and level , un-accelerated flight ; lift equals weight and thrust equals drag .

89. How will frost on the wings of an airplane affect take off performance ?

A. Frost will disrupt the smooth flow of air over the wings, adversely affecting its lifting capability
B. Frost will change the camber of the wing, increasing its lifting capability.
C. Frost will cause the airplane to become airborne with a higher angle of attack, decreasing the stall speed

Answer **(A)** is correct
DISCUSSION: Frost forms on airplane surfaces when the surface is at or below the dew point of the surrounding air and it will disrupt the smooth flow of air over the wings , adversely affecting its lifting capability .

90. In what flight condition is torque effect the greatest in a single-engine airplane ?

A. Low airspeed, high power, high angle of attack
B. low airspeed , low power, low angle of attack.
C. High airspeed, high power, high angle of attack.

Answer **(A)** is correct
DISCUSSION: Torque effect is greatest in a single engine airplane during a low airspeed , high power flight condition .

91. The left turning tendency of an airplane caused by P-factor is the result of the

A. Clockwise rotation of the engine and the propeller turning the airplane counter clockwise.
B. Propeller blade descending on the right, producing more thrust than the ascending blade on the left,
C. Gyroscopic forces applied to the rotating propeller blades acting 90°in advance of the point the force was applied.

Answer **(B)** is correct
DISCUSSION: P-factor results from the descending propeller Blade on the right producing more thrust than the ascending blade on the left . P-factor causes an airplane to yaw to the left when it is at high angles of attack .

92. When does P-factor cause the airplane to yaw to the left ?

A. When at low angles of attack.
B. When at high angles of attack.
C. When at high airspeeds.

Answer **(B)** is correct
DISCUSSION: Asymmetrical thrust occurs when an airplane is flown at a high angle of attack . This causes un even angle of attack between the ascending and descending propeller blades . P-factor causes an airplane to yaw to the left when It is at high angles of attack .

93. What determines the longitudinal stability of an airplane ?

A. The location of the CG with respect of the centre of lift .
B. The effectiveness of the horizontal stabilizer, rudder, and rudder trim tab.
C. The relationship of thrust and lift to weight and drag.

Answer **(A)** is correct
DISCUSSION: The position of the centre of gravity in relation to the centre of lift is a critical factor in longitudinal stability .

94. (Refer to figure 3) If an airplane weighs 1,600 pounds, what approximate weight would the airplane structure be required to support during a 60° banked turn while maintaining altitude?

A. 2,300 pounds.
B. 3,200 pounds.
C. 2,600 pounds

Answer **(B)** is correct
DISCUSSION: With a 60° bank , two G's are required to maintain level flight . This means the airplane's wings must Support twice the weight of the airplane and its contents , although the actual weight of the airplane does not increase .

95. (Refer to figure 3) If an airplane weighs 3,300 pounds, what approximate weight would the airplane structure be required to support during a 30° banked turn while maintaining altitude?

A. 1,200 pounds.
B. 3,100 pounds.
C. 3,960 pounds.

Answer **(C)** is correct
DISCUSSION: 3300 × 1.2 = 3960 lbs
1. Enter the table at a given bank angle (30°)
2. Proceed vertically up to the reference line
3. Proceed horizontally to the load factor
4. airplane weights × load factor =the airplane wings support
5. 3,300 × 1.2 = 3,960 lbs

96. (Refer to figure 3) If an airplane weighs 4,500 pounds, what approximate weight would the airplane structure be required to support banked during a 45° turn while maintaining altitude?

A. 4,500 pounds
B. 6,750 pounds
C. 7,200 pounds

Answer **(B)** is correct
DISCUSSION:
1. Enter the table at a given bank angles (45°)
2. Proceed vertically up to the reference line
3. proceed horizontally to the load factor
4. 4,500 × 1.5 = 6750 lbs

97. The amount of excess load that can be imposed on the wing of an airplane depends upon the

A. Position of the CG.
B. Speed of the Airplane.
C. Abruptness at which the load is applied.

Answer **(B)** is correct
DISCUSSION: The higher the airspeed , the greater the amount of excess load that can be imposed before a stall occurs . the Amount of excess load that can be imposed on an airframe depends on the airplane's speed .

98. Which basic flight manoeuvre increases the load factor on an airplane as compared to straight-and-level flight?

A. Climbs.
B. Turns.
C. Stalls.

Answer **(B)** is correct
DISCUSSION: The load factor imposed on an airplane will Increase as the angle of bank is increased .

99. One of the main functions if flaps during approach and landing is to

A. Decrease the angle of descent without increasing the airspeed.
B. Permit a touchdown at a higher indicated airspeed.
C. Increase the angle of descent without increasing the airspeed.

Answer **(C)** is correct
DISCUSSION: Flaps allows you to steepen the angle of descent on an approach without increasing airspeed .

100. What is one purpose of wing flaps ?

A. To enable the pilot to make steeper approaches to a landing without increasing the airspeed.
B. To relive the pilot of maintaining continuous pressure on the controls.
C. To decrease wing area to vary the lift.

Answer **(A)** is correct
DISCUSSION: An approach with full flaps permits you to fly slowly and at a fairly steep descent angle without gaining airspeed .

101. In what flight condition must an aircraft be placed in order to spin ?

A. Partially stalled with one wing low
B. In a steep diving spiral.
C. Stalled.

Answer **(C)** is correct
DISCUSSION: To enter a spin , an airplane must first be stalled . in a spin , both wings are in a stalled condition .

102. During a spin to the left which wing(s) is/are stalled ?

Answer **(A)** is correct
DISCUSSION: In a spin , both wings are in a stalled condition .

A. Both wings are stalled.
B. Neither wing is stalled.
C. Only the left wing is stalled.

103. The angle of attack at which an airplane wing stall will

A. Increase if the CG is moved forward
B. Change with an increase in gross weight
C. Remain the same regardless of gross weight.

Answer **(A)** is correct
DISCUSSION: If you load your airplane so the CG is forward of the forward CG limit , it will be too nose heavy . Although this tends to make the airplane seem stable , adverse side effects include longer take off distance and higher stalling speeds.

104. What is ground effect ?

A. The result of the interference if the surface of the Earth with the airflow patterns about an airplane
B. The result of an alteration in airflow patterns Increasing induced drag about the wing of an airplane .
C. The result of the disruption of the airflow patterns about the wings of an airplane to the point where the wings will no longer support the airplane in flight.

Answer **(A)** is correct
DISCUSSION: During take offs or landings **,** when you are flying very close to the ground , the earth's surface interferes with the airflow and actually alters the three-dimensional airflow pattern around the airplane . This causes a reduction in wingtip vortices and a decrease in up wash and downwash.

105. Floating caused by the phenomenon of ground effect will be most realized during an approach to land when at

A. Less than the length of the wingspan above the surface
B. Twice the length of the wingspan above the surface
C. A higher-than-normal angle of attack.

Answer **(A)** is correct
DISCUSSION: an airplane is usually in ground effect when it is less than the height of the airplane's wing span above the surface .

106. What must a pilot be aware of as a result of ground effect ?

A. Wingtip vortices increase creating wake turbulence problems for arriving and departing aircraft.
B. Induced drag decreases; therefore any excess speed at the point of flare may cause considerable floating.
C. A full stall landing will require less up elevator deflection than would a full stall when done free of ground effect.

Answer **(B)** is correct
DISCUSSION: In ground effect , induced drag decreases , and excess speed in the flare may cause floating .

107. When taxing with strong quartering tailwind which aileron positions should be side

A. Aileron down on the downwind side
B. Ailerons neutral
C. Aileron down on the side from which the wind is Blowing .

Answer **(C)** is correct
DISCUSSION: the most critical situation is when you are taxiing a tricycle-gear airplane with a high wing in a strong quartering tail wind . Aileron down on the side from which the wind is blowing .

108. What force provides the forward motion necessary to move a glider through the air ?

A. Lift.
B. Centripetal Force.
C. Gravity.

Answer **(C)** is correct
DISCUSSION: In a descent , a component of weight (gravity) acts forward along the flight path .

109. Wing tip vortices have the highest intensity during:

A. Take-off.
B. Cruise.
C. High speed.

Answer **(A)** is correct
DISCUSSION: The strength of the tip vortices is proportionate to the angle of attack. At take-off the speed is very low requiring a high Angle of attack to obtain lift, an angle larger than in a turn within limitations.

110. At the tip of the wing in level flight, the air flows:

A. From the upper surface to the lower surface.
B. From the lower surface to the upper surface and then down at the trailing edge.
C. From the lower surface to the upper surface and then diverges away from the fuselage.

Answer **(B)** is correct
DISCUSSION: Air has a neutral tendency to stream from higher to lower pressure. The wing in level flight will have a low pressure on the top surface and a higher pressure on the bottom surface. Consequently, there will be a flow from the lower surface to the upper surface. The air streaming over the wing because of the motion has to be added giving the flow a swirling moment that causes a downwash behind the wing.

111. When are the wing tip vortices created?

A. When the airplane starts.
B. When the wing produces lift.
C. Only in airplanes with a short wing span.

Answer **(B)** is correct.
DISCUSSION: the tip vortices are formed when the pressure difference between upper and lower surface of the wing exists, which is when lift is produced.

112. A high aspect ratio wing produces:

A. A decrease in induced drag.
B. Less sensitivity to gust effects.
C. A decrease in stall speed.

Answer **(A)** is correct.
DISCUSSION: At a given angle of attack, a higher aspect ratio produces less induced drag for the same amount of lift.

113. The principal cause of hazardous conditions associated with the wake turbulence of large airplanes is the:

A. High speed at which large aircraft operate.
B. Vortices generated at the wing tips.
C. Propeller or jet wash.

Answer **(B)** is correct.
DISCUSSIO: the danger associated with wake turbulence is from the tip vortices that extend up to 9 NM behind the airplane.

114. Vortex wake behind large airplane:

A. Stays at ground level.
B. Gradually descends to ground level.
C. Gradually descends to a lower level.

Answer **(C)** is correct.
DISCUSSION: Trailing vortices tend to drift slowly downward and level off between 500 and 1,000 feet below the flight path of the aircraft.

115. During the take-off made behind a departing large airplane, The pilot can minimise the hazard of wake turbulence by:

A. Extend the take-off roll and not rotating until well beyond the jet's rotation point.

Answer **(C)** is correct.
DISCUSSION: The wake turbulence starts when the aircraft rotates, and the vortices tend to drift downwards. To avoid encountering a preceding airplane's wake turbulence, take-off should be before the other aircraft's rotation point and climb

B. Maintaining extra speed on take-off and climb out.
C. Being airborne prior to reaching the jet's rotation point and climbing above its flight path.

Above its flight path.

116. Induced drag is greatest:

A. At the wingtip.
B. At the wings root.
C. At high speeds.

Answer **(A)** is correct.
DISCUSSION: Induced drag associated with the production of lift. It is directly related to angle of attack and increases as angle of attack increases. Normally, induced drag decreases as airspeed increases.

117. For an aircraft in level flight, induced drag:

A. Would be less if the aspect ratio was increased.
B. Would be greater if the aspect ratio was increased.
C. Would be less if the weight was increased.

Answer **(A)** is correct.
DISCUSSION: At a given angle of attack, a higher aspect ratio produces less drag for the same amount of lift.

118. Induced drag of an aircraft would be increased with:

A. Increased speed.
B. Increased weight.
C. Increased aspect ratio.

Answer **(B)** is correct.
DISCUSSION: Increased weight means increased lift required. maintaining speed the only way to increase lift is to increase the angle of attack to get a higher value of lift coefficient.

119. Induced drag is caused by:

A. Increased pressure at the leading edge stagnation point.
B. Wing mounted fuel tanks.
C. Wing tip vortices and downwash.

Answer **(C)** is correct.
DISCUSSION: in aerodynamics, lift-induced drag, induced drag vortex drag, or sometimes drag due to lift, is a drag force that occurs Whenever a moving object redirects the airflow coming at it. This drag force occurs in airplanes due to wings. With other Parameter remaining the same, as the angle of attack increases, Induced drag increases.

120. With flaps deployed, at a constant IAS in straight and level flight, the magnitude of tip vortices:
.

A. Increases.
B. Increases or decreases depending upon the initial angle of attack.
C. Decreases.

Answer **(C)** is correct.
DISCUSSION: deployment of flaps increases coefficient of lift. to maintain level flight the wing angle of attack has to be decreased. lower angle of attack means weaker tip vortices.

121. What phenomena causes induced drag?

A. Wing tip vortices.
B. Wing tanks.
C. The increased pressure at the leading edge.

Answer **(A)** is correct.
DISCUSSION: when you are flying in ground effect, the effects of up-wash, downwash, and wing tip vortices decrease. This results in a reduction of induced drag.

122. Which location on the aeroplane has the largest effect on the induced drag.

A. Wing root junction.
B. Engine cowling.
C. Wing tip.

Answer **(C)** is correct.
DISCUSSION: the wing tip vortices form as higher pressure air below the wing spills in to the area of lower pressure above the wing causing the airflow behind the wing to be forced downwards (downwash). The downwash causes the airflow direction at the centre of pressure to be deflected and thus tilting the total reaction And the horizontal component – in opposite direction to the

moment is induced drag.

123. The relationship between induced drag and the aspect ratio is:

A. A decrease in the aspect ratio increases the induced drag.
B. There is no relationship.
C. Induced drag = 1,3 aspect ratio value.

Answer **(A)** is correct.
DISCUSSION: a decrease in aspect ratio means a larger total drag and induced drag.

124. Induced drag at constant IAS is affected by:

A. Engine thrust.
B. Aeroplane weight.
C. Aeroplane wing location.

Answer **(B)** is correct.
DISCUSSION: the airplane weight is equal to the lift, and at a certain speed this means flying the certain angle of attack. more weight at the same speed requires a larger angle of attack, and a larger angle of attack gives more induced drag.

125. The angle between the aeroplane longitudinal axis and the chord line is the:

A. Angle of incidence.
B. Glide path angle.
C. Angle of attack.

Answer **(A)** is correct.
DISCUSSION: Once the design of the wing is determined, the wing must be mounted on the airplane. Usually it is attached to the fuselage with the chord line inclined upward at a slight angle, which is called the angle of incidence.

126. The term angle of attack is defined as:

A. The angle that determines the magnitude of the force.
B. The angle between the wing chord line and the relative wind.
C. The angle between the relative airflow and the horizontal axis.

Answer **(B)** is correct.
DISCUSSION: The angle formed by the wing chord line and relative wind is called the angle of attack.

127. The airfoil chord is:

A. A straight line from the wing leading edge to the trailing edge.
B. A line equidistant from the upper and lower wing surfaces.
C. A line tangential to the wing surface at the point of maximum curvature.

Answer **(A)** is correct.
DISCUSSION: The chord line is an imaginary straight line drawn through an airfoil from the leading edge to the trailing edge.

128. The angle between the chord line of the wing and the longitudinal Axis of the airplane is known as the angle of:

A. Attack.
B. Relative wind.
C. Incidence.

Answer **(C)** is correct.
DISCUSSION: angle of incidence is the angle between the chord line and a line parallel to the longitudinal axis of an airplane. you cannot control this angle.

129. The aspect ratio of the wing:

A. Is the ratio between the wingspan and the root chord.
B. Is the ratio between the wingspan and the mean geometric chord.
C. Is the ratio between the tip chord and the wingspan.

Answer **(B)** is correct.
DISCUSSION: Aspect ratio is the span of the wing, wingtip to wingtip, divided by its average chord.

130.Drag is acting in the direction of …….; lift is perpendicular to the……..

A. Chord line.
B. Relative wind (airflow).
C. Horizon.

Answer **(B)** is correct.
DISCUSSION: Lift is always perpendicular to the direction of movement and drag is in the opposite direction to the movement. Relative wind/airflow is the direction of movement.

131.Bernoulli's theorem states:

A. Dynamic pressure increases and static pressure increases.
B. Dynamic pressure increases and static pressure decreases.
C. Dynamic pressure is maximum at stagnation point.

Answer **(B)** is correct.
DISCUSSION: Bernoulli's principle explains how air pressure deceases as velocity increases.

132. The angle between the airflow (relative wind) and the The chord line of an aerofoil is:

A. Climb path angle.
B. Glide path angle.
C. Angle of attack.

Answer **(C)** is correct.
DISCUSSION: The angle formed by the wing chord line and relative wind is called the angle of attack.

133.Which of the following statements are correct?

A. Drag acts in the same direction as the relative airflow and lift perpendicular to it.
B. Lift acts at right angles to the top surface of the wing and drag acts at right angles to lift.
C. Drag acts parallel to the chord and opposite to the direction of motion of the aircraft and lift acts perpendicular to the chord.

Answer **(A)** is correct.
DISCUSSION: Lift is always perpendicular to the direction of movement and drag is in the opposite direction to the movement. relative wind/airflow is the direction of movement.

134. Dihedral of the wing is:

A. The angle between the leading 0,25 chord line of the wing and the vertical axis.
B. The angle between the leading edge of the wing and the lateral axis.
C. The angle between the plane of the wing and the lateral axis.

Answer **(C)** is correct.
DISCUSSION: Dihedral is the upward angle of the airplane's wings with respect to the horizontal (lateral axis).

135. Which one of the following statements about Bernoulli's theorem is correct?

A. The dynamic pressure is maximum in the stagnation point.
B. The dynamic pressure decreases as static pressure decreases.
C. The dynamic pressure increases as static pressure.

Answer **(C)** is correct.
DISCUSSION: As the velocity of a fluid (air) increases, its internal pressure decreases.

136.A wing has a span of 50 feet and an area of 200 square feet . Its mean chord would be:

A. 4 feet
B. 10 feet

Answer **(A)** is correct.
DISCUSSION: From the formula wing area = span × chord, the chord can be found as: chord = area ÷ span = 200 ÷ 50 = 4

C. 7,5 feet.

137. Aspect ratio is:

A. The ratio of the mean chord to the maximum wing thickness
B. The ratio of the wingspan to the square of the mean chord.
C. The ratio of the wing span to the mean chord.

Answer **(C)** is correct.
DISCUSSION: aspect ratio is the span of the wing, wingtip to wingtip ,divided by its average chord.

138.A wing has a span of 64 m and an area of 525 square metres. The means chord is:

A. 7,8 m
B. 0,12m
C. 8,2 m.

Answer **(C)** is correct.
DISCISSION: wing area is span multiplied by chord or S = b × c, Where "S' is wing area, "b" the span, and "c" the mean chord. to find the mean chord rewrite the equation to : c = S ÷ b, and in this case: c = 525 ÷ 64 = 8,2

139.A wing would be said to be swept back if:

A. The wing tips were lower than the wing roots.
B. The tip chord was less than the root chord.
C. The quarter chord line was inclined backward from the lateral axis.

Answer **(C)** is correct.
DISCUSSION: The sweep angle is usually measured as the angle between the line of 25% chord and a perpendicular to the root chord.

140.A wing has a span of 30 m and an area 300 square metres. The aspect ratio is:

A. 3:1
B. 10:1
C. 30:1

Answer **(A)** is correct.
DISCUSSION: The aspect ratio of a wing is defined as the ratio between wingspan and the average chord. the average chord is the same as the mean geometric chord. informally, a high aspect ratio indicates long, narrow wings, whereas a low aspect ratio indicates short, stubby wings.
Aspect ratio = $(\text{wingspan})^2 \div$ wing area or
aspect ratio = wing span ÷ mean chord. in this case we get AR = $(30\text{m})^2 \div 300\text{m}^2 = 900 \div 300 = 3;1$.

141. A wing has a mean chord of 6 metres and a span of 30 metres. The aspect ratio is:

A. 5 to 1
B. 30 to 1
C. 180 to 1

Answer **(A)** is correct.
DISCUSSION: The aspect ratio of a wing is defined as the ratio between wingspan and the average chord. The average chord is the same as the mean geometric chord. informally, a high aspect ratio indicates long, narrow wing, whereas a low aspect ratio indicates short, stubby wings.
AR = 30 m ÷ 6 m = 5:1.

142. A swept wing:

A. Produces more lift at a given angle of attack than an equivalent straight wing.
B. Reaches the critical angle of attack before an equivalent straight wing.
C. Produces less lift at a given angle of attack than an equivalent straight.

Answer **(C)** is correct.
DISCUSSION: The sweptback and delta wings used on higher performance aircraft are efficient at high speeds, so produces less lift at a given angle of attack than an equivalent straight

143. Which of the following is the correct definition of aspect ratio?

Answer **(C)** is correct.
DISCUSSION: aspect ratio is defined as the ratio between

A. Span divided by tip chord.
B. Chord divided by span.
C. Span divided by mean chord.

span and average chord.

144.The force, which acts at right angles to the relative airflow, is:

A. Thrust
B. Total reaction.
C. Lift.

Answer **(C)** is correct.
DISCUSSION: Of the offered choices the lift force is the only one acting perpendicular to the relative airflow

145.Angle of attack of an aerofoil is:

A. The angle between the camber line and the relative airflow.
B. The angle between the chord line and the relative airflow.
C. The angle between the incidence line and the relative airflow.

Answer **(B)** is correct
DISCUSSION: The angle formed by the wing chord line and relative wind is called the angle of attack.

146.Which ratio is defined as the ‘’aspect ratio” of a wing?

A. Ratio between wing span and gross wing area.
B. Ratio between span and mean chord.
C. Ratio between the span and the square of the gross wing area.

Answer **(B)** is correct.
DISCUSSION: Aspect ratio is the relationship between the length and width of a wing

147.The characteristics of a “high aspect ratio” wing area:

A. Short chord, long span.
B. Long span, long chord.
C. Long chord, short span.

Answer **(A)** is correct.
DISCUSSION: In general, the higher the aspect ratio, the higher the lifting efficiency of the wing. For example , short chord and long span.

148. Bernoulli's theorem states that in a perfect and constant airstream:

A. The sum of static and dynamic pressure is constant.
B. The dynamic pressure is equal to the static pressure.
C. The dynamic pressure is always greater than the static pressure.

Answer **(A)** is correct.
DISCUSSION: Bernoulli's theorem states that, the sum of static and dynamic pressure is constant.

149. Of the total lift produced by the wing:

A. The lower surface produces the greater proportion.
B. The upper and lower surfaces always give equal proportions of the lift.
C. The upper surface produces the greater proportion at at all speeds.

Answer **(C)** is correct.
DISCUSSION: The pressure distribution around a wing profile is shown on the illustration. It is quite obvious that the low pressure on the upper side is contributing more to the lift than the high pressure below the wing.

150.Downwsh is:

A. The decreases in the angle of incidence from root to tip of the wing.

Answer **(C)** is correct.
DISCUSSION: As air flows towards an aerofoil producing lift it will be turned towards the lower pressure at the upper surface (up-wash). After passing over the aerofoil the airflow returns to

B. The higher speed airspeed behind the propeller.
C. The downward deflection of the airflow behind the wing.

Its original position and state (down wash).

151. As the air flows over the upper surface of a wing:

A. Its speed increases and total pressure decreases.
B. Its speed increases and static pressure decreases.
C. Its speed decreases and static pressure decreases.

Answer **(B)** is correct.
DISCUSSION: Because of the curvature of the wing the air on the top has to travel a longer distance. the speed must therefore increase. According to Bernoulli's equation, higher velocity means lower static pressure.

152. The angle of attack of a wing controls the:

A. Amount of airflow.
B. Point at which the centre of gravity is located.
C. Distribution of positive and negative pressure acting on the wing.

Answer **(C)** is correct.
DISCUSSION: The angle of attack determines the pressure pressure distribution of positive and negative pressure acting on the wing.

153. At zero angle of attack in flight, a symmetrical wing section will produce:

A. Some lift and drag.
B. Zero lift with some induced and profile drag.
C. Zero lift with some drag.

Answer **(C)** is correct.
DISCUSSION: A symmetrical aerofoil at $\alpha = 0°$ has a symmetrical pressure distribution which means no lift is produced. However, there will still be a certain amount of parasite drag (friction and form drag).

154. Which of the following statements about the lift to drag ratio in straight and level flight is correct?

A. At the highest value of the lift/drag ratio the total drag is lowest.
B. The highest value of the lift/drag ratio is reached when the lift is zero.
C. The lift/drag ratio always increases as the lift decreases.

Answer **(A)** is correct.
DISCUSSION: When considering that in straight and level flight they must be equal to the weight and thus constant, the highest value of L/D must be when the total drag is at its minimum.

155. If the weight of an aircraft is increased, the maximum lift/drag ratio will:

A. Decrease.
B. Increase.
C. Not be affected.

Answer **(C)** is correct.
DISCUSSION: The lift/drag ratio, two quantities only depending on profile and aspect ratio. Consequently, the maximum value is independent of weight.

156. Lift of a wing is increased by:

A. An increase in the temperature of the atmosphere.
B. An increase in the pressure of the atmosphere.
C. An increase in the humidity of the atmosphere.

Answer **(B)** is correct.
DISCUSSION: In the lift equation, the density varies with temperature, pressure and humidity. Higher temperature or higher humidity means decreased density and hence decrease in the lift when the other factors are unchanged. A higher pressure means an increased density and increase lift.

157. The effect of increasing aspect ratio is to:

A. Increase the maximum lift/drag ratio.
B. Decrease the maximum lift/drag ratio.
C. Not affect the maximum lift/drag ratio.

Answer **(A)** is correct.
DISCUSSION: when the aspect ratio increasing, that causes increase the maximum lift/drag ratio.

158. If the weight of the aircraft is increased, the maximum lift/drag ratio will:

A. Decrease.
B. Increase.
C. Remain the same but occur at a higher speed.

Answer **(C)** is correct.
DISCUSSION: However, to fly the maximum L/D means flying with a specific angle of attack, so a higher weight require a higher weight requires a higher speed to maintain the lift. The drag therefore also increases, but the L/D remains the same.

159. Maximum glide distance of an aircraft is obtained when:

A. Induced drag is equals the coefficient of lift.
B. Induced drag and parasite drag are equal.
C. Parasite drag is the least.

Answer **(B)** is correct.
DISCUSSION: Maximum gliding distance is obtained when is L/D maximum, or where the total drag is minimum. This is when induced and parasite drag are equal.

160. The effects of increased pressure would be:

A. Increased lift and drag.
B. Decreased lift and drag.
C. Have no effect on lift and drag.

Answer **(A)** is correct.
DISCUSSION: Since the density of air is proportional with the static pressure an increase in pressure will increase the density; so increase lift and drag.

161. Coefficient of lift varies with:

A. Pressure.
B. Density.
C. Angle of attack.

Answer **(C)** is correct.
DISCUSSION: Lift coefficient varies with angle of attack.

162. If indicated airspeed and angle of attack are kept constant and density decreases, the lift:

A. Increases.
B. Decreases.
C. Remain constant.

Answer **(C)** is correct.
DIASCUSSION: From the lift equation it is evident, that if the IAS is is kept constant, the dynamic pressure is also constant. A decrease in density at constant IAS means a higher TAS, but the dynamic pressure remains the same. The lift coefficient depends on angle of attack, and the remains constant with unchanged angle of attack. in total , all factors in the formula (lift equation) are not changed and the lift remains constant.

163. A high aspect ratio wing:

A. Increase induced drag.
B. Decrease induced drag.
C. Is structurally stiffer than a low aspect ratio.

Answer **(B)** is correct.
DISCUSSION: The tip vortices of a high aspect ratio wing affect a smaller proportion of the span so the overall change in downwash will be less, giving a smaller rearward tilt to the lift force. induce drag therefore decreases as aspect ratio increases.

164. As fuel is consumed during a level flight cruise at high level:

A. The angle of attack must be increased.
B. The stalling speed will increase.
C. The centre of pressure will move forward.
D. The angle of attack must be decreased.

Answer **(D)** is correct.
DISCUSSION: The fuel consumed will decrease the total weight of the aircraft. To maintain level flight the angle of attack can therefore be decreased which in turn decreases the induced drag.

165. Induced drag is created by the:

A. Separation of the boundary layer over the wing.
B. Interference of the air stream between wing and fuselage.
C. Span-wise flow pattern resulting in the tip vortices.

Answer **(C)** is correct.
DISCUSSION: Induce drag is associated with the production of lift. It is directly related to angle of attack and increases as angle of attack increases. such as, spanwise flow pattern resulting in the tip vortices (induced drag).

166.At a constant IAS, induced drag is affected by:

A. Aircraft weight.
B. Changes in thrust.
C. Winglets.

Answer **(A)** is correct.
DISCUSSION: Induced drag depends on the angle of attack, and with a constant IAS in level flight the angle of attack is constant. however, if the weight changes the lift must be change correspondingly by adjusting the angle of attack.

167. Which of the following is the cause of wing tip vortices?

A. Air spilling from the top surface to the bottom surface at the wing tip.
B. Air spilling from the bottom surface to the top surface at the wing tip.
C. Air spilling from the bottom surface to the top surface at the left wing tip and from the top. Surface to the bottom surface at the right wing tip.

Answer **(B)** is correct.
DISCUSSION: On the upper side of the wing there is a lower static pressure the ambient pressure causing the airflow to move toward the wing roots whilst the higher pressure underside gives a movement towards the tip. At the wing tip the higher pressure under the wing has a possibility of moves towards the lower pressure on top, but adding the aircraft velocity results in a swirling motion creating the tip vortex.

168. High aspect ratio:

A. Reduces parasite drag.
B. Reduces induced drag.
C. Increases stalling speed.

Answer **(B)** is correct.
DISCUSSION: An increase in aspect ratio means a smaller total drag, because less induced drag exist.

169. Induced drag may be reduced by:

A. An increase in the taper ratio of the wing.
B. An increase in aspect ratio.
C. A decrease of the aspect ratio.

Answer **(B)** is correct.
DISCUSSION: Increased aspect ratio thus means decreased induced drag.

170. The induced drag:

A. Increases as the lift coefficient increase.
B. Increases as the aspect ratio increases.
C. Has no relation to the lift coefficient.

Answer **(B)** is correct.
DISCUSSION: increased aspect ratio thus means decreased induced drag.

171. A wing is said to be tapered if:

A. It is inclined upwards from root to tip.
B. The chord at the wing tip is less than the chord at the root.
C. The incidence at the tip is less than at the root.

Answer **(B)** is correct.
DISCUSSION: Taper ratio is defined as the root chord divided by the tip chord. consequently, a tapered wing will have a smaller chord at the tip than at the root.

INTENTIONALLY

LEFT

BALNK

CHAPTER 2

THE FLIGHT ENVIRONMENT

- **Safety of Flight**
- **Airports**
- **Airspace**
- **Radio Communications**
- **Radar and ATC Services**

1. How can you determine If another aircraft is on a collision course with your aircraft ?

A. The other aircraft will always appear to get larger and closer at a rapid rate.
B. The nose of each aircraft is pointed at the same point in space.
C. There will be no apparent relative motion between your aircraft and the other aircraft.

Answer **(C)** is correct.
DISCUSSIN: Any aircraft that appears to have no relative motion and stays in one scan quadrant is likely to be on a collision course.

2. What preparation should a pilot make to adapt the eyes for night flying ?

A. Wear sunglasses after sunset until ready for flight.
B. Avoid red lights at least 30 minutes before the flight.
C. Avoid bright white lights at least 30 minutes before the flight.

Answer **(C)** is correct.
DISCUSSION: Exposure to total darkness for at least 30 minutes is required for complete dark adaptation. Any degree of dark adaptation is lost within a few seconds of viewing a bright light. Red lights do not affect night vision.

3. Except in Alaska, during what time period should lighted position lights be displayed on an aircraft ?

A. End of evening civil twilight to the beginning of morning civil twilight.
B. 1 hour after sunset to 1 hour before sunrise.
C. Sunset to sunrise.

Answer **(C)** is correct.
DISCUSSION: an aircraft must display lighted position lights from sunset to sunrise

4. During a night flight, you observe a steady red light and a flashing red light ahead and at the same altitude. What is the general direction of movement of the other aircraft ?

A. The other aircraft is crossing to the left.
B. The other aircraft is crossing to the right.
C. The other aircraft is approaching head-on.

Answer **(A)** is correct.
DISCUSSION: Airplanes have a red light on the left wing tip, a green light on the right wing tip and a white light on the tail. The flashing and red light is the rotating beacon which can be seen from all directions around the aircraft. If the only steady light seen is red, then airplane is crossing from right to the observing pilot.

5. During a night flight, you observe a steady white light and a flashing red light ahead and at the same altitude. what is the general direction of movement of the other aircraft ?

A. The other aircraft is flying away from you.
B. The other aircraft is crossing to the left.
C. The other aircraft is crossing to the right.

Answer **(A)** is correct.
DISCUSSION: Airplanes have a red light on the left wing tip, a green light on the right wing tip and a white light on the tail. The flashing and red light is the rotating beacon which can be seen from all directions around the aircraft. when the only steady light seen is white, then the airplane is head away from the observing pilot.

6. During a night flight, you observe steady red and green lights ahead and at the same altitude. What is the general direction of movement of the other aircraft ?

A. The other aircraft is crossing to the left.
B. The other aircraft is flying away from you.
C. The other aircraft is approaching head-on.

Answer **(C)** is correct.
DISCUSSION: When both a red and green light of another of airplane are observed, the airplane would be flying in general direction toward you. Airplanes have a red light on the left wing tip, a green light on the right wing tip and a white light the tail.

7. The best method to use when looking for other traffic at night is to

A. Look to the side of the object and scan slowly.

Answer **(A)** is correct.
DISCUSSION: During daylight, an object can be seen best by looking directly at it, but at night, a scanning procedure to permit “off-center” viewing of the object is more affective.

B. Scan the visual field very rapidly.
C. Look to the side of the object and scan rapidly.

In addition, the pilot should consciously practice moving the eyes more slowly than in daylight to optimize night vision. Off-center viewing must be utilized during night flying because of the distribution of rods and cones in the eye.

8. The most effective method of scanning for other aircraft for collision avoidance during nighttime hours is to use

A. Regularly spaced concentration on the 3-, 9- and 12-o clock position
B. A series of short, regularly spaced eye movements to search each 30-degree sector
C. Peripheral vision by scanning small sectors and utilizing off center viewing.

Answer **(C)** is correct.
DISCUSSION: During daylight, an object can be seen best by looking directly at it, but at night, a scanning procedure to permit "off-center" viewing of the object is more effective. In addition, the pilot should consciously practice moving the eye more slowly than in daylight to optimize night vision. Off-center viewing must be utilized during night flying because of the distribution of rods and cones in the eye.

9. What affect does haze have on the ability to see traffic of terrain features during flight ?

A. Haze causes the eyes to focus at infinity.
B. The eyes tend to overwork in haze and do not detect relative movement easily.
C. All traffic or terrain features appear to be farther away than their actual distance.

Answer **(C)** is correct.
DISCUSSION: Atmospheric haze can create the illusion of being at a greater distance from objects on the ground and in the air.

10. The most effective method of scanning for other aircraft for collision avoidance during daylight hours is to use.

A. Regularly spaced concentration on the 3-, 9-, and 12-o'clock positions.
B. A series of short, regularly spaced eye movements to search each 10-degree sector off center viewing.
C. Peripheral vision by scanning small sectors and utilizing off center viewing.

Answer **(B)** is correct.
DISCUSSION: Effective scanning is accomplished with a series of short, regularly spaced eye movements that bring successive areas of the sky into the central visual field. Each movement should not exceed 10°, and each area should be observed for at least one second to enable detection.

11. Which technique should a pilot use to scan for traffic to the right and left during straight-and-level flight ?

A. Systematically focus on different segments of the sky for short intervals.
B. Concentrate on relative movement detected in the peripheral vision area.
C. Continuous sweeping of the windshield from right to left.

Answer **(A)** is correct.
DISCUSSION: Effective scanning is accomplished with a series of short, regularly spaced eye movements that bring successive areas of the sky into the central visual field. Each movement areas of the sky into the central visual field. Each movement at least one second to enable detection.

12. Most midair collision accidents occur during

A. Hazy days.
B. Clear days.
C. Cloudy nights.

Answer **(B)** is correct.
DISCUSSION: The ICAO near Mid-Air Collision Report indicates that 81% of the incidents occurred in clear skies and unrestricted visibility conditions.

13. Prior to starting each maneuver, pilots should

A. Check altitude, airspeed, and heading indications.
B. Visually scan the entire area for collision avoidance.
C. Announce their intentions on the nearest CTAF.

Answer **(B)** is correct.
DISCUSSION: Scanning the sky for other aircraft is a key factor in collision avoidance.

14. What is the most effective way to use the eyes during night flight ?

A. Look only at far away, dim lights
B. Scan slowly to permit off center viewing.
C. Concentrate directly on each object for a few seconds.

Answer **(B)** is correct.
DISCUSSION: During daylight an object can be seen best by looking directly at it, but at night a scanning procedure to permit "off-center" viewing of the object is more effective. In addition, the pilot should consciously practice moving the eyes more slowly than in daylight to optimize night vision. off-center viewing must be utilized during night flying because of the distribution of rods and cones in the eye.

15. When taxing with strong quartering tailwinds, which aileron positions should be used ?

A. Aileron down on the downwind side.
B. Ailerons neutral.
C. Aileron down on the side from which the wind is blowing.

Answer **(C)** is correct.
DISCUSSION: Taxiing with a quartering tailwind provides the most hazardous conditions. In this case, the elevator should be in the down position and the aileron on the upwind side should also be in the down position to keep the wing from lifting.

16. Which aileron positions should a pilot generally use when taxing in strong quartering headwinds ?

A. Aileron up on the side from which the wind is blowing.
B. Aileron down on the side from which the wind is blowing.
C. Ailerons neutral.

Answer **(A)** is correct.
DISCUSSION: When taxiing a nose wheel aircraft in the presence of the moderate to strong winds, extra caution should taken. For a quartering headwind, the elevator should be held in the neutral position, and the aileron on the upwind side should be in the up position.

17. When approaching to land on a runway served by a visual approach slope indicator (VASI), the pilot shall

A. Maintain an altitude that captures the glide slope at least 2 miles downwind from the runway threshold.
B. Maintain an altitude at or above the glide slope.
C. Remain on the glide slope and land between the tow-light bar.

Answer **(B)** is correct.
DISCUSSION: An airplane approaching to land on a runway served by a visual approach indicator, shall maintain an altitude at or above the glide slope until a lower altitude is necessary for a safe landing.

18. A slightly high glide slope indication from a precision approach path indicator is

A. Four white lights.
B. Three white lights and one red lights.
C. Two white lights and two red lights.

Answer **(B)** is correct.
DISCUSSION: The precision approach path indicator (PAPI) uses light units similar to the VASI but are installed in a single row of either two or four light units. Four white lights means you are above the glide slope, three white lights and one red light means you are slightly high, two red and two white lights means you are on the glide slope, three reds and one white light means you are slightly low and four red lights means you are below the glide slope .

19. A below glide slope indication from a tri-color VASI is a

A. Red light signal.
B. Rink light signal.
C. Green light signal.

Answer **(A)** is correct.
DISCUSSION: A tri-color VASI normally is a single light unit projecting a three-color visual approach path. Below the glide path is red, on the glide path is green, and above the glide path is amber.

20. (Refer to figure 4) Illustration A indicates that the aircraft is

A. Below the glide slope.
B. On the glide slope.

Answer **(B)** is correct.
DISCUSSION: The two-bar VASI on-glide slope indication is red over white lights.

C. Above the glide slope.

21. (Refer to figure 4) VASI lights as shown by illustration C indicate that the airplane is

A. Off course to the left.
B. Above the glide slope.
C. Below the glide slope.

Answer **(B)** is correct.
DISCUSSION: The two-bar VASI above-glide slope indication is white over white lights.

22. (Refer to figure 4) While on final approach to a runway equipped with a standard 2-bar VASI, the lights appear as shown by illustration D. This means that the aircraft is

A. Above the glide slope.
B. Below the glide slope.
C. On the glide slope.

Answer **(B)** is correct.
DISCUSSION: The below-glide slope indication from a two-bar VASI is red over red lights.

23. An above glide slope indication from a tri-color VASI is

A. A white light signal.
B. A green light signal.
C. An amber light signal.

Answer **(C)** is correct.
DISCUSSION: A tri-color VASI normally is a single light unit projecting a three-color visual approach path. Below the glide path is red, on the glide path is green, and above the glide path is amber.

24. On a glide slope indication from a tri-color VASI is

A. A white light signal.
B. A green light signal.
C. An amber light signal.

Answer **(B)** is correct.
DISCUSSION: A tri-color VASI normally is a single light unit projecting a three-color visual approach path. Below the glide path is red, on the glide path is green, and above the glide path is amber.

25. A glide slope indication from a pulsating approach slope indicator is a

A. Pulsating white light.
B. Steady white light.
C. Pulsating red light.

Answer **(C)** is correct.
DISCUSSION: Pulsating visual approach slope indicators normally consist of a single light unit projecting a two-color visual approach path. The below-glide path indication is red or pulsating red. The one-glide path indication is a steady White light for one type of system, while for another system it is an alternating red and with light.

26. While operating in Class D airspace, each pilot of an aircraft approaching to land on a runway served by a visual approach slope indicator (VASI) shall

A. Maintain a 3° glide until approximately 1/2 mile to the runway before going below the VASI.
B. Maintain an altitude at or above the glide slope until a lower altitude is necessary for a safe landing.
C. Stay high until the runway can be reached in a power-off landing.

Answer **(B)** is correct.
DISCUSSION: An airplane approaching to land on a runway serve by a visual approach indicator, shall maintain an altitude at or above the glide slope until a lower altitude is necessary.

27. An airport's rotating beacon operated during daylight hours indicates.

Answer **(B)** is correct.
DISCUSSION: In Class B, C, D or E airspace, operation of the

A. There are obstructions on the airport.
B. That weather at the airport located in class D airspace is below basic VFR weather minimums.
C. The Air Traffic Control tower is not in operation.

airport beacon during the hours of daylight often indicates that the weather in the airspace is below basic VFR weather minimums (ground visibility is less than 3 miles and/or the ceiling is less than 1,000 feet).

28. Airport taxiway edge lights are identified at night by

A. White directional lights.
B. Blue Omni-directional lights.
C. Alternate red and green lights.

Answer **(B)** is correct.
DISCUSSION: A taxiway-edge lighting system consists of Omni-directional blue lights which outline the usable limits of taxi paths.

29. To set the high intensity runway lights on medium intensity the pilot should click the microphone seven times, and the click it

A. One time within four seconds.
B. Three times within three seconds.
C. Five times within five seconds.

Answer **(C)** is correct.
DISCUSSION: To save money at low-usage airports, pilot-controlled lighting is installed. Key the mike seven times to set the highest level, then adjust to medium with five clicks.

30. A lighted heliport may be identified by a

A. Green, yellow, and white rotating beacon.
B. Flashing yellow light.
C. Blue lighted square landing area.

Answer **(A)** is correct.
DISCUSSION: A lighted heliport has a green, yellow and white beacon flashing 30 to 60 times per minute. A flashing yellow light identifies a lighted water port.

31. A military air station can be identified by a rotating beacon that emits

A. White and green alternating flashes.
B. Two quick, white flashes between green flashes.
C. Green, yellow, and white flashes.

Answer **(B)** is correct.
DISCUSSION: Military airport beacons flash alternately white and green, but are differentiated from civil beacons by dual-peaked (two quick) white flashes between the green flashes.

32. How can a military airport be identified at night ?

A. Alternate white and green light flashes.
B. Dual peaked (two quick) white flashes between green flashes.
C. White flashing lights with steady green at the same location.

Answer **(B)** is correct.
DISCUSSION: Military airport beacons flash alternately white and green, but are differentiated from civil beacons by dual-peaked (two quick) white flashes between the green flashes.

33. (Refer to Figure 6) Select the proper traffic pattern and runway for landing.

A. Left-hand traffic and Runway 18.
B. Right-hand traffic and Runway 18.
C. Left-hand traffic and Runway 22.

Answer **(B)** is correct.
DISCUSSION: The small end of the tetrahedron points into the wind, indicating the direction of landing. The wind is coming from the southwest. However, The runway most nearly aligned into the wind is closed (X), leaving RWY 18 as the most suitable runway. The traffic pattern indicators on a segmented circle are used to indicate the direction of turns. The traffic pattern indicators ,shown as extensions from the segmented circle, present the base and final approach legs. The traffic pattern indicator shows right traffic for RWY 18.

34. (Refer to figure 6) If the wind is as shown by the landing

Answer **(A)** is correct.

direction indicator, the pilot should land on

A. Runway 18 and expect a crosswind from the right.
B. Runway 22 directly into the wind
C. Runway 36 and expect a crosswind from the right.

DISCUSSION: The small end of the tetrahedron points into the wind indicating the direction of landing. landing to the south or RWY 18, the pilot could expect a right crosswind.

35. What does the outbound destination sign identify ?

A. Identifies entrance to the runway from a taxiway
B. Identifies direction to take-off runways.
C. Identifies runway on which an aircraft is located.

Answer **(B)** is correct.
DISCUSSION: Outbound destination signs provide information for locating the departure runway.

36. (Refer to figure 5) That portion of the runway identified by the letter A may be used for

A. landing.
B. Taxiing and takeoff.
C. Taxiing and landing.

Answer **(B)** is correct.
DISCUSSION: Thresholds are marked at the beginning of a full-strength runway surface able to endure landing impacts or at a point on the runway which will encourage pilots to avoid short approaches due to hidden noise or obstacle problems Area A of ICAO figure 5 is marked with arrows which point towards a displaced threshold. Thus, the paved surface prior to the threshold is available for taxi, takeoff and landing rollout, but not for touchdown.

38. (Refer to figure 5) According to the airport diagram, which statement is true ?

A. Runway 30 is equipped at position E with emergency arresting gear to provide a means of stopping military aircraft.
B. Takeoffs may be started at position A or Runway 12, and the landing portion of this runway begins at position B.
C. The takeoff and landing portion of Runway 12 begins at position B.

Answer **(B)** is correct.
DISCUSSION: Thresholds are marked at the beginning of a full-strength runway surface able to endure landing impacts or at a point on the runway which will encourage pilots to avoid short approaches due to hidden noise or obstacle problems. Area A of ICAO Figure 5 is marked with arrows which point towards a displaced threshold. Thus, the paved surface prior to the threshold is available for taxi, takeoff and landing rollout, but not for touchdown.

39. (Refer to figure 5) What is the difference between area A and area E on the airport depicted ?

A. “A” may be used for taxi and takeoff; “E” may be used only as an overrun.
B. “A” may be used for all operations except heavy aircraft landings; “E” may be used only as an overrun.
C. “A” may be used only for taxing ;”E” may be used for all operations except landings.

Answer **(A)** is correct.
DISCUSSION: The paved area behind the displaced threshold is available for taxiing, landing rollout, and takeoff. The stopway, extending beyond the usable runway, is unusable due to the nature of its construction. Area E of ICAO Figure 5, marked with chevrons, is used for overrun only.

40. (Refer to figure 5) Area C on the airport depicted is classified as a

A. Stabilized area.
B. Multiple heliport.
C. Closed runway.

Answer **(C)** is correct.
DISCUSSION: An “X” painted on the end of runway means it is closed.

41. (Refer to figure 5) The arrows that appear on the end of the north/ south runway indicate that the area

A. May be used only for taxiing.

Answer **(C)** is correct.
DISCUSSION: The paved area behind the displaced runway threshold is available for taxiing, landing rollout, and the takeoff aircraft.

B. Is usable for taxiing, takeoff, and landing.
C. Cannot be used for landing, but may be used for taxiing and takeoff.

42. When approaching taxiway holding lines from the side with the continuous line, the pilot

A. May continue taxiing.
B. Should not cross the lines without ATC clearance.
C. Should continue taxiing until all parts of the aircraft have crossed the lines.

Answer **(B)** is correct.
DISCUSSION: When approaching the holding line from the side with the continuous lines, a pilot should not across the holding line without ATC clearance at a controlled airport, or without making sure of adequate separation from other aircraft at uncontrolled airports.

43. What is the purpose of the runway/runway hold position sign ?

A. Denotes entrance to runway from a taxiway.
B. Denotes area protected for an aircraft approaching or departing a runway.
C. Denotes intersecting runways.

Answer **(C)** is correct.
DISCUSSION: Mandatory instruction signs are used to denote n entrance to a runway or critical area and areas where an aircraft is prohibited from entering. The runway holding position sign is located at the holding position on taxiways that intersect a runway or no runways that intersect other runways.

44. The numbers 9 and 27 on a runway indicate that the runway is oriented approximately

A. 009° and 027° true.
B. 090° and 270° true.
C. 080° and 260° magnetic

Answer **(C)** is correct.
DISCUSSION: The runway number is the whole number nearest one tenth magnetic azimuth of the centerline of the runway, measured clockwise from magnetic north. for example : 272° = RWY 27;087° = RWY 9

45.The numbers 8 and 26 on the approach ends of the runway indicate that the runway is oriented approximately

A. 008° and 026° true.
B. 080° and 260 °true.
C. 080° and 260° magnetic.

Answer **(C)** is correct
DISCUSSION: The runway number is the whole number nearest one tenth magnetic azimuth of the centerline of the runway, measured clockwise from magnetic north.

46. (Refer to the Runway Incursion Figure 8) You have requested taxi instructions for takeoff using Runway 16. The controller issues the following taxi instructions : “N123, Taxi to runway 16” where are you required to stop in order to be in compliance with the controller's instructions ?

A. 5 (Five).
B. 6(Six).
C. 9(Nine).

Answer **(A)** is correct.
DISCUSSION: When ATC clears an aircraft to “Taxi to” an assigned takeoff runway, the absence of holding instructions authorizes the aircraft to “cross” all runways which the taxi route intersects except the assigned takeoff runway. It does not include authorization to “taxi onto” or “cross” the assigned takeoff runway at any point. You should taxi and hold short of runway 16, which is position 5.

47. (Refer to figure 7) Which runway and traffic pattern should be used as indicated by the wind cone in the segmented circle?

A. Right-hand traffic on Runway 9.
B. Right-hand traffic on Runway 18.
C. Left-hand traffic on Runway 36.

Answer **(C)** is correct.
DISCUSSION: The large end of the wind cone (wind sock) points into the wind. The wind cone in ICAO Figure 7 indicates a wind from northwest landing into the wind can be accomplished on either Runway 27 or Runway 36. The traffic pattern indicators require right traffic to runway 27 and left traffic to Runway 36.

48. VFR approaches to land at night should be accomplished

Answer **(C)** is correct.

A. At a higher airspeed.
B. With a steeper descent.
C. The same as during daytime.

DISCUSSION: Inexperienced pilots often have a tendency to make approaches and landings at night with excessive air-speed. Every effort should be made to execute the approach and landing in the same manner as during the day.

49. Which is the correct traffic pattern departure procedure to use at a non-controlled airport ?

A. Depart in any direction consistent with safety, after crossing the airport boundary.
B. Make all turns to the left.
C. Comply with any ICAO traffic pattern established for the airport

Answer **(C)** is correct.
DISCUSSION: In the case of an aircraft departing an airport without an operating control tower, comply with any ICAO traffic pattern for that airport.

50. The recommended entry position to an airport traffic pattern is

A. 45° to the base leg just below traffic pattern altitude.
B. To enter 45° at the midpoint of the downwind leg at traffic pattern altitude.
C. To cross directly over the airport at traffic pattern altitude and join the downwind leg.

Answer **(B)** is correct.
DISCUSSION: The recommended entry position for an airport traffic pattern is 45° to the midpoint of the downwind leg at traffic pattern altitude.

51. (Refer to figure 7) The segmented circle indicates that the airport traffic is.

A. Left-hand for Runway 36 and right-hand for Runway 18.
B. Left-hand for Runway 18 and right-hand for Runway 36.
C. Left-hand for Runway9 and right-hand for Runway27.

Answer **(A)** is correct.
DISCUSSION: The traffic pattern indicators on a segmented circle are used to indicate the direction of turns. The traffic pattern indicators, shown as extensions from the segmented circle, represent the base and final approach legs.

52. (Refer to figure 7) The traffic patterns indicated in the segmented circle have been arranged to avoid flights over an area to the

A. South of the airport.
B. North of the airport.
C. Southeast of the airport.

Answer **(C)** is correct.
DISCUSSION: No flight cross the southeast area of the airport.

53. (Refer to figure 7) The segmented circle indicates that a landing on Runway 26 will be with a

A. Right-quartering headwind.
B. Left-quartering headwind.
C. Right-quartering tailwind.

Answer **(A)** is correct.
DISCUSSION: The large end of the wind cone (wind sock) points into the wind. The wind cone in ICAO figure 7indicates a wind from the northwest. When landing on RWY 26, this would be a right quartering headwind.

54. When turning onto a taxiway from another taxiway, the "taxiway directional sign" indicates

A. Direction the take-off runway.

Answer **(B)** is correct.
DISCUSSION: Direction signs consist of black lettering on a yellow background. These signs identify the designations Of taxiways leading out of an intersection. An arrow next to

B. Designation and direction of taxiway leading out of an intersection.
C. Designation and direction of exit taxiway from runway.

each taxiway designation indicates the direction that an aircraft must turn in order to taxi onto that taxiway

55.(Refer to figure 12) Use the sign and taxiway diagram you are approaching the intersection on taxiway 5 and see the sign at the left of the intersection. Taxiway number 2 is identified as

A. A.
B. F.
C. T.

Answer **(B)** is correct.
DISCUSSION: The taxiway diagram shows that taxiway 2 is forward and to the left (Which is not to be confused with directly to the left). The sign shows that the taxiway to the forward left is taxiway foxtrot.

56. (Refer to figure 13).The taxiway ending marker

A. Indicates taxiway does not continue.
B. Identifies area where aircraft are prohibited.
C. Provides general taxiing direction to named taxiway.

Answer **(A)** is correct.
DISCUSSION: A taxiway ending marker sign consists of alternating yellow and black diagonal stripes. Taxiway ending marker signs indicate that the taxiway does not continue beyond the sign.

57. (Refer to figure 16) The pilot generally calls ground control after landing when the aircraft is completely clear of the runway. This is when the aircraft.

A. Passes the red symbol shown at the top of the figure.
B. Is on the dashed-line side of the middle symbol.
C. Is past the solid-line side of the middle symbol.

Answer **(C)** is correct.
DISCUSSION: The middle symbol is a runway boundary sign that has a yellow background with a black inscription and graphic depicting the pavement holding position marking. This sign, which faces the runway and is visible to the pilot exiting the runway, is located adjacent to the holding position marking on the pavement. The sign is intended to provide you with another visual cue. to use as a guide to determine when you are clear of the runway. Thus, you are clear of the runway when you either airplane is on the solid -line site of the holding marking.

58. (Refer to figure 16) The red symbol at the top would most likely be found.

A. Upon exiting all runways prior to calling ground control
B. At an intersection where a roadway may be mistaken as a taxiway.
C. Near the approach end of ILS runways.

Answer **(B)** is correct.
DISCUSSION: The symbol at the top (red background with white inscription) is a mandatory instruction sign that prohibits an aircraft from entering an area. Typically, This sign is located on a taxiway intended to be used in only one directions or at an intersection of vehicle roadways with runways, taxiways or aprons where the roadway may be mistaken as a taxiway or other aircraft movement surface.

59. (Refer to figure 16) While clearing an active runway you are most likely clear of the ILS critical area when you pass which symbol ?

A. Top red.
B. Middle yellow.
C. Bottom yellow.

Answer **(C)** is correct.
DISCUSSION: The bottom symbol is an ILS critical area boundary sign, which has a yellow background with a black 8inscription and graphic depicting the ILS pavement holding position marking. The sign is located adjacent to the ILS holding position making on the pavement and can be seen by pilots leaving the critical area. The sign is intended to provide you with another visual cue to use as a guide in deciding when you are clear of the ILS critical area.

60. (Refer to figure 16) When taxiing up to an active runway, you are likely to be clear of the ILS critical area when short

Answer **(A)** is correct.
DISCUSSION: The bottom symbol is an ILS critical area boundary

of which symbol ?

A. Bottom yellow.
B. Top red.
C. Middle yellow.

sign, which has a yellow background with a black inscription depicting the ILS pavement holding position marking.
The sign located adjacent to the ILS holding position marking on the pavement and can be seen by pilots approaching the ILS critical area. Thus, you will be clear of the ILS critical area, when taxiing to an active runway, when short of the ILS critical area boundary sign.

61. (Refer to figure 16) which symbols does not directly address runway incursion with other aircraft ?

A. Top red
B. Middle yellow.
C. Bottom yellow.

Answer **(A)** is correct.
DISCUSSION: The symbol at the top (red background with white inscription) is a mandatory instruction sign that prohibits an aircraft from entering an area. Typically, This sign is located on a taxiway intended to be used in only one directions or at an intersection of vehicle roadways with runways, taxiways or aprons where the roadway may be mistaken as a taxiway or other aircraft movement surface .Thus, it does not directly address runway incursion with other aircraft.

62. (Refer to figure 14) You are holding short for an intersection departure on Runway 8 with the sign in front of you. After turning onto the runway you should

A. Turn right.
B. Turn left.
C. Insufficient information is given.

Answer **(B)** is correct.
DISCUSSION: You would turn to the left because the runway holding position sign shown in figure 14 shows the actual runway layout. Therefore, you would turn away from the position of the runway designation on the sign just like you would If you were taxiing onto the end of the runway for takeoff.

63. (Refer to figure 17) Sign "1" is an indication

A. Of an area where aircraft are prohibited.
B. That the taxiway does not continue.
C. Of the general taxiing direction to a taxiway.

Answer **(B)** is correct.
DISCUSSION: A taxiway ending marker sign consists of alternating yellow and black diagonal stripes. Taxiway ending marker signs indicate that the taxiway does not continue beyond the sign.

64. How can you determine if another aircraft is on a collision course with your aircraft ?

A. The nose of each aircraft is pointed at the same point in space.
B. The other aircraft will always appear to get larger and closer at a rapid rate.
C. There will be no apparent relative motion between your aircraft and the other aircraft.

Answer **(C)** is correct.
DISCUSSION: Any aircraft that appears to have no relative motion and stays in one scan quadrant is likely to be on a collision course . Also if a target shows no lateral or vertical Movements but increases in size, take evasive action.

65. What is the general direction of movement of the other aircraft during a night flight you observe a steady white light and a rotating red light ahead and at your altitude ? The other aircraft is

A. Headed away from you.
B. Crossing to your left.
C. Approaching you head-on.

Answer **(A)** is correct.
DISCUSSION: A steady white light is the tail light. The other airplane is heading away from you. The rotating red light is the beacon light. The red and green wingtip position lights cannot be seen from the rear.

66. When in the vicinity of a VOR which is being used for navigation on VFR flight, it is important to

Answer **(B)** is correct.
DISCUSSION: When operating VFR in highly congested areas

A. make 90° left and right turns to scan for other traffic.
B. exercise sustained vigilance to avoid aircraft that may be converging on the VOR from other directions.
C. pass the VOR on the right side of the radial to allow room for aircraft flying in the opposite direction on the same radial.

such as in the vicinity of a VOR that is being used for VFR navigation, you should exercise constant vigilance to avoid aircraft that may be converging on the VOR from other directions.

67. During a takeoff made behind a departing large jet airplane, the pilot can minimize the hazard of wingtip vortices by

A. Being airborne prior to reaching the jet's flight path until able to turn clear of its wake.
B. Maintaining extra speed on takeoff and climb out.
C. Extending the takeoff roll and not rotating until well beyond the jet's rotation point.

Answer **(A)** is correct.
DISCUSSION: When departing behind a larger aircraft, you should rotate prior to the larger aircraft's rotation point and climb above its climb path until turning clear of its wake.

68. To avoid possible wake turbulence from a large jet aircraft that has just landed prior to your takeoff, at which point on the runway should you plan to become airborne ?

A. Past the point where the jet touched down.
B. At the point where the jet touched down, or just prior to this point
C. Approximately 500 feet prior to the point where the jet touched down.

Answer **(A)** is correct.
DISCUSSION: When taking off on a runway on which a large jet aircraft has just landed, plan to become airborne past the point where the jet touched down.

69. Choose the correct statement regarding wake turbulence.

A. Vortex generation begins with the initiation of the takeoff roll.
B. The primary hazard is loss of control because of induced roll.
C. The greatest vortex strength is produced when the generating airplane is heavy, clean, and fast.

Answer **(B)** is correct.
DISCUSSION: The usual hazard associated with wake turbulence is the induced rolling movements, which can exceed the rolling capability of the encountering aircraft.

70. Which procedure should you follow to avoid wake turbulence if a large jet crosses your course from left to right approximately 1 mile ahead and at your altitude ?

A. Make sure you are slightly above the path of the jet.
B. Slow your airspeed to VA and maintain altitude and course.
C. Make sure you are slightly below the path of the jet and perpendicular to the course

Answer **(A)** is correct.
DISCUSSION: To avoid the wake turbulence of a large jet at your altitude, you should increase your altitude slightly to get above the flight path of the jet.

71. When landing behind a large aircraft, which procedure should be followed for vortex avoidance ?

A. Stay above its final approach flight path all the way to touchdown.
B. Stay below and to one side of its final approach flight path.
C. Stay well below its final approach flight path and land at least 2,000 feet behind.

Answer **(A)** is correct.
DISCUSSION: When landing behind a large aircraft, stay above its final approach flight path all the way to touchdown ;i.e., touchdown beyond the touchdown point of the large aircraft.

72. With respect to vortex circulation, which is true ?

Answer **(C)** is correct.

A. Helicopters generate downwash turbulence , no vortex circulation
B. The vortex strength is greatest when the generating aircraft is flying fast.
C. Vortex circulation generated by helicopters in forward flight trail behind in manner similar to wingtip vortices generated by airplanes.

DISCUSSION: In forward flight, helicopters produce a pair of high velocity trailing vortices similar to wing tip vortices of large fixed wing aircraft.

73. Which is true with respect to vortex circulation ?

A. Helicopters generate downwash turbulence only not vortex circulation.
B. The vortex strength is greatest when the generating aircraft is heavy , clean and slow
C. When vortex circulation sinks into ground effect, it tends to dissipate rapidly and offer little danger.

Answer **(B)** is correct
DISCUSSION: The greatest vortex strength occurs when the generating aircraft is heavy ,clean, and slow
.

74. Who has the final authority to accept or decline any "land and hold short" (LAHSO) clearance ?

A. ATC tower controller.
B. Airplane owner/operator of the pilot.
C. Pilot-in-command.

Answer **(C)** is correct.
DISCUSSION: The pilot-in-command has the final authority to accept or decline any land and hold short (LAHSO) clearance The safety and operation of the airplane remain the responsibility. Pilots are expected to decline a LAHSO clearance if they determine it will compromise safety.

75. When should pilots decline a "land and hold short" (LAHSO) clearance ?

A. When it will compromise safety.
B. If runway surface is contaminated.
C. Only when the tower controller concurs.

Answer **(A)** is correct.
DISCUSSION: The pilot in command has the final authority to accept or decline any land and hold short (LAHSO) clearance. The safety and operation of the airplane remain the responsibility of the pilot. Pilots are expected to decline a LAHSO clearance if they determine it will compromise safety.

78. What is the minimum visibility and ceiling required for a pilot to receive a "land and hold short" clearance ?

A. 3 statute miles and 1,000 feet.
B. 3 nautical miles and 1,000 feet.
C. 3 statute miles and 1,500 feet.

Answer **(A)** is correct.
DISCUSSION: you should only receive a LAHSO clearance when there is a minimum ceiling of 1,ooo ft and 3 SM visibility. The intent of having "basic" VFR weather conditions is to allow pilots to maintain visual contact with other aircraft and ground vehicle operation.

79. Once a pilot-in-command accepts a "land and hold short" (LAHSO) clearance, the clearance must be adhered to, just any other ATC clearance, unless.

A. an amended clearance is obtained or an emergency occurs.
B. the wind changes or Available Landing Distance decreases.
C. Available Landing Distance decreases or density altitude increases.

Answer **(A)** is correct.
DISCUSSION: If , for any reason, the pilot elects to request to land on the full length of the runway, to land on another runway, or to decline LAHSO, a pilot is expected to promptly inform air traffic, ideally even before the clearance is issued A LAHSO clearance, once accepted must be adhered to, just as any other ATC clearance unless an amended clearance obtained or an emergency occurs. A LAHSO clearance does not preclude a rejected landing.

80. When an aircraft is operating its secondary Surveillance Radar In Mode C an air traffic controllers presentation gives information regarding the aircraft's indicated flight level that is accurate to within:

Answer **(A)** is correct.
DISCUSSION: In mode C the altitude reporting facility transmits information direct from a pressure altitude sensor (such as an encoding altimeter or air data computer). The altitude information

A. ±50 ft.
B. ±75 ft.
C. ±100 ft.

is relative to the 1013,25 hPa level (it is pressure altitude). The altitude information sent is in the hundreds of feet (= accuracy to ± 50 ft): for example an altitude on 35,064 ft will be encoded as '' 351'' = 35,100 ft (rounded to the nearest hundred).

81. The accuracy of SSR height as displayed to the air traffic controller is:

A. ±25ft.
B. ±50ft.
C. ±75ft.

Answer **(B)** is correct.
DISCUSSION: In mode C the altitude reporting facility transmits information direct from a pressure altitude sensor (such as an encoding altimeter or air data computer). The altitude information is relative to the 1013,25 hPa level (it is pressure altitude). The altitude information sent is in the hundreds of feet (= accuracy to ± 50 ft): for example an altitude on 35,064 ft will be encoded as '' 351'' = 35,100 ft (rounded to the nearest hundred).

82.The spacing between the two pulses transmitted by an SSR interrogator decides:

A. The identification of that SSR.
B. What mode is used.
C. What service may be provided by the SSR.

Answer **(B)** is correct.
DISCUSSION: the pilot sets the transponder to the mode and code are instructed by ATC. If the transponder is set to the ''ON'' position, the unit will respond to mode A interrogations, providing only the identification code. If set to ''ALT'' , the transponder will respond to mode A and C interrogations, sending identification code + automatic altitude information. The transponder's response will be in the form of a pulse train. This consists of two ''framing'' pulses separated by 20.3µs. between those two framing pulses there is a facility for up to13 coding pulses to be transmitted. Pulse ''X" is not used at this time, so only 12 pulses are available. The "A" pulses from the first digit of the four-figure code. "B" the second, "C" the third and "D" the fourth. Figure below shows the possible arrangement of A, B, C, and D pulses for sending the digits. For each of the 4 digits, by combining the pulses available there are 8 possibilities ranging from 0 to 7. This lead to a total 4096 selectable codes.
Excluding mode "S" there are 2 basic modes of transponder operation. Mode A and mode C. the signal received by the aircraft transponder includes coding of the mode in which the request is being mode – this coding consists of spacing of the first and the third pulse of the request pulse train. In mode A the spacing is 8µs while in mode C the spacing is 21µs. based on the received requested the transponder then sends the appropriate pulse train back to the ground interrogator. : in mode A only the four digit identification code is sent, while in mode C both the four digit identification code as well as barometric altitude information is sent. In mode C the altitude reporting facility transmits information direct from a pressure altimeter sensor.

83.The selection of code 7600 on an aircraft SSR transponder indicates:

A. An emergency.
B. Unlawful interference with the planned operation of the flight.
C. Radio communication failure.

Answer **(C)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = Unlawful interference
Code 7600 = Radio failure
Code 7700 = Emergency
Before departure the aircraft transponder equipment should beset to "SBY" (standby). The test function should then be activated in order to establish the operational status of the equipment. When instructed by ATC, set the mode and code given by ATC, and when told to "squawk" set the controller to ON or ALT as appropriate. In order to avoid causing interference, do not change the mode or code without first selecting STBY on the mode controller.
When in an abnormal situation, there are three codes that you may set to alert the ATC controllers. These codes have their predefined meaning and, with one of these selected, a signal indicating a special condition will be triggered on the controller's screen. The aircraft symbol may

change colour to attract his attention. On some radar systems, an audio alarm will be triggered together will the visual signal.
There are 3 other standardized transponder codes that the pilot can set in certain situations that are not considered abnormal:

1. Code 0000 = transponder (or altitude reporting) malfunction.
2. Code 2000 = aircraft entering ATC airspace, but has not been assigned transponder code, or entering from a region where transponder operation was not required.
3. Code 7000 = conspicuity code – when operating above FL 100 and specific transponder code has not been assigned.

For time to time the ATC controller may ask you to SQUAWK IDENT. By pushing the IDENT button, the transponder is activated to transmit the additional pulse. This is shown at the radar display as a flashing target. This function, when first enabled, will continue for approximately 20 seconds. Never pressing the IDENT button unless you are instructed to by the air traffic controller.

84. The ATC transponder system, excluding Mode S, contains:

A. Four modes, each 1024 codes.
B. Two modes, each of 4096 codes.
C. Four modes, each 4096 codes.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #82

85. why do clouds not appear on secondary radar screens:

A. Too high a frequency.
B. Too low a frequency.
C. The transmit and receive signals are on different frequency.

Answer **(C)** is correct
DISCISSION: The primary radar operates on the echo-principle: ground radar facility transmits pulses of radio wave of radio wave That are reflected from the aircraft back to the radar facility. the pulses must have sufficient energy to travel to the aircraft and back there is no equipment required on board the aircraft as the radio wave get reflected from the aircraft structure itself. The SSR works on the transponder principle: ground facility transmits pulses of radio waves to the aircraft. when these pulses are received by the aircraft transponder, the transponder sends a response on a different frequency back to the ground facility. It is possible to determine the bearing and range of the target just like with the primary radar system. The main advantages of using SSR over the primary radar are the following:

1. Target response is not dependent on target size, aspect, shape or material.
2. Responses can be coded to carry identification and other related information – the ground facility can therefore receive a signal that clearly identifies a specific aircraft (transponder codes) and if equipped with mode C also its altitude.
3. As each signal (interrogation and response) has only one path to follow attenuation is considerably reduced and lower power out-put is required.
4. Since the signals of the SSR are much stronger than those of primary radar this system also does not suffer from atmospheric attenuation or signal distortion such as from storms.

The practice the ATC uses both the primary and secondary radar systems together. Primary radar is a very useful equipment in determining the aircraft bearing and range, but it has limitations. For these reason the ATC uses both the primary and secondary radars – the SSR supplements the primary radar. When use in conjunction, the primary radar is more accurate in determining the bearing and range of the targets than the SSR, but the SSR provides multitude of additional information – the ATC controllers are therefore able to see the squawk code, flight level (provided by the transponder in mode C), ground speed calculated by the SSR ground facility based on the change of bearing of the aircraft and the call-sign (provided by the transponder in mode S or assigned by the ground facility to a specific squawk code). Some questions asks why the clouds do not appear on the SSR screens.

It is because the SSR dies not operate on the principle of echoes, but uses a different frequency for the interrogation signal and a different frequency for the response signal. If the interrogation signals gets reflected back to the radar facility from clouds, it will be ignored because it will not be at the correct listening frequency.

86. SSR is not affected by weather clutter because:

A. It uses different frequencies for transmission and reception.
B. The wavelength is too short to be reflected from cloud droplets.
C. The equipment uses a moving target indicator.

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question # 85.

87. What most affects the range available from a secondary radar?

A. The transmission power of aircraft interrogator.
B. The transmission power of ground transponder.
C. The height of aircraft and height of ground interrogate.

Answer **(C)** is correct.
DISCUSSION: The ground based SSR interrogators have a nominal range of around 200 NM. But the wave propagation is line of sight , therefore the height of the aircraft also determines the range

88. Which one of the following is an advantage of a SSR when compared to a primary radar system?

A. The relatively small ground antenna transmits no side lobes, thus eliminating the danger of false replies from the airborne transponder.
B. The required power of transmission from the ground equipment is reduced.
C. Possibility of obtaining speed information for aircraft within Rang

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question # 85.

89.When both SSR and primary radar is presented on the controller's display:

A. The SSR information is more accurate in bearing and distance.
B. The primary radar information is superfluous.
C. The primary radar information is more accurate in bearing and distance.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question # 85.

90. With regard to SSR:

A. The interrogator is on the ground and the transponder is on on the ground.
B. The interrogator is on the ground and the transponder is in in the aircraft.
C. The interrogator is in the aircraft and the transponder is on is on the ground.

Answer **(B)** is correct.
DISCUSSION: SSR operates on secondary radar principles. SSR uses one ground based transmitter and receiver, called the interrogator, and An airborne transmitter and receiver referred to as the ATC transponder, or simply transponder.
The sequence of events is as follows;
1. The ground interrogator transmits a pulse coded signal.
2. The aircraft transponder responds by transmitting a pulse train back to the interrogator.
3. A receiver within the interrogator's beam receives these pulses and decodes them.
The pulse train contains information in accordance with the interrogator's pulse coded signal. SSR operates on two different frequencies: one on which the pulses are transmitted by the interrogator

and one on which the response pulses are received. All interrogations are transmitted at a frequency of 1030 MHz and all aircraft transponder responses are transmitted at a frequency of 1090 MHz. the SSR antenna consists of a radiator and reflector similar to that used in the primary radar but, because the return is much stronger than that of a primary radar reflection, it is much smaller.

91. Why is a secondary radar display screen free of storm clutter?

A. The principle of each return is not used is secondary radar.
B. The frequencies employed are too high to give returns from moisture sources.
C. A moving target indicator facility suppresses the display of static or near static returns.

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question # 85

92. When the ATC transponder ‘’IDENT’’ button is pressed by the pilot:

A. The airplane's identification will be sent to all SSRs within range.
B. The airplane's echo on the controller's display will flash or ‘’fill in’’.
C. Mode A will automatically be selected.

Answer **(B)** is correct.
DISCUSSION: from time to time the ATC controller may ask you to SQUAWK IDENT. The IDENT function changes the appearance of the aircraft target on the ATC controller's screen – the IDENT function helps the ATC controller to find your aircraft on his screen. by pushing the IDENT button, the transponder is activated to transmit the additional pulse at the end of the normal response. pulse train. this is shown at the radar display as a flashing target. This function, when first enabled, will continue for approximately 20 seconds. Never press the IDENT button unless you are instructed to by the air traffic controller

93. SSR in ATC use:

A. In complementary to primary radar.
B. Suffers from greater attention (than primary radar) due to the higher frequency used.
C. Replaces primary radar.

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question # 85.

94. Why is the effect of returns from storms not a problem with SSR?

A. The frequency is too high.
B. SSR does not use the echo principle.
C. The PRF is jittered.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question # 85.

95.In the SSR response, the operation of the transponder IDENT button:

A. Transmits the aeroplanes registration or flight number as a data Coded sequence.
B. Sends a special pulse after the normal response pulse train.
C. Sends a special pulse before the normal response pulse train.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #92

96. A transponder capable of mode A or mode C operation only will:

Answer **(B)** is correct.
DISCUSSION: Mode S is the most advanced mode of operation of

A. Not respond to interrogations made on mode S.
B. Respond to mode S interrogations but cannot send data.
C. Respond to mode S interrogations with limit data.

aircraft SSR transponders. As we know the transponder in mode A can only provide response including the aircraft identification (4-digit transponder/ squawk code). Transponders in mode C, in addition to the identification, can also provide an altitude information in the response. Transponders in mode S can provide all of this information + multitude of additional data, such as:

- Call sign.
- Specific aircraft identification/ registration address
- Altitude information in 25 ft increments (as opposed to 100 ft increments for mode C).

Mode S interrogator and receiver operate on the same frequency as standard SSR. the initial part of the interrogation signal is such that the standard SSR modes will be recognised by the normal airborne transponder unit. The second part of the mode S interrogation consists of a message of up to 112 data bits within which 24 bits are allocated to aircraft address. This permits the controller to interrogate a specific aircraft. If the controller wishes to address all the transponder equipped aircraft in range, a special feature known as SSR/mode S "ALL CALL" is broadcast at intervals. Normal SSR transponders respond to this in

Mode A or C. Mode S transponders will recognise the special character of the "ALL CALL" interrogation as a roll call request and will transmit a response which will include the aircraft's identity/ address along with details of the capability of the relevant on board equipment.
Since the SSR operation in mode S works on the principle of interrogating a specific aircraft, the problems of fruiting and garbling are also eliminated.
When an interrogation in mode S is received by an aircraft equipped by a transponder operating only in modes A or C, the transponder will return a correct response, but only in mode A or C, depending on its capabilities, without the additional data provided by mode S transponders. If an interrogation in mode A or C is received by a mode S transponder, it will return a correct response in the respective mode A or C.

97. A mode S transponder will:

A. Not respond to interrogations made on mode A.
B. Respond to normally to mode A or C interrogations.
C. Respond to mode A interrogations but not mode C.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #96.

98. The selection of code 7700 on an aircraft SSR transponder indicates:

A. An emergency.
B. Radio communication failure.
C. Unlawful interference with the planned operation of the flight.

Answer **(A)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = Unlawful interference.
Code 7600 = Radio failure
Code 7700 = Emergency.

99. The code transmitted by a SSR transponder consists of:

A. Phases differences.
B. Pulses.
C. Frequency differences.
D. Amplitude differences.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #82

100. Which one of the following switch positions should be used when selecting a code on the transponder?

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #83.

A. NORMAL.
B. STBY (standby).
C. IDENT (identification).

101. With regard to the advantages of SSR which of the following statements is correct?

A. Little power is required to enable a relatively long range.
B. No aircraft manoeuvres are necessary for identification.
C. Range, bearing and height can be calculated from reply signals.
D. All of the above.

Answer **(D)** is correct.
DISCUSSION: For explanation refer to question # 85.

102. With SSR, interrogation and response signals:

A. Are separated by 63 MHZ.
B. Must be set by the pilot but are always 60 MHZ apart.
C. Are standard frequencies separated by 60 MHZ.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #90.

103. Which of the following statements regarding Mode S is most correct:

A. Mode S is used to assist in GPS calculations.
B. Mode S transponders are used with the radio altimeters.
C. Mode S transponders reduced R/T traffic and also provide the aircraft with the data link facility.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #96.

104. Which statement regarding Mode S transponders is most correct?

A. Mode S transponders reduced RT traffic and provide a data link facility.
B. Mode S transponders are used with TCAS III.
C. Mode S transponders are used to assist GPS positioning.

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question #96.

105. Data transmission and exchange is conducted in:

A. Mode A.
B. Mode C.
C. Mode S.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #96.

106. A secondary radar can provide up to 4.096 different codes. These 4.096 codes can be used in:

A. Mode C and A only.
B. Mode S only.
C. All modes.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #82

107. In SSR, the interrogation use different modes. If altitude reporting

Answer **(C)** is correct.

is required, the aeroplane's transponder should be set to ''ALT'' and will respond to:

A. Mode C interrogation only.
B. Mode A interrogation only.
C. Mode C and A interrogations.

DISCUSSION: For explanation refer to question #82.

108. What SSR modes are frequently in use by ATC?

A. Mode S and mode D.
B. Mode A and mode B.
C. Mode A and mode C.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #82.

109. In special condition signals, to signify radio failure, which of the following codes should you select on your transponder?

A. 7700.
B. IDENT.
C. 7600.

Answer **(C)** is correct.
DISCUSSIOON: The special codes are as follows:
Code 7500 = unlawful interference.
Code 7600 = Radio failure
Code 770 = Emergency.

110. which of the following equipment works on the interrogator/ transponder principle?

A. Secondary Surveillance Radar (SSR).
B. Global Positioning System (GPS).
C. Airborne Weather Radar (AWR)

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question #85.

111. On a typical computer generated SSR display the following data on a particular flight will be shown:

A. Squawk code, flight level, ground speed and airborne call-sign.
B. Destination, flight level, ground speed and airborne call-sign.
C. Squawk code, magnetic heading, ground speed and airborne call-sign.

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question #85.

112. A radar which employs an interrogator/transponder technique is:

A. Primary radar.
B. Continuous wave radar.
C. Secondary radar.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question # 85.

113. The two main design functions of Secondary Surveillance Radar (SSR) mode S are:

A. The elimination of ground to air communications and the introduction of automatic separation between aircraft using TCAS II.
B. Collision avoidance using TCAS II and improved long

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #96.

range communication capability.
C. Air to ground and ground to air data link communications and improved ATC aircraft surveillance capability.

114. The availability of 4096 codes in SSR is applicable to mode:

A. A.
B. C.
C. S.
D. All answer are correct.

Answer **(D)** is correct.
DISCUSSION: For explanation refer to question #82.

115. When a mode C interrogation is responded to, vertical position of the aircraft is coded and transmitted. This vertical position is referred to:

A. The sub-scale of the altimeter.
B. Area QNH.
C. 1013,2 hPa.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #82.

116. The selection of code 2000 on an aircraft SSR transponder indicates:

A. Unlawful interference with the planned operation of the flight.
B. Transponder malfunction.
C. Entry into airspace from an area where SSR operation has not been required.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #83.

117. The selection of code 7500 on an aircraft SSR transponder indicates:

A. Unlawful interference with the planned operation of the flight.
B. An emergency.
C. Transponder malfunction

Answer **(A)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = Unlawful interference.
Code 7600 = Radio failure.
Code 7700 = Emergency.

118.When mode C is selected on the aircraft SSR transponder the additional information transmitted is:

A. Height based on QFE.
B. Altitude based on regional QNH.
C. Flight level based on 1013,25 hPa.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #82.

119. What information may be displayed on an ATC radar screen connected only to a primary radar system?

A. Aircraft position only.
B. Aircraft position and SSR code.
C. Aircraft position, SSR code and altitude.

Answer **(A)** is correct.
DISCUSSION: In practice the ATC uses both the primary and secondary radar systems together. Primary radar is a very useful equipment in determining the aircraft bearing and range, but it has limitations – for example, if the target is too small, targets can not be directly identified as a specific aircraft or the radar signals suffer

attenuation due to adverse weather such as storms. For these reasons the ATC uses both the primary and secondary radars- the SSR supplements the primary radar. When used in conjunction, the primary radar is more accurate in determining the bearing and range of the targets than the SSR, but the SSR provides multitude of additional information – the ATC controllers are therefore able to see the squawk code (transponder code), flight level (provided by the transponder in mode C), ground speed calculated by the SSR ground facility based on the change of bearing of the aircraft and a call sign (provided by the transponder in mode S or assigned by the ground facility to a specific squawk code).

120. Selection of mode C on the SSR provides ATC with information based on:

A. Aircraft height above the QFE.
B. Aircraft altitude as indicated in the captains altimeter.
C. Aircraft pressure altitude.

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #82.

121. Consider the following statements on SSR mode S:

A. Mode S will have the ability to transmit short messages from the ground to a particular aircraft.
B. A mode S interrogator, when installed, will also collect data from old mode A and C transponders.
C. Mode S will be able to address any particular of some 16 million aircraft.
D. All statements are correct.

Answer **(D)** is correct.
DISCUSSION: For explanation refer to question #96.

122. In order to indicate radio failure the aircraft SSR transponder should be selected to code:

A. 7000.
B. 7600.
C. 7500.

Answer **(B)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = unlawful interference.
Code 7600 = Radio failure
Code 7700 = Emergency.

123. The SSR code for a total radio failure is:

A. 7500.
B. 7600.
C. 7500 plus mode C.

Answer **(B)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = unlawful interference
Code 7600 = Radio failure
Code 7700 = Emergency

124. In order to indicate unlawful interference with the planned operation of the flight, the aircraft SSR transponder should be selected to:

A. 7600.
B. 7500.
C. 7700.

Answer **(B)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = unlawful interference
Code 7600 = Radio failure
Code 770 = Emergency.

125. If an aircraft is hijacked it is recommended that the pilot set transponder code:

A. 7700.
B. 7500.
C. 7600.

Answer **(B)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = unlawful interference
Code 7600 = Radio failure
Code 7700 = Emergency.

126. In order to indicate an emergency situation, the aircraft SSR transponder should be set to:

A. 7600
B. 7500
C. 7700

Answer **(C)** is correct.
DISCUSSION: The special codes are as follows:
Code 7500 = unlawful interference
Code 7600 = Radio failure
Code 7700 = Emergency.

127. What is the maximum number of usable SSR transponder codes?

A. 4096
B. 3600
C. 1000

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question #82.

128. The SSR conspicuity code is:

A. 7000
B. 2000
C. 0033

Answer **(A)** is correct.
DISCUSSION: For explanation refer to question #83.

129. Which one of the following SSR codes should be used by aircraft entering airspace from an area where SSR operation has not been required?

A. 0000
B. 7000
C. 2000

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question # 83.

130. The ground SSR equipment incorporates a transmitter and receiver respectively operating in the following frequencies (transmitter; receiver):

A. 1090 MHz; 1090 MHz
B. 1090 MHz; 1030 MHz
C. 1030 MHz; 1090 MHz

Answer **(C)** is correct.
DISCUSSION: For explanation refer to question #90.

131. The frequency of an SSR ground transmitter is:

A. 1050 ± 0,5 MHz
B. 1030 ± 0,2 MHz
C. 1090 ± 0,3 MHz

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #90.

132. The SSR ground transceiver interrogates on……and receivers responses on……..

A. 1030 MHZ; 1030 MHz
B. 1030 MHz; 1090 MHz
C. 1090 MHz; 1030 MHz
D. 1090 MHz; 1090 MHz

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #90.

133. What are the frequencies used for interrogation and response for SSR?

A. 1090 MHz for interrogation from the ground, 1030 MHz for response from the aircraft.
B. 1030MHz for interrogation from the ground, 1090 MHz for response from the aircraft.
C. 1090 MHz for interrogation from the aircraft, 1030 MHz for response from the ground.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #90.

134. The vertical position provided by SSR mode C is referenced to:

A. QNH unless QFE is in use.
B. 1013,25 HPa.
C. QNH.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #82.

135. When an aircraft is operating its SSR in mode C an air traffic controller's presentation gives information regarding the aircraft's indicated flight level in increments of:

A. 200 ft.
B. 100 ft.
C. 250 ft.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question #81.

136. With reference to SSR, what code is used to indicate transponder altitude failure

A. 9999
B. 0000
C. 4096

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question # 83.

137. Using SSR, the normal transmission from the ATC Transponder in the aircraft consists of:

A. The two pulses received plus the aircraft identification.
B. The two pulses received plus an additional number of pulses between them.
C. The aircraft identification plus pulses giving the altitude.

Answer **(B)** is correct.
DISCUSSION: For explanation refer to question # 82

D. Pulses giving the altitude, plus any ident pulse.

INTENTIONALLY

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CHAPRET 3

AIRCRAFT SYSTEMS AND PERFORMENCE

- **Pitot-Static Instruments**
- **Gyroscopic Instruments**
- **Engine and Propeller**
- **Fuel and Electrical Systems**
- **Predicting Performance**
- **Weight and Balance**

1. You are flying in the northern hemisphere on 270 heading, and you notice that your compass swings toward the…….when you accelerate your aircraft:

A. South.
B. North.
C. East.

Answer **(B)** is correct.
DISCUSSION: In the northern hemisphere, if an airplane is accelerated on an easterly or westerly heading, the compass swings toward the north. This error is greatest when flying on a heading of east or west, and decreases to zero on a north or south heading.

2. In the northern hemisphere, the compass turns toward the south when:

A. An airplane enters a left turn from an east heading.
B. An airplane enters a right turn from a west heading.
C. an aircraft is decelerated and flying on an easterly or westerly heading.

Answer **(C)** is correct.
DISCUSSION: in the northern hemisphere, if an airplane is decelerated on an east or west heading, the compass swings toward the south. This error does not occur when you are flying on a north or south heading.

3. When an airplane decelerates on a heading of east in the northern hemisphere:

A. The compass swings toward the south.
B. The compass swings toward the north.
C. The compass swings toward the east.

Answer **(A)** is correct.
DISCUSSION: In the northern hemisphere, if an airplane is decelerated on an east or west heading, the compass swings toward the south. This error does not occur while on a north or south heading.

4. You are flying on 090 heading in the northern hemisphere, if your airplane is accelerated, your compass:

A. Indicates a turn toward the south.
B. Swings toward the north.
C. Doesn't swing and remains on the same heading.

Answer **(B)** is correct.
DISCUSSION: In the northern hemisphere, if an airplane is accelerated while on an east or west heading, the compass swings toward the north.

5. In the northern hemisphere, a magnetic compass will …… when entering a turn from a north heading.

A. Initially lead the turn.
B. Initially swing in the opposite direction.
C. Initially swing toward the east.

Answer **(B)** is correct.
DISCUSSION: In the northern hemisphere, when making a turn from a heading of north, the compass initially indicates a turn in opposite direction. As the turn proceeds, the compass card begins to turn in the correct direction, but it lags behind the actual heading of the aircraft. the amount of lag decreases as the turn continues, and disappears as the airplane reaches a heading of east or west.

6. An airplane begins rolling into a turn toward west from a southerly heading. The magnetic compass in that airplane will:

A. Initially indicate a turn toward the east.
B. Swing in the correct direction but will lead the turn.
C. Indicate no error when turning from a southerly heading.

Answer **(B)** is correct.
DISCUSSION: In the northern hemisphere, when you begin a turn from a southerly heading, the compass begins to turn in the correct direction, but leads the actual heading.

7. An airplane is flying in the northern hemisphere, in what condition the airplane will initially indicate a turn toward the west.

A. An airplane is accelerated while flying on a northerly heading.
B. An airplane rolls into a left turn from a heading of south .
C. An airplane rolls into a right turn from a heading of north.

Answer **(C)** is correct.
DISCUSSION: In the northern hemisphere, if the airplane begins to turn right from a heading of north, the compass will initially indicate a turn toward the west.

8. The angle between the magnetic north and true north is called:

A. Deviation
B. Variation.
C. Magnetic dip.

Answer **(B)** is correct.
DISCUSSION: The angle between the magnetic north and true north is called the magnetic variation.

9. The difference between the direction indicated by a magnetic compass installed in an airplane, and one not installed in an airplane ,is:

A. Dip.
B. Variation.
C. deviation.
D. Southerly turning error.

Answer **(C)** is correct.
DISCUSSION: magnetic deviation is the error caused by disturbances from magnetic fields produced by aircraft metal components and electrical equipment.

10. What causes deviation in a magnetic compass?

A. The angular difference between the true north and magnetic north.
B. Magnetic fields produced by metal components and electrical equipment within the aircraft.
C. The defective components of the magnetic compass.

Answer **(B)** is correct.
DISCUSSION: Magnetic deviation is the error caused by disturbances from magnetic fields produced by metal components and electrical equipment within the aircraft.

11. The pitot system is connected to:

A. Airspeed indicator.
B. Altimeter.
C. Vertical speed indicator.

Answer **(A)** is correct.
DISCUSSION: Pitot pressure, also called ram or impact pressure, is provided for airspeed indicator by the pitot system .

12. Which instrument will become inoperative by a pitot tube blockage?

A. Altimeter.
B. Airspeed indicator.
C. Vertical speed indicator.

Answer **(B)** is correct.
DISCUSSION: The pitot system provides ram or pitot pressure only for the airspeed indicator. Hence, a pitot tube blockage only affects the airspeed indicator.

13. What type of blockage will cause the airspeed indicator to read zero?

A. When only the ram air inlet becomes clogged and the drain hole remains open.
B. When both the ram air inlet and drain hole become clogged.
C. When the static port becomes clogged.

Answer **(A)** is correct.
DISCUSSION: When the pitot tube becomes clogged and the drain hole remains open, the ram pressure in the system will vent out through the drain hole, causing the airspeed indicator to show zero.

14. Which instrument(s) would be affected when the static port becomes clogged?

A. Altimeter.
B. Vertical speed indicator, and altimeter.

Answer **(C)** is correct.
DISCUSSION: Static port provides static pressure or ambient pressure to airspeed indicator, altimeter, and vertical speed indicator. Therefore, if the static port becomes clogged all three instruments will become inoperative.

C. Altimeter, vertical speed indicator, and airspeed indicator.

15. If both the ram air inlet and drain are clogged. How will the airspeed indicator react in a climb?

A. Shows a decrease in airspeed.
B. Shows an increase in airspeed.
C. This type of blockage will cause the airspeed indicator to register zero.

Answer **(B)** is correct.
DISCUSSION: If both ram air inlet and drain hole of the pitot tube become clogged, the ram pressure in the pitot system will be trapped. When the static port remains open, the airspeed indicator will react as an altimeter. Therefore, the indicated airspeed increases when climbing and decreases when descending.

16. Assume that the static port of your airplane became clogged (pitot tube remains open) at 2500 feet and you climbed. How does this affect the readings on your airspeed indicator at higher altitudes?

A. It has no effect on the airspeed indicator's readings.
B. Airspeed indicator will read lower than actual.
C. Airspeed indicator will read higher than actual.

Answer **(B)** is correct.
DISCUSSION: If the static port becomes clogged but the pitot system remains open, the airspeed indicator continues to operate, but the readings will be inaccurate. If airplane operates above the altitude where the static port became blocked, the airspeed indicator will display lower than actual airspeed. In this example the static port became clogged at 2500 feet, and then the airplane climbed. This results in slower than actual indications.

17. Assume that the static port of your airplane became clogged at 5500 feet (pitot tube remains open) and you have to descend your airplane. How does this affect the readings on your airspeed indicator at lower altitudes?

A. It has no effect on the airspeed indicator's readings.
B. Airspeed indicator will read lower than actual.
C. Airspeed indicator will read higher than actual.

Answer **(C)** is correct.
DISCUSSION: If the static port becomes clogged but the pitot system remains open, the airspeed indicator continues to operate, but the readings will be inaccurate. If airplane operates operates below the attitude where the static port became clogged the airspeed indicator will display higher than actual airspeed. In this example, the static port became clogged at 5500 feet. and then the airplane descended. This results in faster than actual indication.

18. What is the green arc on the airspeed indicator called?

A. Maneuvering speed
B. Stalling speed or the minimum steady flight speed.
C. Normal operating range.

Answer **(C)** is correct.
DISCUSSION: The green arc on the airspeed indicator identifies the normal operating range.

19. What does the white arc on the airspeed indicator represents?

A. Normal operating range.
B. Flap operating range.
C. Maximum structural cruising speed.

Answer **(B)** is correct.
DISCUSSION: The white arc represents the flap operating range of the airspeed indicator.

20. What does the red line on the airspeed indicator denotes?

A. Never-exceed airspeed.
B. Maximum structural cruising speed.
C. Caution range.

Answer **(A)** is correct.
DISCUSSION: The red line on the airspeed indicator identifies the never-exceed speed. Operating above this speed may result in structural damage.

21. What does the yellow arc on the airspeed indicator represent?

Answer **(B)** is correct.
DISCUSSION: The yellow arc represents the caution range

A. Normal operating range.
B. Caution range and only operate in smooth air.
C. Maximum structural cruising speed.

of the airspeed indicator. Airplane may only operate in this range.

22. What does VNO denote?

A. Never exceed speed.
B. Maximum structural cruising speed.
C. Maximum flap extended speed.

Answer **(B)** is correct.
DISCUSSION: The upper limit of green arc is VNO, which identifies the maximum structural cruising speed. You should never operate above this airspeed except in smooth air.

23. What is an important airspeed limitation that is no it color-coded on the airspeed indicator?

A. Stalling speed in landing configuration.
B. Maneuvering speed.
C. Maximum structural cruising speed.

Answer **(B)** is correct.
DISCUSSION: Manoeuvring speed, or VA, is the maximum speed at which full and abrupt deflection of airplane controls can be made without causing structural damage.

24. The lower limit of white arc of the airspeed indicator represents:

A. Stalling speed in landing configuration (VSO).
B. Stalling speed in a specified configuration (VS1).
C. Maximum speed with flaps fully extended (VFE).

Answer **(A)** is correct.
DISCUSSION: The lower limit of white arc, or VSO, indicates the stalling speed or the minimum steady flight speed in the landing configuration.

25. What is the maximum structural cruising speed of this airplane (refer to figure 36)?

A. 165 KIAS.
B. 208 KIAS.
C. 100 KIAS.

Answer **(A)** is correct.
DISCUSSION: The maximum structural cruising speed is indicated as the upper limit of green arc on the airspeed indicator You may operate above this speed only in smooth air.

26. The flap operating range of this airplane (refer to figure 18)?

A. 60-100 KIAS.
B. 65-165 KIAS.
C. 165-208 KIAS.

Answer **(A)** is correct.
DISCUSSION: The white arc identifies the normal flap operating range. The lower limit of the white arc identifies the stalling speed in landing configuration (VSO), and its upper limit corresponds to corresponds to

27. What is the stalling speed, or minimum steady flight speed, in the landing configuration for this airplane (refer to figure 18)?

A. 65 KIAS.
B. 60 KIAS.
C. 100 KIAS.

Answer **(B)** is correct.
DISCUSSION: Stalling speed or the minimum steady flight speed in landing configuration, or VSO, is identified by the lower limit of the white arc.

28. What is the maximum flap extended speed of this airspeed Indicator (refer to figure 18)

A. 165 KIAS.
B. 100 KIAS.
C. 65 KIAS.

Answer **(B)** is correct.
DISCUSSION: The maximum flap extended speed is identified by the upper limit of the white arc on the airspeed indicator.

29. What is the normal operating range of this airplane

Answer **(C)** is correct.

(refer to figure 18)?

A. 60-165 KIAS.
B. 60-100 KIAS.
C. 65 165 KIAS.

DISCUSSION: Normal operating range is identified by the green arc on the airspeed indicator.

30. What altitude is indicated in this altimeter (Figure19)?

A. 1500 feet.
B. 11500 feet.
C. 10500 feet.

Answer **(C)** is correct.
DISCUSSION: The altimeter has three pointers. The longest pointer indicates hundreds of feet, the middle-length pointer shows thousands of feet, and the shortest pointer indicates tens of thousands of feet.

31. What altitude is indicated in this altimeter (Figure20)?

A. 4500 feet.
B. 14500 feet.
C. 1500 feet.

Answer **(B)** is correct.
DISCUSSION: The altimeter has three pointers. The longest pointer indicates hundreds of feet, the middle-length pointer shows thousands of feet, and the shortest pointer indicates tens of thousands of feet.

32. What altitude is indicated in this altimeter (Figure 21)?

A. 1500 feet.
B. 10950 feet.
C. 9500 feet.

Answer **(C)** is correct.
DISCUSSION: The altimeter has three pointers. The The longest pointer indicates hundreds of feet, the middle-length pointer shows thousands of feet, and the shortest pointer indicates tens of thousands of feet.

33. What is pressure altitude?

A. The indicated altitude corrected for nonstandard temperature
B. The altitude indicated on altimeter when it is set to standard sea level pressure of 29.92 in. Hg.
C. It is indicated altitude corrected for instrument errors.

Answer **(B)** is correct.
DISCUSSION: Pressure altitude is indicated on the altimeter when it is set to standard sea level pressure of 29.92 in. Hg. or 1013.25 millibars.

34. The …… is the actual height of an object above mean sea level.

A. True altitude.
B. Absolute altitude.
C. Pressure altitude.

Answer **(A)** is correct.
DISCUSSION: True altitude is defined as the actual height of an object above sea level.

35. Absolute altitude is:

A. The height of the aircraft above the earth's surface.
B. The elevation above mean sea level.
C. The altitude displayed on the altimeter with 29.92 in. Hg. or 1013.25 millibars set in the Kollsman window.

Answer **(A)** is correct.
DISCUSSION: Absolute altitude is defined as the height of the aircraft above the earth's surface.

36. What is calibrated altitude?

A. Pressure altitude corrected for nonstandard temperature.
B. Indicated altitude corrected for instrument errors.
C. Vertical distance above the standard datum plan.

Answer **(B)** is correct.
DISCUSSION: Calibrated altitude is the indicated altitude corrected for instrument error.

37. Density altitude will be equal to pressure altitude:

A. At standard temperature.
B. At sea level, when temperature is equal to 15° F.
C. Always when you set your altimeter to standard sea level level pressure of 29.92 in. Hg.

Answer **(A)** is correct.
DISCUSSION: Density altitude will be equal to pressure altitude at standard temperature.

38. Pressure altitude is equal to true altitude when:

A. Standard atmospheric conditions exist.
B. When the sea level pressure is 29.92 in. Hg. and temperature is 5° F.
C. Pressure altitude is corrected for non-standard temperature.

Answer **(A)** is correct.
DISCUSSION: Pressure altitude is equal to true altitude when standard atmospheric conditions exist.

39. What condition(s) must exist for true altitude to be equal to indicated altitude?

A. When temperature conditions match International Standard Atmosphere.
B. When you have the correct altimeter setting and temperature conditions match International Standard Atmosphere.
C. When Indicated altitude is corrected for installations errors.

Answer **(B)** is correct.
DISCUSSION: True altitude will be equal to indicated altitude when you have the correct altimeter setting and temperature conditions match International Standard Atmosphere.

40. Approximately how many percent lower the true altitude will be than your indicated altitude, if the temperature is 10°C colder than standard?

A. 8%.
B. 4%.
C. 12%.

Answer **(B)** is correct.
DISCUSSION: When the temperature is 10°C lower than standard, the true altitude will be approximately 4% lower than the indicated altitude.

41. If you change the altimeter setting from 30.12 in. Hg. to 29.82, what would be the change in the indicated altitude?

A. Indicated altitude would increase 300 feet.
B. Indicated altitude would decrease 30 feet.
C. Indicated altitude would decrease 300 feet.

Answer **(C)** is correct.
DISCUSSION: A change of one inch in the altimeter setting will change the indicated altitude by 1000 feet. A decrease in the altimeter setting causes the altimeter indicate a decrease. In this example, the altimeter setting decreases from 30.12 to 29.82 that is equal to 0.3 in. or 300 feet. Therefore, the altimeter reading decreases by 300 feet.

42. A pilot changes the altimeter setting from 29.75 to 30.10. What would be the change in the indicated altitude?

A. Indicated altitude would increase 35 feet.
B. Indicated altitude would increase 350 feet.
C. Indicated altitude would decrease 350 feet.

Answer **(B)** is correct.
DISCUSSION: A change of one inch in the altimeter setting will change the indicated altitude by 1000 feet. An increase in the altimeter setting causes the altimeter to indicate an increase. In this example, the altimeter setting increases increases from 29.75 to 30.10 that is equal to 0.35 in or 300 feet. Therefore, the altimeter reading increases by 350 feet.

43. You are cruising at 5500 feet indicated altitude from point A where air temperature is much lower than standard to point B where air temperature is much warmer than standard.

Answer **(B)** is correct.
DISCUSSION: When your airplane is flying in air that is warmer than standard, your indicated altitude will be lower than your airplane's true altitude.

A. Over point B Your True altitude will be lower than point A.
B. Over point B your True altitude will be higher than point A.
C. Your true altitude will not change in this case.

44. Assume that you are flying from an area of high pressure to an area low pressure without resetting your altimeter, your indicated altitude will be:

A. Equal to your actual altitude above sea level.
B. Higher than true altitude.
C. Lower than true altitude.

Answer **(B)** is correct.
DISCUSSION: When you fly from an area of high pressure to an area of low pressure without resetting your altimeter, your indicated altitude will be higher than your true altitude.

45. Assume that you are flying from an area of low pressure to an area of high pressure without resetting your altimeter, your indicated altitude will:

A. Equal to your actual altitude above sea level.
B. Higher than true altitude.
C. Lower than true altitude.

Answer **(C)** is correct.
DISCUSSION: When you fly from an area of low pressure to an area of high pressure without resetting your altimeter, your indicated altitude will be lower than your true altitude.

46. When air temperature is colder than standard:

A. The true altitude is lower than the indicated altitude.
B. The indicated altitude is lower than the true altitude.
C. Density altitude is higher than indicated altitude.

Answer **(A)** is correct.
DISCUSSION: In colder-than-standard air temperature your true altitude will be lower than your indicated altitude.

47. When air temperature is warmer than standard:

A. The true altitude will be higher than the indicated altitude.
B. The true altitude will be lower than the indicated altitude.
C. The density altitude will be lower than indicated altitude.

Answer **(A)** is correct.
DISCUSSION: When the air temperature is warmer than standard, your true altitude will be higher than your indicated altitude.

48. What are the three gyroscopic instruments of your airplane?

A. Turn coordinator, heading indicator, and altimeter.
B. Heading indicator, attitude indicator, and vertical speed indicator.
C. Turn coordinator, heading indicator, and attitude indicator.

Answer **(C)** is correct.
DISCUSSION: The three gyroscopic instruments in the airplanes are the attitude indicator, heading indicator, and the turn coordinator. The attitude indicator and heading indicator are powered by the vacuum system in most small airplanes, and the turn coordinator is power by the airplane's electrical system.

49. A gyro tends to remain fixed in the plane in which it is spinning. This principle is called:

A. Bernoulli's principle.
B. Rigidity in space.
C. Precession.

Answer **(B)** is correct.
DISCUSSION: Rigidity in space refers to the principle that a spinning wheel with a heavily weighted rim tends to remain fixed in the plane in which it is spinning.

50. When an outside force acts to tilt a spinning gyro, the gyro responds as if the force had been applied in 90 º further in the direction of rotation. This principle is called:

A. Bernoulli's principle.

Answer **(C)** is correct.
DISCUSSION: When an outside force is applied to tilt a spinning gyro, the effect of this force is felt 90 º further around in the direction of rotation.

B. Rigidity in space.
C. Precession.

51. In order to receive accurate heading from a heading indicator during flight, it is necessary to:

A. Set the instrument to the runway heading prior to takeoff.
B. Calibrate the instrument on a compass rose at 30 minute intervals.
C. To align the heading indicator with the magnetic compass at 15 minute intervals.

Answer **(C)** is correct.
DISCUSSION: Due to gyro precession the heading drifts from the correct setting, therefore, it is required to realign your heading indicator with the magnetic compass periodically (approximately every 15 minutes during flight).

52. What information is obtained from a turn coordinator?

A. A turn coordinator indicates the rate of turn and the rate of roll of the airplane.
B. It indicates the bank angle of your aircraft.
C. Attitude of the aircraft with reference to the vertical axis.

Answer **(A)** is correct.
DISCUSSION: The miniature airplane of the turn coordinator directly indicates rate of turn and rate of roll of your airplane, and it indirectly indicates the bank attitude.

53. A turn-and-slip indicator is an instrument that directly indicates the:

A. Rate of roll.
B. Rate of turn.
C. Bank attitude.

Answer **(B)** is correct.
DISCUSSION: A turn-and-slip indicator only indicates the rate of turn, and it indirectly indicates the bank attitude. However, it does not indicate the rate of roll.

54. An abnormally high engine oil temperature could be due to:

A. Operating with an excessively low oil level.
B. Operating with an excessively rich mixture.
C. Operating with a high viscosity oil.

Answer **(A)** is correct.
DISCUSSION: With the oil level being too low, transferring of engine heat to the engine's oil cooler is prevented. Additionally, insufficient oil may damage an engine from friction within the cylinders and other metal parts against each other.

55. What will happen as a result of an excessively high engine temperature?

A. Nothing will happen to the aircraft engine.
B. Heat-conducting hoses and warping of the cylinder cooling fins will be damaged.
C. Loss of power, excessive oil consumption, detonation, and will also lead to serious permanent internal engine damage.

Answer **(C)** is correct.
DISCUSSION: Operating the engine at excessively high temperatures will result in loss of power, excessive oil consumption, detonation, and also results in serious permanent damage.

56. The internal cooling of the reciprocating aircraft engines is accomplished by:

A. Air flow over fins attached to the cylinder.
B. Flow of oil through the lubricating system.
C. Air flow over the exhaust manifold and throttle body.

Answer **(B)** is correct.
DISCUSSION: Flow of oil through the lubricating system is vital to the internal cooling of reciprocating aircraft engines.

57. A pilot notices that the cylinder head temperature and engine oil temperature have exceeded their normal range, what could

Answer **(C)** is correct.
DISCUSSION: Excessively high temperature indicated can

have caused this high temperature indication?

A. Operating with an excessively rich mixture.
B. Oil pressure being too high.
C. Operating with too high power setting and the mixture set too lean.

can be caused when operating with very high power setting and with the low fuel to air mixture ratio.

58. One procedure that helps in cooling an overheating engine is to:

A. Increase the rate of climb and add power.
B. Decrease you rate of climb and add power.
C. Reduce your rate of climb and increase the airspeed.

Answer **(C)** is correct.
DISCUSSION: Decreasing rate of climb causes the airspeed to increase. Increasing the airspeed increases the airflow into the engine compartment which results in decreasing of engine temperature.

59. In order to reduce the temperature of an engine that is overheating a pilot must:

A. Increase the rate of climb and decrease the airspeed.
B. Increase the fuel to air ratio by enriching the fuel mixture.
C. Increase the RPM and lean the fuel mixture.

Answer **(B)** is correct.
DISCUSSION: Enriching the fuel to air ratio (mixture), adds extra fuel to the mixture which increases the cooling effect.

60. If the pilot does not adjust the mixture setting, the fuel to air ratio becomes rich as the altitude increases. Why does it happen?

A. The density of fuel decreases but the density of air decreases less.
B. The density of fuel remains the same while the density of air decreases.
C. The density of fuel remains the same and the volume of air decreases.

Answer **(B)** is correct.
DISCUSSION: When the altitude increases the density of air entering the carburettor decreases while the density of fuel remains constant. Therefore if the pilot doesn't lean the mixture to adjust the fuel to air ratio, the mixture becomes excessively rich.

61. A pilot is performing the run-up checks at a high- elevation airport, and he notes that the engine runs slightly rough that is not caused by the magneto check but becomes worse when carburetor heat is checked. What initial action should this pilot take?

A. Shut down the engine and restart the engine.
B. Lean the mixture to establish the correct fuel to air ratio.
C. Turn the electric fuel pump on to provide fuel under pressure to the engine generally .

Answer **(B)** is correct.
DISCUSSION: As the altitude increases, the air becomes less dense and the use of carburettor heat makes the air even less dense (heated air is less dense) which causes the fuel /air mixture to become too rich. Therefore, leaning the mixture should solve this problem.

62. As the altitude increases the pilot needs to adjust the ratio of fuel to air mixture in order to:

A. Decrease the fuel flow to compensate for the increased air density.
B. Increase the fuel density to compensate for the increased air density.
C. Decrease the fuel density to compensate for the decreased air density.

Answer **(C)** is correct.
DISCUSSION: The higher the altitude, the lower the density of air becomes. Therefore, the pilot needs to adjust the mixture setting to decrease the fuel flow (fuel density) in order to establish the correct fuel to air ratio.

63. An airplane is cruising at 3500 feet and the mixture is properly set. What will happen if the airplane climbs to 7500 feet without adjusting the mixture?

A. The fuel/air mixture will become too rich and this will cause the cylinder head temperature to increase which consequently results in detonation.
B. The fuel to air ratio becomes excessively lean, therefore, the mixture must be enriched during climb.
C. The fuel air mixture will become rich, hence, to maintain the correct fuel to air ratio the mixture must be leaned during climb.

Answer **(C)** is correct.
DISCUSSION: When the altitude increases the density of air entering the carburetor decreases while the density fuel remains constant. Therefore, the mixture adjustments are required during climb and descent to maintain the proper fuel/air ratio.

64. The fuel to air ratio is the:

A. Ratio between the density of fuel and volume of air entering the cylinder
B. Ratio between the density of fuel and the density of air entering the cylinder.
C. Ratio between the density of fuel and the density of air entering the carburetor.

Answer **(B)** is correct.
DISCUSSION: The fuel to air ratio is defined as the ratio between the density (weight) of the fuel and the density of air entering the cylinder.

65. The ratio between the air and fuel that enters the engine cylinders is controlled by:

A. Throttle.
B. Electric fuel pump.
C. Mixture.

Answer **(C)** is correct.
DISCUSSION: Mixture control adjusts the ratio between fuel and air that enters into the cylinders. However, the throttle controls the total volume of fuel and air that enters the cylinders.

66. The use of carburetor heat:

A. Enriches the Fuel/air mixture because the heated air is denser than the outside air that had been entering the cylinder.
B. Enriches the Fuel/air mixture because the heated air is less dense than the outside air that had been entering the cylinder.
C. Will not enrich the fuel/air mixture.

Answer **(B)** is correct.
DISCUSSION: When carburettor heat is applied, the heated air which is less dense than the outside air is introduced into the engine. Therefore, the fuel/air mixture becomes richer because the amount of fuel remains unchanged and the air gets less dense.

67. Applying carburetor heat causes:

A. The engine RPM to decrease slightly, because the heated air is more dense than the outside air that had been entering the cylinders.
B. The fuel/air mixture to become leaner.
C. The fuel/air mixture to become richer.

Answer **(C)** is correct.
DISCUSSION: When carburettor heat is applied, the heated air which is less dense than the outside air is introduced into the engine. Therefore, the fuel/air mixture becomes richer because the amount of fuel remains unchanged and the air gets less dense.

68. The use of carburetor heat generally:

A. Increases engine performance.
B. Decreases engine performance.

Answer **(B)** is correct.
DISCUSSION: The use of carburettor introduces hot air that is less dense into the engine. The heated air reduces the engine performance and also increases the operating

C. Has no effect on engine performance.

temperature of the engine. Therefore, the use of carburettor heat is not recommended during phases that full power is required (such as takeoff).

69. With regard to carburetor ice, float-type carburetor systems in comparison to fuel injection systems are generally considered to be:

A. less susceptible to icing.
B. more susceptible to icing.
C. susceptible to icing when there is visible moisture in the air.

Answer **(B)** is correct.
DISCUSSION: Float-type carburettors are more prone to icing than fuel injection systems. Carburettor icing forms in the carburettor venturi. Carburettor icing is most most likely to occur when the outside air temperature is between -7º C and 21º C and relative humidity is above 80% or there is visible moisture in the air.

70. The operating principle of the float-type carburetor is based the:

A. decrease in air velocity in the throat of a venturi, causing an increase in air pressure.
B. difference in air pressure at the venturi throat and the air inlet.
C. the shape of the venturi that creates an area of high pressure.

Answer **(B)** is correct.
DISCUSSION: When air flows into the carburettor, it passes through a venturi. This increases the velocity of the air and decreases its pressure. As the air flows faster though the venturi, a low pressure area is created which draws the fuel form a main fuel jet located at the throat of the carburettor and into the airstream, where it is mixed with flowing air.

71. What would be the first indication of carburetor icing in an aircraft with a fixed-pitch propeller and a float-type carburetor?

A. Engine roughness.
B. A decrease in cylinder head temperature.
C. A reduction in engine RPM.

Answer **(C)** is correct.
DISCUSSION: In an airplane with a fixed-pitch propeller and a float-type carburettor, the first indication of carburettor icing would be a decrease in engine RPM, followed by engine roughness.

72. Ice has formed in the carburetor of an airplane that is equipped with a fixed-pitch propeller, and the pilot applies the carburetor heat to eliminate ice. How does the change in this situation?

A. A slight decrease in RPM, and then remains constant.
B. A slight decrease in RPM, followed by a gradual increase in RPM.
C. An increase in RPM, followed by a gradual decrease in RPM.

Answer **(B)** is correct.
DISCUSSION: The presence of carburettor ice in an airplane with a fixed-pitch propeller can be verified when the pilot applies the carburettor head and he notes that there is a slight decrease in RPM, and then a gradual increase in RPM as the ice eliminates. When the pilot applies the carburettor heat, there will be a slight decrease in RPM because the heated air is less dense than the outside air that had been entering the engine. This reduces the power output.

73. Under which conditions carburetor icing is more likely to occur?

A. When temperature is below freezing and humidity is less than 40%.
B. When temperature is between 0º C and 20º C and humidity is high.
C. When temperature is between -7º C and 21º C and humidity is above 80%.

Answer **(C)** is correct.
DISCUSSION: Carburettor icing is more like to happen when temperature is between -7º C and 21º C and humidity is above 80%. However, due to the sudden cooling that can occur in the carburettor, ice can form even at high temperatures like 38º C and humidity as low as 50%.

74. When does detonation occur in reciprocating engines?

A. When there is an explosive increase of fuel due to an excessively rich mixture setting.
B. When the fuel/ air mixture in the cylinder's combustion chamber explodes instead of burning normally.
C. It occurs when there is an electrical short in spark plugs wires.

Answer **(B)** is correct.
DISCUSSION: Detonation occurs when fuel/air mixture in the cylinders explode instead of burning.

75. What can cause detonation?

A. Operating at high power settings and the mixture being too lean.
B. Low engine temperatures.
C. An extremely rich mixture.

Answer **(A)** is correct.
DISCUSSION: Detonation is an uncontrolled, explosive ignition within the cylinders instead. Detonation causes extreme temperatures and pressures, and if allowed to continue, can lead to severe damage and failure of affected parts. Detonation may be caused by the following conditions: the engine operating at excessively high temperatures, operating at high RPM and low airspeed, using lower-than-specified-fuel grade, and extremely lean mixture.

76. If detonation is suspected on climb-out after takeoff, what initial corrective action would you take in this situation?

A. Reduce your rate of climb to increase airspeed and retard the throttle.
B. Lean the mixture.
C. Increase your rate of climb to reduce your airspeed.

Answer **(A)** is correct.
DISCUSSION: If detonation is suspected during your climb-out, it is recommended to decrease the rate of climb in order to increase your airspeed and reduce the power.

77. What will most likely happen if you use a fuel that is lower than specified grade?

A. The engine oil temperature will remain at the normal operating range.
B. Detonation will occur.
C. A mixture of fuel and air will form that is not uniform in the cylinders.

Answer **(B)** is correct.
DISCUSSION: If you use a lower-than-specified fuel grade, it will most likely cause detonation. The lower-grade fuel ignite at lower temperature,

therefore, an engine that has reached high temperatures may cause a lower- than-specified grade fuel to explode (detonate) instead of burning smoothly.

78. Detonation may lead to another problem, known as …….

A. Pre-ignition.
B. Vapor lock.
C. Combustion.

Answer **(A)** is correct.
DISCUSSION: Detonation can often lead to another problem known as pre-ignition.

79. The uncontrolled combustion of fuel/air mixture in advance of normal ignition is known as:

A. Detonation
B. Pre-ignition.

Answer **(B)** is correct.
DISCUSSION: Pre-ignition is defined as the uncontrolled combustion of fuel/air mixture in advance of normal ignition. Pre-ignition can be caused by a residual hot spot in the cylinder such as a carbon particle on a spark plug, a cracked

C. Spark plug fouling.

ceramic spark plug insulator, or almost any damage around the combustion chambers.

80. What is the main purpose of incorporating a dual ignition system on an aircraft engine?

A. To improve engine performance
B. Uniform heat distribution.
C. To balance cylinder head pressure.

Answer **(A)** is correct.
DISCUSSION: The incorporation of the dual ignition system into the aircraft engine increases safety and combustion of the fuel/air mixture, which results in improved engine performance.

81. Before engine shutdown, when the power is at idle, the ignition key is momentarily turned off. The engine continues to run without any interruption; this:

A. Is normal because the engine is usually stopped by moving the mixture to idle.
B. Won't normally happen. It indicates that a magneto not grounding in OFF position.
C. This indicates that there is nothing wrong with the ignition system.

Answer **(B)** is correct.
DISCUSSION: When an engine continues to run even after the ignition switch has been turned off, you can conclude that it is most likely due to a broken magneto ground wire. The ignition switch is unable to ground the magneto to stop the generation of electrical impulses that provide electricity to the spark plug.

82. How can you conclude that the magneto ground wire is broken?

A. Bring the power to idle, and momentarily turn the ignition switch off.
B. Turn the ignition switch from BOTH to only One magneto, lean the mixture, and look for an increase in manifold pressure.
C. Hold the brakes, apply full power, and momentarily turn the ignition switch off.

Answer **(A)** is correct.
DISCUSSION: You can detect a broken magneto ground wire when an engine continues to run even after the ignition switch has been turned off.

83. What is most likely to cause an engine to continue running after the ignition switch is turned off?

A. Overheated exhaust manifold.
B. Carbon deposits glowing on the spark plugs.
C. Magneto ground wire is in contact with engine casing.
D. A broken magneto ground wire.

Answer **(D)** is correct.
DISCUSSION: A broken magneto ground wire causes the engine to continue running even after you turn the ignition switch off.

84. How is the engine of an airplane equipped with a constant-speed propeller controlled?

A. The throttle controls power output which is indicated on the manifold pressure gauge and propeller control adjusts a constant blade angle.
B. The throttle controls power output which is indicated on manifold pressure gauge and the propeller control regulates the engine RPM which is indicated on the tachometer.
C. The throttle controls engine RPM which is indicated on the tachometer and the propeller control regulates the power output which is indicated on manifold pressure gauge.
D. The throttle adjusts the propeller blades angle to control the RPM, and the mixture control regulates the power output.

Answer **(B)** is correct.
DISCUSSION: The engine of an aircraft equipped with a constant- speed propeller is controlled directly by the propeller and indirectly by the propeller control. The throttle controls engine power output which is indicated on the manifold pressure gauge, and the propeller control regulates the engine RPM (by changing the pitch of the propeller blades) which is indicated on the on the tachometer.

85. The engine of an airplane equipped with a constant-speed propeller is controlled directly by the…….and indirectly by the …….. .

A. propeller control – throttle.
B. throttle – propeller control.
C. throttle – mixture control.
D. propeller control – mixture control.

Answer **(B)** is correct.
DISCUSSION: The engine of an airplane equipped with a constant- speed propeller is controlled directly by the throttle and indirectly by the propeller control.

86. To prevent internal stress on the engine of an airplane equipped with a constant-speed propeller you should:

A. Avoid high RPM settings with low manifold pressure.
B. Avoid low RPM settings with high manifold pressure.
C. Always use a rich mixture with high RPM settings.
D. Always use a rich mixture with high manifold pressure.

Answer **(B)** is correct.
DISCUSSION: On the engine of airplanes equipped with a constant-speed propeller, you should avoid low RPM settings with high manifold pressure to prevent internal engine stress.

87. An advantage of a constant-speed propeller is that it:

A. Allows the pilot to select a high blade angle and high RPM setting for takeoffs.
B. Allows the pilot to select and maintain a desired cruising speed.
C. Allows the pilot to select the blade angle that provides the most efficient performance.
D. Allows the airplane to operate smoother with stable RPM and eliminates vibrations.

Answer **(C)** is correct.
DISCUSSION: A constant speed propeller, also referred to as a variable-pitch or controllable- pitch propeller, allows the pilot to select the blade angle that provides the most efficient performance. For instance, a low blade angle and a lower pitch, reduces the propeller drag which allows higher RPM for maximum thrust on takeoffs. After the airplane reaches the cruising flight conditions, the pilot can select a higher pitch and a lower RPM to maintain adequate thrust for the selected airspeed. This process is similar to using a low gear in an automobile to accelerate, then shifting to high gears for cruising speed.

88. A propeller with a low blade angle provides the best performance for takeoff and climb is known as a …….and one with a high blade angle provides the best performance for high cruise speed and high altitude flight referred to as a ….....

A. takeoff propeller – cruise propeller.
B. climb propeller – cruise propeller.
C. constant-speed propeller – variable-pitch propeller.
D. cruise propeller – climb propeller.

Answer **(B)** is correct.
DISCUSSION: A propeller with a low blade angle provides the best performance for takeoff and climb is known a climb propeller and one with a high blade angle provides the best performance for high cruise speed and high altitude flight is referred to as a cruise propeller.

89. The…… is much more efficient than a fixed-pitch propeller.

A. Climb propeller.
B. Cruise propeller.
C. Constant-speed propeller.
D. three-blade propeller.

Answer **(C)** is correct.
DISCUSSION: A constant-speed propeller, also referred to as a variable-pitch or controllable-pitch propeller is more more efficient as compared to a fixed-pitch propeller. A constant-speed propeller allows the pilot to adjust the blade angle for the most efficient performance.

90. Under what condition a vapor lock may occur?

A. When operating with an excessively rich mixture.

Answer **(C)** is correct.
DISCUSSION: On an airplane equipped with fuel pumps, running a tank completely dry can allow air to enter the fuel

B. Anytime the cylinder head temperature exceeds the normal operating range
C. When you run a fuel tank completely dry.
D. Anytime you use the carburetor heat for more than 5 minutes.

system and cause vapor lock. When this happens, it can be difficult, or impossible, to restart the engine.

91. What type of fuel may be substituted if the recommended grade of fuel is not available?

A. The next lower grade of fuel.
B. The next higher grade of fuel.
C. Automobile gas of the same octane rating.
D. You should never use other than the recommended grade.

Answer **(B)** is correct.
DISCUSSION: If the recommended fuel grade is not available for an airplane, the next higher grade aviation gas may be airplane, the next higher grade aviation gas may be used.

92. What can cause the cylinder head temperature and engine oil temperature to exceed their normal operating limits?

A. Operating with a very high viscosity oil.
B. Operating with an extremely rich fuel/air mixture.
C. Using a higher-than specified fuel grade.
D. Using a lower-than specified fuel grade.

Answer **(D)** is correct.
DISCUSSION: Using a lower-than-specified fuel grade can cause the cylinder head temperature and engine temperature to exceed their normal operating limits.

93. On an airplane equipped with fuel pumps, when should a pilot use the electric driven pump?

A. Electric driven pumps should be always used to help the engine driven fuel pumps in providing fuel to the engine.
B. It should always be used except for the engine start.
C. Must be used when the RPM is reduced below 2000.
D. When the engine-driven fuel pumps fails

Answer **(D)** is correct.
DISCUSSION: An electric driven pump provides fuel under pressure for engine starting and also as a backup if the engine driven fuel pump fails

94. Which component of the fuel system allows air pressure inside the tank to remain the same as the outside the tank?

A. Fuel strainer.
B. Primer.
C. Fuel filler cap.
D. Fuel tank vents.

Answer **(D)** is correct.
DISCUSSION: The fuel tanks contain a vent which allows air pressure inside the tank to remain equal to the air pressure outside the tank. This prevents the formation of vacuum which would restrict fuel flow out of the tank. The vent can be located in the filler caps, or the tank may be vented through a small tube extending through the wing surface.

95. Why is it considered good practice to fill the fuel tanks after the last flight of the day?

A. To force any existing water to the top of the tank away from the fuel lines.
B. To prevent moisture from condensing by eliminating air from the tanks.
C. To prevent expansion of fuel by eliminating air from the tanks.

Answer **(B)** is correct.
DISCUSSION: It is considered good practice to fill the fuel tanks after the last flight of the day, because it prevents moisture condensation by eliminating air from the tanks.

96. The process of converting the……..... in fuel into ……. Takes place in the cylinder of reciprocating engine.

Answer **(B)** is correct.
DISCUSSION: The process of converting the chemical energy in fuel into the mechanical energy takes place in

A. mechanical energy – chemical energy.
B. chemical energy – mechanical energy.
C. thermal energy – chemical energy.

the cylinder of reciprocating engine.

97. Most reciprocating engines use a four-stroke operating cycle. What is the correct order of the steps in this cycle?

A. Compression – Intake – Power – Exhaust.
B. Intake – Power – Compression – Exhaust.
C. Intake – Compression – Power – Exhaust.
D. Compression – Power – Intake – Exhaust.

Answer **(C)** is correct.
DISCUSSION: The four stroke operating cycle consists of the following steps:
1) Intake: In this phase, the piston moves away from the cylinder head, the intake valve opens and the fuel and air mixture are drawn into the cylinder.
2) Compression: In this stroke, the piston starts moving upward, the intake valve closes, and the fuel and air mixture is compressed. When the compression is nearly complete, the spark plugs fire to ignite the compressed mixture.
3) Power: In this phase, the high pressure gases from the controlled burning of the air and fuel mixture moves the piston away from the cylinder head, therefore providing power to rotate the crankshaft.
4) Exhaust: In this step of the cycle, the piston moves back toward the cylinder head and the burned gases are expelled through the opened exhaust valve.

98. When you operate an airplane equipped with a reciprocating engine at high altitudes, efficiency of the engine decreases as a result of reduced ……, even though the ……. remains the same.

A. fuel flow – air density.
B. volume of air – fuel flow.
C. volume of air – density
D. air density – volume of air.

Answer **(D)** is correct.
DISCUSSION: As the altitude increases the amount of fuel remains the same, while the density of air decreases (fuel/air mixture becomes richer). The volume of air does not change with an increase in altitude.

99. What should be the pilot's first action after starting an aircraft engine?

A. Turn the avionics master switch on.
B. Test the brakes and set the parking brakes.
C. Adjust RPM and check engine gauges for proper indications
D. Turn the beacon light on.

Answer **(C)** is correct.
DISCUSSION: After starting the engine, a pilot should adjust RPM and check engine gauges for proper indications

100. When hand-starting an airplane engine, it is very important that a competent pilot:

A. be in the cockpit and call out all the commands.
B. be at the controls.
C. hand-prop the airplane.

Answer (B) is correct.
DISCUSSION: When hand-starting an airplane engine, it is very important that a competent pilot be at the controls.

101. What is essential for internal cooling of an airplane engine?

A. Outside air flowing around the engine.
B. Engine oil system.
C. Water cooling.
D. Opening the cowl flaps.

Answer **(B)** is correct.
DISCUSSION: Engine oil system is essential to internal cooling of the engine. In order to maintain normal temperatures, additional cooling is also required. Much of the remaining heat is dissipated in the exhaust gases And through outside air flowing around the engine.

102. What method is helpful in reducing the engine temperature?

A. Leaning the mixture.
B. Increasing the rate of climb.
C. Reducing the airspeed.
D. Reducing power.

Answer **(D)** is correct.
DISCUSSION: Engine temperature may be reduced by decreasing the rate of climb, increasing airspeed, enriching the fuel/air mixture, and reducing power.

103. What is the primary purpose of the battery in aircraft electrical system?

A. Providing a means of starting the engine
B. To provide standby or emergency electrical power in the event of alternator malfunction.
D. Operation of electrical components without starting the engine.

Answer **(B)** is correct.
DISCUSSION: fuel/air mixture, and reducing power aircraft electrical system is the battery. The primary purpose of the battery is to provide the means of starting the engine. However, battery allows limited operation of electrical components without starting the engine. It also provides standby or emergency electrical power in the event of alternator malfunction.

104. The standard temperature and pressure values at sea level are:

A. 15 ºF and 29.92 in. Hg.
B. 15 ºC and 29.92 in. Hg.
C. 59 ºC and 1013.2 millibars.
D. 15 º and 1013.2 millibars.

Answer **(B)** is correct.
DISCUSSION: The standard temperature and pressure at sea level are 15 ºC and 29.92 in. Hg. These values are equivalent to 59º F and 1013.2 millibars of mercury.

105. Which factor will cause an increase in density altitude at a given airport?

A. A decrease in temperature.
B. A decrease in humidity.
C. A decrease in ambient pressure.

Answer **(C)** is correct.
DISCUSSION: As atmospheric pressure decreases, the air becomes less dense which results in an increase in density altitude. low ambient pressure, high humidity, and high temperature would tend to decrease air density. The decreased air density causes an increase in density altitude.

106. Which factor will cause a decrease in density altitude at a given airport?

A. A decrease in temperature.
B. A decrease in atmospheric pressure.
C. An increase in humidity.

Answer **(A)** is correct.
DISCUSSION: When the ambient temperature decreases, the air density increases which results in a decrease in density altitude.

107. How does high humidity affect the aircraft performance?

A. It does not affect the performance.
B. It decreases the performance.
C. It increases the performance.

Answer **(B)** is correct.
DISCUSSION: As the humidity increases the air density decreases This is because a given volume of air that contains water vapor weighs less than the same volume of dry air. When air density decreases the performance diminishes.

108. Density altitude varies directly with …… and ……, and inversely with …….. .

A. Humidity – atmospheric pressure – temperature.
B. Temperature – atmospheric pressure – humidity.
C. Humidity – temperature – atmospheric pressure.

Answer **(C)** is correct.
DISCUSSION: Density altitude varies directly with humidity and temperature, and inversely with barometric pressure.

109. How does the propeller efficiency change as the density altitude increases?

A. Efficiency increases due to less friction on the propeller blades.
B. Efficiency is reduced because the propeller exerts more force as the air density decreases.
E. Efficiency diminishes because the propeller exerts less force at high density altitudes.

Answer **(C)** is correct.
DISCUSSION: The propeller produces thrust in proportion to the mass of air being accelerated through the rotating propeller. As the air density decreases (higher density altitude) the propeller efficiency decreases as well.

110. An increase in density altitude results in:

A. An increase in engine performance.
B. A diminished climb performance.
C. An increase in takeoff performance.
D. An increase in propeller efficiency.

Answer **(B)** is correct.
DISCUSSION: As density altitude increases, the airplane's overall performance decreases.

111. Under which set of atmospheric conditions the aircraft takeoff and climb performance are reduced?

A. High temperature, low humidity, and low density altitude.
B. High temperature, high humidity, and low density altitude.
C. low temperature, high humidity, and low density altitude.
D. High temperature, high humidity, and high density altitude.

Answer **(D)** is correct.
DISCUSSION: Takeoff and climb performance are reduced with an increase in density altitude. Density altitude increasesdue to high temperature, high humidity, and low atmospheric pressure.

112. On a day that temperature is above standard at a given altitude, the density altitude is:

A. lower than pressure altitude.
B. higher than pressure altitude.
C. equal to pressure altitude.

Answer **(B)** is correct.
DISCUSSION: Air expands when heated and therefore becomes less dense. This decrease in air density causes the density altitude to increase. Pressure altitude is based on standard temperature. Therefore, density altitude will be higher than pressure altitude when the air temperature is above standard.

113. (Refer to Figure 23) Determine the density altitude for the following conditions:

Altimeter setting: 30.10 in. Hg
Temperature: 27 ºC (80 ºF)
Airport elevation: 665 ft. MSL

A. 2000 feet MSL.
B. 500 feet MSL.
C. 1500 feet MSL.

Answer **(A)** is correct.
DISCUSSION: With an altimeter setting of 30.10 in. Hg., we must subtract 165 feet from the field elevation to obtain the pressure altitude of 500 feet. Note that in this example, the pressure altitude will be less than the true altitude because of the higher-than-normal pressure of

30.10. Now that you have found the pressure altitude, enter the chart at the bottom, just above the temperature of 27 ºC. Proceed up the chart vertically until you intercept 500 feet pressure altitude. Finally, move horizontally to the left to reach the density altitude of 2000 feet. Since the air temperature is warmer than standard, the density altitude is higher than pressure altitude. This means your airplane will perform as if it were at 2000 feet MSL on a standard day.

114. (Refer to Figure 23) Determine the density altitude for the following conditions:

Altimeter setting: 30.15 in. Hg
Temperature: 32 ºC (90 ºF)

Answer **(C)** is correct.
DISCUSSION: With an altimeter setting of 30.15 in. Hg., we should subtract 211 feet from the field elevation to obtain a pressure altitude of 2000 feet. Interpolation was used to find 211 feet: 30.10 on the graph is -165 feet, and 30.20 is -257 ft. Subtract -165 feet from -257 feet to

Airport elevation: 2211 ft. MSL

A. 1800 feet MSL.
B. 3500 feet MSL.
C. 4500 feet MSL.
D. 4800 feet MSL.

get -92 feet difference, and then add one-half the -92 feet (-46 ft.) to -165 feet to get -211 feet. Note that in this example, the pressure altitude will be less than the true altitude because of the higher-than-normal pressure of 30.15. Now that you have found the pressure altitude, enter the chart at the bottom, just above the temperature of 32 ºC. Proceed up the chart vertically until you intercept 2000-foot pressure altitude line. Finally, move horizontally to the left to reach the density altitude of 4500 feet. Since the air temperature is warmer than standard, the density altitude is higher than pressure altitude. This means your airplane will perform as if it were at 4500 feet MSL on a standard day.

115. (Refer to figure 23) Temperature increases from 16 ºC to 21 ºC and pressure altitude remains at 2000 feet. What effect does it have on the density altitude?

A. 650-foot decrease.
B. 650-foot increase.
C. 850-foot increase.
D. 850-foot decrease.

Answer **(B)** is correct.
DISCUSSION: On the density altitude chart, just above the temperature of 16 ºC proceed up the chart vertically and intercept the diagonal 2000-foot pressure altitude line, and then move horizontally to the left to reach the density altitude of 2500 feet. Use the same instructions to plot 2000 feet pressure altitude at 21 ºC, to reach 3150 feet density altitude. Therefore, when temperature rises from 16 ºC to 21 ºC at the pressure altitude of 2000 feet, the density altitude increases from 2500 ft. to 3150 ft. This a 650-foot increase in density altitude.

116. (Refer to figure 23) Temperature decreases from 27 ºC to 16 ºC and pressure altitude remains at 3000 feet. What effect does it have on the density altitude?

A. 1100-foot increase
B. 1500-foot increase
C. 1100-foot decrease
D. 1300-foot decrease

Answer **(D)** is correct.
DISCUSSION: On the density altitude chart, just above the temperature of 27 ºC proceed up the chart vertically and intercept the diagonal 3000-foot pressure altitude line, and then move horizontally to the left to reach the density altitude of approximately 4900 feet. Use the same instructions to plot 3000 feet pressure altitude at 16 ºC, to reach the density altitude of approximately 3600 feet. Therefore, when temperature decreases from 27 ºC to 16 ºC at the pressure altitude of 3000 feet, the density altitude decreases from 4900 ft. to 3600 ft. This a 1300-foot decrease in density altitude.

117. (Refer to figure 23) What is the pressure altitude at an airport that is 2500 feet MSL with an altimeter setting of 29.85 in Hg.?

A. 2586 feet MSL.
B. 2566 feet MSL.
C. 2546 feet MSL.
D. 2648 feet MSL.

Answer **(B)** is correct.
DISCUSSION: Pressure altitude is determined by setting the altimeter to the standard sea level pressure of 29.92 in. Hg. Since 29.85 is not a number given on the conversion chart, you need to interpolate. On the density altitude chart, an altimeter setting of 29.80 requires you to add 112 feet to determine the pressure altitude, and 29.90 requires you to add 20 feet. Subtract 20 ft. from 112 ft. to get 92 feet difference. Since 29.85 is half way between 29.80 and 29.90, you must only add 46 (92/2) to 20 feet, which is 66 ft. Now add 66 ft. to 2500 ft. to obtain a pressure altitude of 2566 ft.

118. (Refer to figure 23) What is the pressure altitude at an airport that is 1960 feet MSL with an altimeter setting of 29.98 in. Hg.?

A. 1920 feet MSL.
B. 1935 feet MSL.

Answer **(D)** is correct.
DISCUSSION: Pressure altitude is displayed on the altimeter when it is adjusted to the standard sea level pressure of 29.92 in. Hg. In this example, you must interpolate because 29.98 is not given on the conversion chart. On the

C. 1890 feet MSL.
D. 1905 feet MSL.

density altitude chart, an altimeter setting of 30.00 requires you to subtract 73 feet to determine the pressure altitude. However, with an altimeter setting of 29.92, nothing is subtracted or added because that is pressure altitude. Since 29.98 is 6/8 of the way between 29.92 and 30.00, you must compute 6/8 of -73 which is equal to 55. Subtract 55 feet from 1960 feet to obtain a pressure altitude of 1905 feet.

119. (Refer to figure 23) What is the pressure altitude at an airport that is 3850 feet MSL with an altimeter setting of 30.10 in. Hg.?

A. 3685 feet MSL.
B. 3777 feet MSL.
C. 3923 feet MSL.
D. 3870 feet MSL.

Answer **(A)** is correct.
DISCUSSION: Pressure altitude is determined by setting the altimeter to the standard sea level pressure of 29.92 in. Hg. on the density altitude chart, an altimeter setting of 30.10 requires you to subtract 165 feet to determine the pressure altitude. Hence, subtract 165 feet from 3850 feet to obtain a pressure altitude of 3685 feet MSL.

120. (Refer to figure 23) What is the pressure altitude at an airport that is 3850 feet MSL with an altimeter setting of 29.75 in. Hg.?

A. 3870 feet MSL.
B. 3906 feet MSL.
C. 4008 feet MSL.
D. 3894 feet MSL.

Answer **(C)** is correct.
DISCUSSION: Pressure altitude is displayed on the altimeter when it is adjusted to the standard sea level Pressure of 29.92in. Hg. Since 29.75 is not a number Given on the conversion chart, you need to interpolate. On the density altitude chart, an altimeter setting of 29.70 requires you to add 205 feet to determine the pressure altitude, and 29.80 requires you to add 112 feet. Subtract 112 ft. from 205 ft. to get 93 feet difference. Since 29.75 is half way between 29.70 and 29.80, you must only add one-half the 93 ft. difference (46.5 ft.) to 112 to get 158.5 ft. You should now add 158.5 to 3850 to obtain a pressure altitude of approximately 4008 ft. MSL.

121. (Refer to figure 23) Temperature increases and pressure altitude decreases: from 21 ºC and 2700 feet pressure altitude to 27 ºC and 1300 feet pressure altitude. What effect does it have on the density altitude?

A. 700-foot increase.
B. 700-foot decrease.
C. 1000-foot increase.
D. 1000 foot decrease.

Answer **(D)** is correct.
DISCUSSION: On the density altitude chart, plot the pressure of 2700 ft. at 21 ºC, to reach 4000 feet density altitude. Then, plot the 1300 ft. pressure altitude at to reach 3000 feet density altitude. The following 27 ºC, changes in temperature and pressure altitude results in a 1000-foot decrease (from 4000 ft. to 3000ft.) in density altitude.

122. (Refer to figure 23) Temperature decreases and pressure altitude increases: from 10 ºC and 2200 feet pressure altitude to -7 ºC and 5000 feet pressure altitude. What effect does it have on the density altitude?

A. 1200-foot decrease.
B. 1300-foot decrease.
C. 1550-foot increase.
D. 1800 foot increase.

Answer **(C)** is correct.
DISCUSSION: On the density altitude chart, plot the pressure altitude of 2200 ft. at 10 ºC, to reach 2000 feet density altitude. Then, plot the 5000 ft. pressure altitude at at -7 ºC, to reach 3550 feet density altitude. The following changes in temperature and pressure altitude results in a 1550-foot increase (from 2000 ft. to 3550ft.) in density altitude.

123. (Refer to figure 23) Temperature increases and pressure altitude decreases: from 10 ºC and 2600 feet pressure altitude to 21 ºC and 1000 feet pressure altitude. What effect does it have on the density altitude?

A. 750-foot increase.
B. 750-foot decrease.
C. 550-foot increase.
D. 550 foot decrease.

Answer **(D)** is correct.
DISCUSSION: On the density altitude chart, plot the pressure altitude of 2600 ft. at 10 ºC, to reach 2500 feet density altitude.Then, plot the 1000 ft. pressure altitude at 21 ºC, to reach 1950 feet density altitude. The following changes in temperature and pressure altitude results in a 550-foot decrease (from 2500 ft. to 1950ft.) in density altitude.

124. (Refer to Figure 23) Determine the density altitude for the following conditions:

Altimeter setting: 29.95 in. Hg
Temperature: 4 ºC (80 ºF)
Airport elevation: 2327 ft. MSL

A. 1200 feet MSL.
B. 1350 feet MSL.
C. 1500 feet MSL.
D. 1650 feet MSL.

Answer **(C)** is correct.
DISCUSSION: With an altimeter setting of 29.95 in. Hg., about 27 feet must be subtracted from the field elevation to obtain the pressure altitude of . Interpolation was used to find 27 feet because 29.98 is not given on the conversion chart. On the density altitude chart, an altimeter setting of 30.00 requires you to subtract 73 feet to determine the pressure altitude. However, with an altimeter setting of 29.92, nothing is subtracted or added because that is pressure altitude. Since 29.95 is 3/8 of the way between 29.92 and 30.00, you must compute 3/8 of -73 which is 27.
Now that you have found the pressure altitude, enter the chart at the bottom, just above the temperature of 4 ºC. Proceed up the chart vertically until you intercept 2300-foot pressure altitude line. Finally, move horizontally to the left to reach the density altitude of 1500 feet. Since the air temperature is lower than standard, the density altitude is lower than pressure altitude.

125. (Refer to Figure 23) Determine the density altitude for the following conditions:

Altimeter setting: 30.65 in. Hg
Temperature: 32 ºC (80 ºF)
Airport elevation: 1867 ft. MSL

A. 3500 feet MSL.
B. 3700 feet MSL.
C. 3200 feet MSL.
D. 3100 feet MSL.

Answer **(A)** is correct.
DISCUSSION: With an altimeter setting of 30.65 in. Hg., we should subtract 667 feet from the field elevation to obtain a pressure altitude of 1200 feet. Interpolation was used to find 667 feet: 30.60 on the graph is - 622 feet, and 30.70 is -712 ft. Subtract -622 feet from -712 feet to get -90 feet difference, and then add one-half the -90 feet (-45 ft.) to -622 feet to get - 667 feet. Now that you have found the pressure altitude, enter the chart at the bottom, just above the temperature of 32 ºC. Proceed up the chart vertically until you intercept 1200-foot pressure altitude. Lastly, move horizontally to the left to reach the density altitude of 3500 feet.

126. (Refer to figure 23) Temperature decreases and pressure altitude increases: from 21 ºC and 2000 feet pressure altitude to - 1 ºC and 3300 feet pressure altitude. What effect does it have on the density altitude?

A. 1150-foot decrease.
B. 1300-foot increase.
C. 1350-foot decrease.
D. 1100 foot increase.

Answer **(A)** is correct.
DISCUSSION: On the density altitude chart, plot the pressure altitude of 2000 ft. at 21 ºC, to reach 3150 feet density altitude. Then, plot the 3300 ft. pressure altitude at -1 ºC, to reach 2000 feet density altitude. The following changes in temperature and pressure altitude results in a 1150-foot decrease (from 3150 ft. to 2000ft.) in density altitude.

127. (Refer to figure 23) What is the pressure altitude with an indicated altitude of 566 feet MSL and an altimeter setting of 29.55 at standard temperature?

A. 4140 feet MSL.
B. 4195 feet MSL.
C. 3890 feet MSL.
D. 3505 feet MSL.

Answer **(B)** is correct.
DISCUSSION: Pressure altitude is displayed on the altimeter when it is adjusted to the standard sea level pressure of 29.92in. Hg., i.e., adjusting for nonstandard Pressure. This is the indicated altitude plus or minus the pressure altitude conversion factor (based on the current altimeter setting). Since 29.55 is not a number given on the conversion chart, you need to interpolate. On the density altitude chart, an altimeter setting of 29.50 requires you to add 392 feet to determine the pressure altitude, and 29.60 requires you to add 298 feet . Subtract 298 ft. from 392 ft. to get 94 feet difference. Adding one-half the 94 ft. difference (47) to 298 ft., results in 345 feet. You must add 345 feet to 3850 ft. to obtain a pressure altitude of 4195 feet.

128. (Refer to figure 22) Determine the total distance required for takeoff to clear a 50-foot obstacle for the following conditions:

OAT:	20 ºC
Pressure Altitude:	6000 ft
Takeoff weight:	2600 lb
Headwind component:	calm

A. 1200 feet.
B. 2050 feet.
C. 2700 feet.
D. 2500 feet.

Answer **(B)** is correct.
DISCUSSION: Enter the graph at the bottom, just above the temperature of 20 ºC. Proceed up the chart vertically until you intercept the diagonal 6000-foot pressure altitude line. Then move horizontally to the first reference line, and then proceed parallel to the closest guideline to the total weight line (2600 lb). From there, move horizontally to the right to the second reference line, and because there is no wind, you may proceed on the same line to the third reference line. Finally, move parallel to the closest guideline all the way to the distance scale and read 2050 feet. This is the total distance required for takeoff to clear a 50-ft obstacle.

129. (Refer to figure 22) Determine the total distance required for takeoff to clear a 50-foot obstacle for the following conditions:

OAT:	Std
Pressure Altitude:	4000 ft
Takeoff weight:	2400 lb
Headwind component:	calm

A. 1100 feet.
B. 750 feet.
C. 1500 feet.
D. 1300 feet.

Answer **(D)** is correct.
DISCUSSION: On the takeoff distance graph, from the point where the standard temperature line (represented by the curved line labelled ISA) crosses the 4000-ft pressure altitude line, proceed horizontally to the first reference line, and then move parallel to the closest guideline to the total weight line (2400 lb). From there, move horizontally to the right to the second reference line. Since the wind is calm, you may proceed on the same line to the third reference line. Finally, move parallel to the closest guideline all the way to the distance scale and read 1300 feet. This is the total distance required for takeoff to clear a 50-ft obstacle.

130. (Refer to figure 22) Determine the total distance required for takeoff to clear a 50-foot obstacle for the following conditions:

OAT:	30 ºC
Pressure Altitude:	6000 ft
Takeoff weight:	2300 lb
Headwind component:	20 kts

Answer **(C)** is correct.
DISCUSSION: Enter the graph at the bottom, just above the temperature of 30 ºC. Proceed up the chart vertically until you intercept the diagonal 6000-foot pressure altitude line. Next, move horizontally to the first reference line, and then proceed parallel to the closest guideline to the total weight line (2300 lb). From there, move horizontally to the right to the

A. 1100 feet.
B. 850 feet.
C. 1500 feet
D. 1200 feet.

second reference line, and then parallel to the closest guideline to the 20 knots line. Then proceed horizontally to the right to the third reference line. Finally, move parallel to the closest guideline all the way to the distance scale and read the takeoff distance of 1500 feet. This is the total distance required for takeoff to clear a 50-ft obstacle.

131. (Refer to figure 22) Determine the approximate ground roll distance required for takeoff.

OAT: 0 ºC
Pressure Altitude: 2000 ft
Takeoff weight: 2600 lb
Headwind component: Calm

A. 900 feet.
B. 700 feet.
C. 1100 feet
D. 1200 feet

Answer **(B)** is correct.
DISCUSSION: Enter the graph at the bottom, just above the temperature of 0 ºC. Proceed up the chart vertically until you intercept the diagonal 2000-foot pressure altitude line. Next, move horizontally to the first reference line, and then proceed parallel to the closest guideline to the total weight line (2600 lb). From there, move to the right to the second reference line. Since you must proceed horizontally to the right to the end of the graph (skip the third reference line because there is no obstacle to clear) and read the ground roll of 700feet.

132. (Refer to figure 22) Determine the approximate ground roll distance required for takeoff.

OAT: 10 ºC
Pressure Altitude: 8000 ft
Takeoff weight: 2800 lb
Headwind component: 10 kts

A. 1450 feet.
B. 2300 feet.
C. 1000 feet
D. 1200 feet.

Answer **(A)** is correct.
DISCUSSION: From the intersection of the 8000-foot pressure line and 10 ºC in the left section of the graph, move horizontally to the first reference line, and then proceed parallel to the closest guideline to the total weight line (2800 lb). From there, move horizontally to the right to the second reference line, and then parallel to the closest guideline to the right to 10 knots. Then you may proceed horizontally to the right, directly to the end of the graph (skip the third reference line because there is no obstacle to clear) reference line of 1450 feet.

133. (Refer to figure 22) Determine the approximate ground roll distance required for takeoff.

OAT: Std
Pressure Altitude: 2000 ft
Takeoff weight: 2600 lb
Headwind component: calm

A. 1400 feet.
B. 600 feet.
C. 950 feet
D. 750 feet.

Answer **(D)** is correct.
DISCUSSION: From the point at which the standard temperature line (represented by the curved line labelled ISA) crosses the 2000-ft pressure altitude line, proceed horizontally to the first reference line, and then move parallel to the closest guideline to the total weight line (2600 lb). From there, move horizontally to the right to the second reference line. Since the wind is calm, you must proceed horizontally the right to the end of the graph (skip the third reference line because there no obstacle to clear) and read the ground roll of 750 feet.

134. (Refer to figure 24) Determine the fuel, time, and distance For a normal climb from an airport at a pressure altitude of 4000 feet to a pressure altitude of 8000 feet?
The outside air temperature at the departing airport is 7 ºC above standard, and the weight is 3400 pounds.

A. 5 minutes, 29 pounds, and 11 NM.
B. 5 minutes, 11 pounds, and 11 NM.
C. 5.5 minutes, 30.1 pounds, and 12.1 NM.

Answer **(C)** is correct.
DISCUSSION: Find the given weight of 3400 pounds on the far left side of the table. Move to the right to the pressure altitude column. Determine the time fuel and distance-to-climb to 8000 feet at a weight of 3400 pounds (10 minutes, 21 pounds of fuel, and 20 NM to climb to 8000ft). Then read the time, fuel, and distance to be subtracted for the departing airport at a pressure altitude of 4000 feet (5 minutes, 10 pound of

D. 5.5 minutes, 12.1 pounds, and 12.1 NM.

fuel, and 9 NM to climb to 4000).
Subtract the values for the departure altitude from the values for the cruise altitude: time: 10 – 5 = 5 minutes, fuel: 21 – 10 = 11 pounds, and distance: 20 – 9 = 11 NM. Since the temperature is 7 ºC above standard, our findings must be increased by 10% (indicated in the notes section of the chart). After adding 10%, our findings should read 5.5 minutes, 12.1 pounds, and 12.1 NM. In addition, we must add 16 pounds of fuel for engine start, taxi, and takeoff (as indicated in the notes section of the chart), which results in a fuel consumption of 30.1 pounds.

135. (Refer to figure 24) Determine the fuel, time, and distance for a normal climb from an airport at sea level to a pressure altitude of 8000 feet? The outside air temperature at the departing airport is 29 ºC, and the weight is 3700 pounds.

A. 12 minutes, 24 pounds, and 23 NM.
B. 14.4 minutes, 28.8 pounds, and 27.6 NM.
C. 14.4 minutes, 42 pounds, and 27.6 NM.
D. 14.4 minutes, 44.8 pounds, and 27.6 NM.

Answer **(D)** is correct.
DISCUSSION: consumption of 30.1 pounds the left column. Move to the right to the pressure altitude column. Read the time, fuel, and distance-to-climb that corresponds with the pressure altitude of 8000 feet at a weight of 3700 pounds (12 minutes, 24 pounds of fuel, and 23 NM). At sea level, the numbers read zero. Therefore, time, fuel, and distance for a normal climb from sea level to 8000 feet would be 12 minutes, 24 pounds, and 23 nautical miles. Since the temperature is 14 ºC above standard, our findings must be increased by 20% (as indicated in the notes section you are required to add 10% to the findings for each 7º above standard). After adding 20%, the findings should read 14.4 minutes, 28.8 pounds, and 27.6 NM. In addition, we must add 16 pounds of fuel for engine start, taxi, and takeoff (as indicated in the notes section of the chart), which results in a fuel consumption of 44.8 pounds

136. (Refer to figure 25) Determine the fuel flow at 10000 feet on a standard day with 65% maximum continuous thrust.

A. 11.3 GPH.
B. 11.8 GPH.
C. 11.5 GPH.
D. 10.5 GPH.

Answer **(C)** is correct.
DISCUSSION: Note that the entire chart applies to 65% maximum continuous thrust. Locate the pressure altitude Of 10000 feet on the far left column. Follow that line to the middle section of the table under the standard day (ISA) column, and read the fuel flow of 11.5 gallons per hour.

137. (Refer to figure 25) Determine the fuel flow at 11000 feet with a temperature of 20 ºC above standard and 65% maximum continuous thrust.

A. 11.2 GPH.
B. 11 GPH.
C. 11.4 GPH.
D. 10.6 GPH.

Answer **(B)** is correct.
DISCUSSION: Note that the entire chart applies to 65% maximum continuous thrust. Interpolation must be used for this problem, because the 11000-foot pressure altitude is not a given value on this table. With a temperature of 20 ºC above standard, the fuel flow at 10000 feet is 11.4 GPH, and the fuel flow at 12000 ft. is 10.6 GPH. The fuel flow at 11000 ft. would be half way between the fuel flow at 10000 ft. and fuel flow at 12000 ft. You must add one-half the difference between 11.4 and 10.6 (0.8/2 GPH) to 10.6 GPH to get the fuel flow of 11 GPH. Therefore, at 11000 feet with a temperature of 20 ºC above standard and 65% maximum continuous thrust, you should expect a fuel flow of 11 GPH.

138. (Refer to figure 25) Determine the fuel consumption for a 800-nautical mile flight under the following conditions.

Pressure altitude: 10000 feet.
Temperature: 18 ºC.
Manifold pressure: 20.3" Hg.
Wind: Calm.

A. 54.9 gallons.
B. 57.8 gallons.
C. 51.3 gallons.
D. 58.3 gallons.

Answer **(A)** is correct.
DISCUSSION: To determine the fuel consumption, you need to know the number of hours the flight will last and the gallons per hour the airplane will burn. The chart is divided into three sections based on air temperature. since temperature is 20 degrees above standard, you must use the right section of the chart under the ISA+20 ºC column.
At 10000-foot pressure altitude, 20.3" Hg manifold pressure, and a temperature of 18 ºC, the fuel flow is 11.4 GPH, and the true airspeed is 166 kts. Since the wind is calm, this trip will take 4.82 hours (800 NM/166 kts).
Multiply the number of hours by gallons per hour to determine the fuel consumption for this flight:
4.82 hrs. × 11.4 GPH. = 54.9 gallons

139. (Refer to figure 25) Determine the fuel consumption for a 500-nautical mile flight under the following conditions.

Pressure altitude: 8000 feet.
Temperature: 2 ºC.
Manifold pressure: 20.2" Hg.
Wind: Calm.

A. 32.5 gallons.
B. 37.8 gallons.
C. 35.8 gallons.
D. 31.3 gallons.

Answer **(C)** is correct.
DISCUSSION: To determine the fuel consumption, you need to know the number of hours the flight will last and the gallons per hour the airplane will burn. Since it is a standard day (temperature is 2 ºC at 8000 feet), you must use the middle section of the chart under the STANDARD DAY (ISA) column.
At 8000-foot pressure altitude, 20.2" Hg manifold pressure, and a temperature of 2 ºC, the fuel flow is 11.5 GPH, and the true airspeed is 161 kts. Since the wind is calm, this trip will take 3.11 hours (500 NM/161 kts).
Multiply the number of hours by gallons per hour to determine the fuel consumption for this flight:
3.11 hrs. × 11.5 GPH. = 35.8 gallons

140. (Refer to figure 25) Determine the fuel consumption for a 900-nautical mile flight under the following conditions.

Pressure altitude: 12000 feet.
Temperature: -6 ° C.
Manifold pressure: 18.8" Hg.
Wind: Calm.

A. 58.5 gallons.
B. 61.2 gallons.
C. 63.5 gallons.
D. 60.2 gallons.

Answer **(D)** is correct.
DISCUSSION: To determine the fuel consumption, you need to know the number of hours the flight will last and the per hour the airplane will burn. Since it is a standard day gallons (temperature is 2 ºC at 8000 feet), you must use the middle section of the chart under the STANDARD DAY (ISA) column.
At 12000-foot pressure altitude, 18.8" Hg manifold pressure, and a temperature of -6 ºC, the fuel flow is 10.9 GPH, and the true airspeed is163 kts. Since the wind is calm, this trip will take 5.52 hours (900 NM/163 kts).
Multiply the number of hours by gallons per hour to determine the fuel consumption for this flight:
5.52 hrs. × 10.9 GPH. = 60.2 gallons

141. (Refer to figure 25) What is the manifold pressure of an airplane flying at a pressure altitude of 10000 feet, with a temperature of 20 ºC above standard, and the RPM setting of 2450 to achieve 65 percent maximum continuous power?

A. 20.3" Hg.
B. 20.8" Hg.

Answer **(A)** is correct.
DISCUSSION: You must use the right section of the table under the ISA+20 ºC column, because the temperature is 20°C above standard.
At a pressure altitude of 10000 feet, with a temperature 18 ºC (20 ºC above standard), and the RPM setting of 2450 to achieve 65% maximum continuous thrust, the

C. 18.8" Hg.
D. 17.4" Hg.

manifold pressure will 20.3" Hg.

142. (Refer to figure 25) What is the manifold pressure of an airplane flying at a pressure altitude of 13000 feet, at standard temperature, and the RPM setting of 2450 to achieve 65 percent maximum continuous power?

A. 18.8" Hg.
B. 17.8" Hg.
C. 18.1" Hg.
D. 18.4" Hg.

Answer **(C)** is correct.
DISCUSSION: Since temperature is standard, you must use the middle section of the chart under the STANDARD DAY (ISA) column. Since 13000-foot pressure altitude is not given on this table, you must interpolate. The manifold pressure at 13000 ft. would be half way between the manifold pressure at 12000 ft. (18.8" Hg) and the manifold pressure at 14000 ft (17.4" Hg).
You must subtract one-half the difference between 18.8" Hg and 17.4" Hg [(18.8-17.4)/2] from 18.8" Hg to get the manifold pressure of 18.1" Hg. Therefore, at 13000 feet pressure altitude, at standard temperature, and the RPM setting of 2450 to achieve 65% maximum continuous thrust, you should expect the manifold pressure of 18.1" Hg.

143. (Refer to figure 25) Determine the expected true airspeed of an airplane flying at a pressure altitude of 7000 feet, with a temperature of 20 ºC below standard, and the RPM setting of 2450 to achieve 65 percent maximum continuous power?

A. 155 KTS.
B. 162 KTS.
C. 160 KTS.
D. 156 KTS.

Answer **(D)** is correct.
DISCUSSION: Since the temperature is 20 ºC below standard must use the left section of the table under the ISA-20 ºC. Since the pressure altitude of 7000 feet is not given on this table, you need to use interpolation. The true airspeed at 7000 feet is half way between the true airspeed at 8000 ft. (157 kts.) and the true airspeed at 6000 ft. (155 kts.)
Subtracting one-half the difference between 155 kts and 157 kts (1 kts) from 157 kts results 156 kts
Therefore, at 7000 feet pressure altitude, with a temperature of 20 ºC below standard, and 2450 RPM to achieve 65% maximum continuous thrust, the true airspeed will be 156 kts.

144. (Refer to figure 25) Determine the expected true airspeed of an airplane flying at a pressure altitude of 14500 feet, at standard temperature, and the RPM setting of 2450 to achieve 65 percent maximum continuous power?

A. 156 KTS.
B. 159 KTS.
C. 160 KTS.
D. 161 KTS.

Answer **(B)** is correct.
DISCUSSION: Since temperature is standard, you must use the middle section of the chart under the STANDARD DAY (ISA) column. Since the pressure altitude of 14,500 feet is not given on this table, you need to use interpolation. Therefore, subtract 1/4 of the difference between the true airspeed at 14000 feet (160 kts) and the true airspeed at 16000 feet (156 kts.) from 160 kts: 160 kts – (160-156/4) = 159 kts. Therefore, at 14500 feet pressure altitude, at standard temperature, and 2450 RPM, the the true airspeed will be 159 kts.

145. (Refer to figure 26) Determine the crosswind component for a wind from 260 at 20 knots when you are landing on runway 29.

A. 10 knots.
B. 12 knots.
C. 18 knots.
D. 8 knots.

Answer **(A)** is correct.
DISCUSSION: The crosswind component is the portion of that acts perpendicular to the runway. it is found on the horizontal axis of the graph. To determine the crosswind component, you must Begin by calculatingthe angle between the wind and the runway (290º -260 º = 30 º). Next, find the intersection of 30° line and the 20-kt. wind velocity Arc. Then, proceed down vertically to the bottom of the chart and read the crosswind component of 10 knots.

146. (Refer to figure 26) Determine the crosswind component for a wind from 195 at 30 knots when you are landing on runway 24.

A. 25 knots.
B. 15 knots.
C. 21 knots.
D. 30 knots.

Answer **(C)** is correct.
DISCUSSION: The crosswind component is the portion of the wind that acts perpendicular to the runway. It is found on the horizontal axis of the graph. To determine the crosswind component, you must begin by calculating the angle between the wind and the runway (240º - 195 º = 45 º). Next, find the intersection of 45 º line and and 30-kt. wind velocity arc. Then, proceed down vertically to the bottom of the chart and read the crosswind component of 21 knots.

147. (Refer to figure 26) Determine the headwind component for a wind from 290 at 20 knots when you are landing on runway 33.

A. 13 knots.
B. 20 knots.
C. 10 knots.
D. 16 knots.

Answer **(D)** is correct.
DISCUSSION: The headwind component refers to the portion of the wind which acts straight down the runway toward the airplane. The headwind component is found on the vertical axis of the graph. To determine the headwind component, you must begin by calculating the angle between the wind and the runway (330º - 290 º = 40 º). Next, find the intersection of 40 º line and the 20-kt. wind velocity arc. Then, proceed horizontally to the left and read the headwind component of approximately 16 knots.

148. (Refer to figure 26) Determine the headwind and crosswind wind components for a wind from 270 º at 20 knots when you are landing on runway 21.

A. Headwind component: 10 konts.
Crosswind component: 20 knots.
B. Headwind component: 17 konts.
Crosswind component: 10 knots.
C. Headwind component: 10 konts.
Crosswind component: 17 knots.

Answer **(C)** is correct.
DISCUSSION: To determine the headwind and crosswind components, you must begin by calculating the angle between the wind and the runway (270º - 210 º = 60 º). Next, find the point at which the 60º line crosses the 20-kt wind velocity arc. Then, move horizontally to the left and read the headwind component of 10 knots. Lastly, proceed down vertically to the bottom of the chart and read the crosswind component of 17 knots

149. (Refer to figure 26) Determine the maximum wind velocity for a 60 º crosswind if the maximum crosswind component for the airplane is 26 knots.

A. 22 knots.
B. 16 knots.
C. 35 knots.
D. 30 knots.

Answer **(D)** is correct.
DISCUSSION: Enter the graph at the bottom, just above the 26-kt crosswind component and move up the graph vertically until you intercept the 60 º line. Note that the intersection is located on the 30-kt wind velocity arc, which means that the maximum wind velocity for a 60 º crosswind is 30 knots if the airplane has a maximum crosswind component of 26 knots

150. (Refer to figure 26) Determine the maximum wind velocity for a 40 º crosswind if the maximum crosswind component for the airplane is 29 knots.

A. 40 knots.
B. 45 knots.
C. 35 knots.
D. 49 knots.

Answer **(B)** is correct.
DISCUSSION: Enter the graph at the bottom, above the 15-kt crosswind component and proceed upward vertically until you intercept the 30-kt wind velocity arc. Note that the intersection is located on the 30 º line, which means that under the given condition (wind from 350º at 30 Knots), the angular difference between runway and wind should not exceed 30º when the airplane has a maximum crosswind component of 15 knots. Therefore, only runway 32 is acceptable for use (350 º- 320 º = 30 º).

151. (Refer to figure 26) At your destination airport the wind is from 350 º at 30 knots, which runway (03, 30, or 32) is acceptable for use if the maximum crosswind component for your airplane is 15 knots.

A. Runway 03.
B. Runway 30.
C. Runway 32.

Answer **(B)** is correct.
DISCUSSION: Enter the graph at the bottom, above the 25-kt crosswind component and move upward vertically until you intersect the 35-kt wind velocity arc. Note that the intersection is located on the 45 º line. Therefore, under the given conditions (a 20-kt wind), for an airplane with a 25-kt maximum cross wind component, the angular difference between runway and wind should not exceed 45 º. Hence, only runway 29 is acceptable for use (290 º- 245 º = 45 º).

152. (Refer to figure 26) At your destination airport the wind is from 245 º at 35 knots, which runway (31, 29, or 19) is acceptable for use if the maximum crosswind component for your airplane is 25 knots.

A. Runway 31.
B. Runway 29.
C. Runway 19.

Answer **(B)** is correct.
DISCUSSION: Enter the graph at the bottom, above the 25-kt crosswind component and move upward vertically until you intersect the 35-kt wind velocity arc. Note that the intersection is located on the 45 º line. Therefore, under the given conditions (a 20-kt wind), for an airplane with a 25-kt maximum cross wind component, the angular difference between runway and wind should not exceed 45 º. Hence, only runway 29 is acceptable for use (290 º- 245 º = 45 º).

153. (Refer to figure 26) Determine the maximum wind velocity for a 50 º crosswind if the maximum crosswind component for the airplane is 19 knots.

A. 25 knots.
B. 16 knots.
C. 20 knots.
D. 29 knots.

Answer **(A)** is correct.
DISCUSSION: Enter the graph at the figure 44, just above the 19-kt crosswind component and proceed up the graph vertically until you intercept the 50° line. Note that the point where these two lines meet is located halfway between the 20-kt and the 30-kt wind velocity arc. Therefore, the maximum wind velocity for a 50°crosswind is 25 knots if the airplane has a maximum crosswind component of 19 knots.

154. (Refer to figure 26) At your destination airport the wind is from 160 º at 30 knots, which runway (09, 12, or 21) is acceptable for use if the maximum crosswind component for your airplane is 19 knots.

A. Runway 09.
B. Runway 12.
C. Runway 21.

Answer **(B)** is correct.
DISCUSSION: Enter the graph at the figure 44, above the 19-kt crosswind component and move upward vertically until you intersect the 30-kt wind velocity arc. Note that the point where these two lines intersect is located on the 40 º line. Therefore, under the given condition (a 20-kt wind) for an airplane with a 19-kt maximum cross wind component, the angular difference between runway and wind should not exceed 40 º. Therefore, only runway 12 is appropriate for landing (160 º- 120 º = 40 º).

155. (Refer to figure 27) Determine the total distance required to land over a 50-foot obstacle under the following conditions:

OAT:	20 ºC
Pressure Altitude:	2000 ft
weight:	2300 lb
Wind component:	Calm

A. 1850 feet.

Answer **(B)** is correct.
DISCUSSION: Enter the graph at the bottom, just above the temperature of 20 ºC. Proceed up the chart vertically until you intercept the diagonal 2000-foot pressure altitude line. Next, move horizontally to the first reference line, and then proceed parallel to the closest guideline to 2600 lb. From there, move horizontally to the right to the second reference line, and because the wind is calm, you may proceed horizontally on the same line to the third reference line. Finally, to

B. 1650 feet.
C. 1300 feet
D. 1100 feet.

determine the total distance required to land over a 50-foot obstacle, move parallel to the closest diagonal guideline up all the way to the distance scale to find the landing distance of 1650 feet.

156. (Refer to figure 27) Determine the total distance required to land under the following conditions:

OAT: 13 ºC
Pressure Altitude: 6000 ft
weight: 2500 lb
Headwind component: 20 kts.

A. 850 feet.
B. 650 feet.
C. 1050 feet
D. 1200 feet

Answer **(A)** is correct.
DISCUSSION: Enter the graph at the bottom, just above the temperature of 14 ºC. Move up vertically until you intercept the diagonal 6000-foot pressure altitude line. Next, move horizontally to the first reference line, and then proceed parallel to the closest guideline to 2600 lb. From there, move horizontally to the right to the second reference line, and then parallel to the closest guideline to the 20-knots line. Then you may proceed horizontally to the right, directly to the end of the graph (skip the third reference line because there is no obstacle to clear) to read the ground roll distance of 850 feet.

157. (Refer to figure 27) Determine the total distance required to land over a 50-foot obstacle under the following conditions:

OAT: Std
Pressure Altitude: 8000 ft
weight: 2200 lb
Wind component: calm.

A. 1800 feet.
B. 1300 feet.
C. 1650 feet.
D. 1050 feet.

Answer **(C)** is correct.
DISCUSSION: Begin by finding the point where the 8000 foot pressure altitude line and the standard temperature line (the line labelled “ISA” on the left section of the graph) meet. Next, move horizontally to the right to the first reference line, and then proceed parallel to the closest guideline to 2200 lb. From there, move horizontally to the right to the second reference line. Since the wind is calm, you may proceed horizontally on the same line to the third reference line. Finally, to same line to the distance required to land over a 50- foot obstacle, move parallel to the closest diagonal guideline up all the way to the distance scale and read1650 feet.

158. (Refer to figure 27) Determine the total distance required to land over a 50-foot obstacle under the following conditions:

OAT: Std
Pressure Altitude: 4000 ft
weight: 2400 lb.
Headwind component: 20 Knots.

A. 1450 feet.
B. 900 feet.
C. 1350 feet.
D. 1150 feet.

Answer **(D)** is correct.
DISCUSSION: From the intersection of the 4000-ft pressure altitude line and the standard temperature line (as represented by the line labelled “ISA”), move horizontally to the right to the first reference line, and then proceed parallel to the closest guideline to 2400 lb. From that point, move horizontally to the right to the second reference line, and then parallel to the closest guideline to 20 knots. Next, you may horizontally to the right to the third reference line. proceed Then, to determine the total distance over a a 50-foot obstacle, move parallel to the closest diagonal guideline up all the way to the distance scale and read 1150 feet.

159. (Refer to figure 27) Determine the total distance required to land over a 50-foot obstacle under the following conditions:

OAT: Std
Pressure Altitude: 8000 ft
weight: 2600 lb
Headwind component: 20 Knots.

Answer **(C)** is correct.
DISCUSSION: From the intersection of the 8000-ft pressure altitude line and the standard temperature line (as represented by the line labelled “ISA”), move horizontally to the right to the first reference line, and then proceed parallel to the closest guideline to 2600 lb. From there, move horizontally to the right

A. 900 feet.
B. 1600 feet
C. 1450 feet.
D. 1100 feet.

to the second reference line, and then parallel to the closest guideline to 20 knots. Next, you may proceed horizontally to the right to the third reference line. Lastly, to determine the total distance over a 50-foot obstacle, move parallel to the closest diagonal guideline up to the distance scale and read 1450 feet.

160. (Refer to figure 28) Determine the approximate landing ground roll distance.

Pressure altitude: Sea level
Headwind: 8 kts.
Temperature: Std

A. 470 feet.
B. 356 feet.
C. 445 feet.
D. 401 feet.

Answer **(B)** is correct.
DISCUSSION: At sea level, the required ground roll is 445 knots. Note 1 at the bottom of the figure, indicates g that your round roll distance must be decreased by 10% for each 4 knots of headwind. Since we have an 8-kt headwind, the ground roll must be reduced by 20%. Thus, under the following conditions, the landing ground roll distance will be 356 feet.

161. (Refer to figure 28) Determine the approximate landing ground roll distance.

Pressure altitude: 6250 feet.
Headwind: 4 kts
Temperature: Std

A. 508 feet.
B. 485 feet.
C. 457 feet
D. 520 feet.

Answer **(C)** is correct.
DISCUSSION: The pressure altitude of 6250 feet is half way between 5000 ft. and 7500 ft. Therefore, add the ground roll distance of 495 ft. for 5000 ft. to the ground roll distance of 520 ft. for 7500 ft., and divide the total by two to obtain the ground roll distance of 507.5 feet for 6250 ft. Since you have a 4-kt headwind, you must apply the correction for the wind. As indicated in the notes section of this table, for each 4-kt of headwind, the landing distance is reduced by 10%. As a result, the distance required will be 456.75 feet (508 ft. × 90%).

162. (Refer to figure 28) Determine the total distance required to land over a 50-ft. obstacle.

Pressure altitude: 2500feet.
Headwind: calm.
Temperature: 110 ° F

A. 1135 feet.
B. 1249 feet.
C. 1022 feet.
D. 1320 feet.

Answer **(B)** is correct.
DISCUSSION: The total distance required to land over a 50-ft.obstacle at a pressure altitude of 2500 ft. is 1135 feet. As indicated in note 2, the distance must be increased by 10% for a temperature 60 ° F above standard. Since the temperature is 110 ° F (60 ° F above standard), the total distance must be increased by 10%.
1135 ft. × 110 % = 1248.5 ft.

163. (Refer to figure 28) Determine the total distance required to land over a 50-ft. obstacle.

Pressure altitude: 6250 feet.
Headwind: 16 kts
Temperature: Std

A. 1055 feet.
B. 1225 feet.
C. 858 feet.
D. 735 feet.

Answer **(D)** is correct.
DISCUSSION: You must use interpolation to determine the total landing distance to clear a 50-ft obstacle for a pressure altitude of 6350 feet. Since 6350 feet is halfway between 5000 ft. and 7500 ft, you must determine the distance that lies halfway between the total distance of 1195 ft. (at 5000ft.) and the total distance of 1255 ft. (at 7500 ft.).

(1255+1195)/2 = 1225 ft.
Since we have a 16-kt headwind, the total distance

must be reduced by 40% (10% for each 4kt.)
60% × 1225 ft. = 735 ft.

164. (Refer to figure 28) Determine the total distance required to land over a 50-ft. obstacle.

Pressure altitude: 5000 feet.
Headwind: calm
Temperature: 101 ° F

A. 1076 feet.
B. 1245 feet.
C. 1315 feet.
D. 1420 feet.

Answer **(C)** is correct.
DISCUSSION: The total distance required to clear a 50-ft obstacle at a pressure altitude of 5000 ft. is 1195 ft. According to note 2, the distance must be increased by 10% for temperature 60 ° F above standard.
1195 ft. × 110% = 1314.5 ft.

165. (Refer to figure 28) Determine the total distance required to land over a 50-ft. obstacle.

Pressure altitude: Sea level
Headwind: 20 kts
Temperature: 59 ° F

A. 538 feet.
B. 645 feet.
C. 753 feet.

Answer **(A)** is correct.
DISCUSSION: At sea level, the total distance required to land over a 50-ft obstacle is 1075 ft. The temperature is standard (59 ° F at sea level), requiring no adjustment. According to note 1, the headwind of 20 kt. reduces the total distance by 50% (10% for each 4kt.).

50% × 1075 = 537.5 ft.

166. What items are included in the empty weight of an airplane?

A. Only the airframe, engine, optional equipment, and fixed ballast.
B. Hydraulic fluid, unusable fuel, and un-drainable oil.
C. Usable fuel, and full engine oil.
D. Only the airframe, engine, fixed ballast, and hydraulic fluid.

Answer **(B)** is correct.
DISCUSSION: The empty weight of an airplane includes the weight of the airframe, engines, and all items of operating equipment that have fixed locations and are permanently installed in the aircraft. It includes optional and special equipment, fixed ballast, hydraulic fluid, unusable fuel, and un-drainable oil.

167. Ramp weight of an airplane is the:

A. takeoff weight plus the fuel to be burned during engine start, run-up, and taxi.
B. empty weight plus usable fuel.
C. empty weight plus payload.
D. weight of the flight crew, usable fuel, and payload.

Answer **(A)** is correct.
DISCUSSION: Ramp weight is the term used to describe the airplane loaded for flight prior to engine start. Therefore, adding the takeoff weight to the fuel burned during engine start, run-up, and taxi, yields the ramp weight.

168. That items are included in useful load of an aircraft?

A. Only flight crew, usable fuel.
B. pilots and crew, usable fuel, passengers, baggage, cargo, and engine oil.
C. Only passengers, baggage, and cargo.
D. Only usable fuel, and engine oil.

Answer **(B)** is correct.
DISCUSSION: Useful load includes the weight of pilots and crew, usable fuel, passengers, baggage, cargo, and engine oil. To determine the useful load, either prior to engine start or at takeoff, you must subtract the empty weight from ramp weight or takeoff weight respectively.

169. Payload is the term used for the weight of:

A. the passengers, and usable fuel.

Answer **(D)** is correct.
DISCUSSION: Payload includes the weight of only the passengers, baggage, and cargo.

B. the flight crew and usable fuel.
C. only the baggage and cargo
D. only the passengers, baggage, and cargo.

170. ……. is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.

A. CG limits
B. Moment.
C. Reference datum.
D. Arm.

Answer **(C)** is correct.
DISCUSSION: Reference datum is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.

171. What constitutes the difference between basic empty weight and licensed empty weight?

A. The weight of usable fuel.
B. The weight of unusable fuel.
C. The weight of usable oil.
D. The weight of unusable oil.

Answer **(C)** is correct.
DISCUSSION: Airplanes manufactured after March 1, 1979 use the term basic empty weight. This is the weight of the standard airplane, optional equipment, unusable fuel, and full operating fluids including full engine oil. However, older airplanes use the term licensed empty weight which is similar to basic empty weight, empty that it doesn't include full engine oil.

172. If an aircraft exceeds its maximum certificated gross weight by 170 pounds, how many gallons of fuel must be drained to bring the aircraft weight within limits?

A. 22.7 gallons.
B. 28.4 gallons.
C. 25.4 gallons.
D. 24.3 gallons.

Answer **(B)** is correct.
DISCUSSION: The standard weight of aviation gasoline is 6 pounds per gallon. Therefore, if an aircraft exceeds its maximum certificated gross weight by 170 pounds,28.4 gallons (170 lb./6) must be drained to bring the aircraft weight within limits.

173. If an aircraft exceeds its maximum certificated gross weight by 130 pounds, how many gallons of fuel must be drained to bring the aircraft weight within limits?

A. 17.4 gallons.
B. 19.2 gallons.
C. 21.7 gallons.
D. 23.4 gallons

Answer **(C)** is correct.
DISCUSSION: The standard weight of aviation gasoline is 6 pounds per gallon. Therefore, if an aircraft exceeds its maximum certificated gross weight by 130 pounds,21.4 gallons (130 lb./6) must be drained to bring the aircraft weight within limits.

174. ……. is the imaginary point where the aircraft would balance if it were possible to suspend it at that point.

A. Datum.
B. Centrifugal force
C. Arm.
D. Center of gravity.

Answer **(D)** is correct.
DISCUSSION: Center of gravity is the imaginary point where the aircraft would balance if it were possible to suspend it at that point.

175. Given:

Weight (lbs.)	Arm (in.)	Moment (lb. – in.)

Answer **(B)** is correct.
DISCUSSION: Begin by multiplying each weight by the arm to find begin by multiplying each weight by the arm to find the moment. Note that we have 40

Empty weight	1750	42.5	74375
Pilot and front passenger:	320	45.6	…….
Fuel (40 gal. usable fuel):	…...	49.2	…….

Determine the center of gravity (CG) position in inches from the datum.

A. 42.23 inches
B. 43.63 inches
C. 45.46 inches
D. 46.87 inches.

gallons of fuel. To get the weight of fuel, multiply the 40 by 6 pound per gallon.

(40 × 6) = 240 pounds.

	Weight (lbs.)	Arm (in.)	Moment (lb. – in.)
Empty weight:	1750	42.5	74375
Pilot and front passenger:	320	45.6	14592
Fuel (40 gal. usable fuel):	240	49.2	11808
	2310		100775

Next, add the weights and moments. Then, to determine the CG, you must divide the total moment by the total weight.
100775 ÷ 2310 = 43.63 in.

176. Given:

	Weight (lbs.)	Arm (in.)	Moment (lb. – in.)
Empty weight:	2950	105.2	310340
Pilot and front passenger:	340	58.0	…….
Fuel (120 gal. usable fuel):	…...	102.3	…….

Determine the center of gravity (CG) position in inches from the datum.

A. 96.23 inches
B. 97.44 inches
C. 98.82 inches
D. 100.68 inches.

Answer **(D)** is correct.
DISCUSSION: Begin by multiplying each weight by the arm to find the moment. Note that we have 120 gallons of fuel To get the weight of fuel, multiply the 120 by 6 pound per gallon.

(120 × 6) = 720 lbs.

	Weight (lb.)	Arm (in.)	Moment (lb. – in.)
Empty weight:	2950	105.2	310340
Pilot and front passenger:	340	58.0	19720
Fuel (120 gal. usable fuel):	720	102.3	73656
	4010		403716

Next, add the weights and moments. Then, to determine the CG, you must divide the total moment by the total weight.
403716 ÷ 4010 = 100.68 in.

177. Given:

	Weight (lbs.)	Arm (in.)	Moment (lb. – in.)
Empty weight:	2245	70.4	158048
Pilot and front passenger:	370	53.0	…….
Rear passengers:	350	88.0	…….
Fuel (80 gal. usable fuel):	……	72.0	……..

Determine the center of gravity (CG) position in inches from the datum.

A. 68.34 inches.
B. 69.12 inches.
C. 70.54 inches.
D. 71.88 inches.

Answer **(C)** is correct.
DISCUSSION: Begin by multiplying each weight by the arm to find the moment. Note that we have 80 gallons of fuel. To get the weight of fuel, multiply the 80 by 6 pound per gallon.

(80 × 6) = 480 lbs.

	Weight (lbs.)	Arm (in.)	Moment (lb. – in.)
Empty weight:	2245	70.4	158048
Pilot and front passenger:	370	53.0	19610
Rear passengers:	350	88.0	30800
Fuel (80 gal. usable fuel):	480	72.2	34560
	3445		243018

Next, add the weights and moments. Then, to determine the CG, you must divide the total moment by the total weight.

243018 ÷ 3445 = 70.54 in.

178. Given:

	Weight (lbs.)	Arm (in.)	Moment (lb. – in.)

Answer **(B)** is correct.
DISCUSSION: Begin by multiplying each weight by the arm to find the moment. Note that we have 25 gallons

Empty weight:	1455	74.0	107607
Pilot and front passenger:	290	68.0	…….
Rear passengers:	270	99.0	…….
Fuel (25 gal. usable fuel):	……	72.0	……..

Determine the center of gravity (CG) position in inches from the datum.

A. 75.11 inches.
B. 76.15 inches.
C. 77.98 inches.
D. 78.85 inches.

of fuel. To get the weight of fuel, multiply the 25 by 6 pound per gallon.
(25 × 6) = 150 lbs.

	Weight (lbs.)	Arm (in.)	Moment (lb. – in.)
Empty weight:	1455	74.0	107607
Pilot and front passenger:	290	68.0	19720
Rear passengers:	270	99.0	26730
Fuel (25 gal. usable fuel):	150	72.0	10800
	2165		164857

Next, add the weights and moments. Then, to determine the CG, you must divide the total moment by the total weight.

164857 ÷ 2165 = 76.15 in.

179. Given:

	Weight (lbs.)	Arm (in.)	Moment (lb.-in.)
Empty weight:	3145	95.4	300033
Pilot and front passenger:	330	55.0	…….
Center passengers:	345	88.0	…….
Aft passengers:	290	123.0	…….
Fuel (140 gal. usable fuel):	…...	82.0	…….

Determine the center of gravity (CG) position in inches from the datum.

A. 91.53 inches.
B. 92.88 inches.
C. 94.12 inches.
D. 95.35 inches.

Answer **(A)** is correct.
DISCUSSION: Begin by multiplying each weight by the arm to find the moment. Note that we have 140 gallons of fuel. To get the weight of fuel, multiply the 140 by 6 pound per gallon.
(140 × 6) = 840 lbs.

	Weight (lbs.)	Arm (in.)	Moment (lb.-in.)
Empty weight:	3145	95.4	300033
Pilot and front passenger:	330	55.0	18150
Center passengers:	345	88.0	30360
Aft passengers:	290	123.0	35670
Fuel (180 gal. usable fuel):	840	82.0	68880
	4950		453093

Next, add the weights and moments. Then, to determine the CG, you must divide the total moment by the total weight.

453093 ÷ 4950 = 91.53 in.

180. (Refer to figure 29) Find the maximum amount of baggage that may be loaded aboard the airplane for the CG to remain within allowable limits.

	Weight (lbs.) (lbs.)	MOM/1000 (lb.-in.)
Empty weight:	1445	55.2
Pilot and front passenger:	280	…….
Rear passengers:	320	…….
Baggage	……	……..
Fuel, 25gal.	……	……..
Oil, 8 Qt.	…...	-0.2

A. 80 pounds.
B. 90 pounds.
C. 100 pounds.
D. 110 pounds.

Answer **(B)** is correct.
DISCUSSION: To determine the maximum amount of baggage that may be loaded aboard the airplane, you must find the moment for the items you intend to have aboard the airplane by using the loading graph and add them. First, begin by finding the moment for the pilot and front seat passenger. The total weight of pilot and front seat passenger is 290 lb. Find 290 on the vertical axis of the loading graph (Load weight). From that point, proceed horizontally to the right until you intercept the diagonal line that identifies the pilot and front passenger. From there, proceed vertically to the bottom of the graph and read the moment of 10.5.
Repeat the same process for the rear passengers to find the moment of 23.5.
To determine the moment of fuel, you must begin by finding the weight of the fuel. Multiply 25 gallons by 6 to find a total fuel weight of 150 pounds. Locate the value of 150 pounds on the vertical axis at the left side of the loading graph. Then, proceed horizontally until the 150-lb. line intersects a diagonal that represents the fuel. From there, move vertically downward to the bottom of the graph to read the moment of 7.5.
According to note 2 at the bottom of the loading graph, 8 qt. of oil weighs 15 pounds and a moment of -0.2.

Add the weights and the moments.
Total weight: 1445+280+320+150+15 = 2210 lbs.
Total moment: 55.2+10.5+23.5+7.25-0.2 = 96.25 lb.-in.
With this information, refer to the center of gravity moment envelop graph, note that the weight must be kept under 2300 lb. to remain within the envelop. Therefore, subtracting 2210 from 2300, leaves a maximum of 90 lb. for baggage. You need to make sure that adding 90 pounds of baggage does not exceed the 109 moments allowed. Refer to loading graph, 90 lb of baggage indicates 8.5 moments. Add 8.5 to 96.25 to obtain a total of 104.75 moments. Note that the intersection of the 2300-lb. line and the line that represents 105.75 moment is within the envelope.

181. (Refer to figure 29) Determine the moment of the airplane.

	Weight (lbs.) (lbs.)	MOM/1000 (lb.-in.)
Empty weight:	1320	49.5
Pilot and front passenger:	360	…….
Rear passengers:	110	…….
Fuel, 45 gal	……	……..
Oil, 8 Qt.	…...	-0.2

A. 81.4 pound-inches
B. 82.6. pound-inches.
C. 83.8 pound-inches.
D. 84.4 pound-inches.

Answer **(C)** is correct.
DISCUSSION: First we need to calculate the fuel weight. Since one gallon of fuel weighs 6 lb, multiply 45 gallons by 6 to get 270 lb. of fuel.
Use the loading graph in figure 29 to find the moment of each useful load item. The empty weight moment is 49.5 lb.-in. Determine the moment for the pilot and front seat passenger as 13.5, the rear seat passenger as 8, the fuel as 13 Lastly, add all the moments to arrive at the total moment of 83.8 lb.-in.

	Weight (lbs.) (lbs.)	MOM/1000 (lb.-in.)
Empty weight:	1320	49.5
Pilot and front passenger:	360	13.5
Rear passengers:	110	8
Fuel, 45 gal	270	13
Oil, 8 Qt.	15	-0.2
	2075	83.8

182. During weight and balance computations for a flight, you find that the proposed loading places the CG 1.2 inches behind the aft CG limit. The total weight of the airplane is 1850 pounds. Determine how much cargo must be shifted from the aft baggage area at station 160 to the forward baggage area at station 130 to bring the CG within allowable limits.

A. 60 pounds.
B. 64 pounds.
C. 70 pounds.
D. 74 pounds.

Answer **(D)** is correct.
DISCUSSION:
We use the weight-shift formula to solve this problem.

$$\frac{\text{Weight Moved}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{\text{Weight Moved}}{1850} = \frac{1.2}{(160-130)}$$

$$\frac{\text{Weight Moved}}{1850} = \frac{1.2}{30}$$

Weight to be shifted = 74 pounds

183. During weight and balance computations for a flight, you find that the proposed loading places the CG 1.5 inches behind the aft CG limit. The total weight of the airplane is 3540 pounds. Determine how much weight must be shifted from the rear seat at station 125 to the center seats at station 95 to bring the CG within allowable limits.

A. 145 pounds.
B. 156 pounds.
C. 165 pounds.
D. 177 pounds.

Answer **(D)** is correct.
DISCUSSION:
We use the weight-shift formula to solve this problem.

$$\frac{\text{Weight Moved}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Location}}$$

$$\frac{\text{Weight Moved}}{3540} = \frac{1.5}{(125-95)}$$

$$\frac{\text{Weight Moved}}{3540} = \frac{1.5}{30}$$

Weight to be shifted = 177 pounds

184. Assume that the total weight of an airplane is 6630 pounds and its CG is located at station75. Determine the location of the CG if 120 pounds of cargo is added to station 165.

A. 76.6 inches.
B. 75.2 inches.
C. 73.4 inches
D. 78.0 inches.

Answer **(A)** is correct.
DISCUSSION:

$$\frac{\text{Added Weight}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{120}{6630+120} = \frac{\Delta CG}{165-75}$$

$$\frac{120}{6750} = \frac{\Delta CG}{90}$$

$\Delta CG = 1.6$ inches
New CG = Old CG + ΔCG = 75+1.6 = 76.6 in.

185. Assume that the total weight of an airplane is 1820 pounds and its CG is located at station 45. Determine the location of the CG if 180 pounds of weight is added to the rear seat at 70 station.

A. 43.0 inches.
B. 45.45 inches.
C. 47.25 inches
D. 48.75 inches.

Answer **(C)** is correct.
DISCUSSION:

$$\frac{\text{Added Weight}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{180}{1820+180} = \frac{\Delta CG}{70-45}$$

$$\frac{180}{2000} = \frac{\Delta CG}{25}$$

$\Delta CG = 2.25$ inches
New CG = Old CG + ΔCG = 45+2.25 = 47.25 in.

186. Assume that the total weight of an airplane is 2717 pounds and its CG is located at station 60. Determine the location of the CG if 55 pounds of weight is added to the baggage area B at 123 station.

A. 59.75 inches.
B. 61.25 inches.
C. 62.50 inches.
D. 58.75 inches.

Answer **(B)** is correct.
DISCUSSION:

$$\frac{\text{Added Weight}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{55}{2717+55} = \frac{\Delta CG}{123-60}$$

$$\frac{55}{2772} = \frac{\Delta CG}{63}$$

$\Delta CG = 1.25$ inches
New CG = Old CG + ΔCG = 60+1.25 = 61.25 in.

187. Assume that the total weight of an airplane is 2170 pounds and its CG is located at station 42. Determine the location of the CG if 70 pounds of weight is removed from the rear seat at 78 station.

A. 38.8 inches.
B. 39.5 inches.
C. 40.2 inches.
D. 40.8 inches.

Answer **(D)** is correct.
DISCUSSION:

$$\frac{\text{Weight Removed}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{70}{2170-70} = \frac{\Delta CG}{78-42}$$

$$\frac{70}{2100} = \frac{\Delta CG}{36}$$

$\Delta CG = 1.2$ inches
New CG = Old CG - ΔCG = 42 - 1.2 = 40.8 in.

188. Assume that the total weight of an airplane is 8200 pounds and

Answer **(A)** is correct.

its CG is located at station 93. Determine the location of the CG if 200 pounds of weight is removed from the aft baggage area at 193 station.

A. 90.50 inches.
B. 90.75 inches.
C. 91.25 inches.
D. 91.50 inches.

DISCUSSION:

$$\frac{\text{Weight Removed}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{200}{8200-200} = \frac{\Delta CG}{193-93}$$

$$\frac{200}{8000} = \frac{\Delta CG}{100}$$

$\Delta CG = 2.5$ inches
New CG = Old CG - ΔCG = 93 - 2.5 = 90.5 in.

189. Assume that the total weight of an airplane is 3425 pounds and its CG is located at station 68. Determine the location of the CG if 75 pounds of weight is removed from the aft baggage area at 135 station.

A. 65.25 inches.
B. 65.75 inches.
C. 66.50 inches.
D. 67.25 inches.

Answer **(C)** is correct.
DISCUSSION:

$$\frac{\text{Weight Removed}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{75}{3425-75} = \frac{\Delta CG}{135-68}$$

$$\frac{75}{3350} = \frac{\Delta CG}{67}$$

$\Delta CG = 1.5$ inches
New CG = Old CG - ΔCG = 68 - 1.5 = 66.5 in.

190. An airplane has a total weight of 4650 pounds and a CG located at 62 inches. This airplane is loaded with 130 gallons of fuel at station 57 inches. Assume the airplane burns 15 gallons per hour (fuel weighs 6 lb. per gal.), where will the CG be located after 4 hours and 10 minutes of flight?

A. 61.65 inches aft of datum.
B. 61.35 inches aft of datum.
C. 62.65 inches aft of datum.
D. 62.35 inches aft of datum.

Answer **(D)** is correct.
DISCUSSION: In this example, you are asked to find the CG location after 4 hours and 10 minutes (250 minutes) of flight. This airplane burns 14 gallons per hour (g.p.h.). You can divide 15 gallons per hour by 60 minutes to get 0.25 gallons per minute fuel consumption. Next, to determine the amount of fuel that the airplane burns during this flight, multiply 0.25 g.p.m. by 250 minutes during this flight, get 62.5 gallons. Then, multiply 62.5 gallons by 6 pounds per gal. to get 375 pounds of fuel.

$$\frac{\text{Weight Removed}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{375}{4650-375} = \frac{\Delta CG}{62-57}$$

$$375 \quad \Delta CG$$

$$\frac{}{4275} = \frac{}{5}$$

ΔCG = 0.35 inches
Since the CG is moving aft, the ΔCG is added to the old CG.
New CG = Old CG + ΔCG = 62 + 0.35 = 62.35 in.

191. An airplane has a total weight of 2820 pounds and a CG located at 45 inches. This airplane is loaded with 80 gallons of fuel at station 42 inches. Assume the airplane burns 12 gallons per hour (fuel weighs 6 lb. per gal.), where will the CG be located after 3 hours of flight?

A. 45.85 inches aft of datum.
B. 45.25 inches aft of datum.
C. 44.75 inches aft of datum.
D. 44.20 inches aft of datum.

Answer **(B)** is correct.
DISCUSSION: In this example, you are asked to find the CG location after 3 hours (180 minutes) of flight. This airplane burns 12 gallons per hour (g.p.h.). You need to divide 12 gallons per hour by 60 minutes to get 0.2 gallons per minute fuel consumption. Next, to determine the amount of fuel that the airplane burns during this flight, multiply 0.2 g.p.m. by 180 minutes (0.2 × 180) to get 36 gallons. Then, multiply 36 gallons by 6 pounds per gal. to get 216 pounds of fuel.

$$\frac{\text{Weight Removed}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{216}{2820-216} = \frac{\Delta CG}{45-42}$$

$$\frac{216}{2604} = \frac{\Delta CG}{3}$$

ΔCG = 0.25 inches
Since the CG is moving aft, the ΔCG is added to the old CG.

192. An airplane has a total weight of 4360 pounds and a CG located at 67 inches. This airplane is loaded with 160 gallons of fuel at station 62 inches. Assume the airplane burns 24 gallons per hour (fuel weighs 6 lb. per gal.), where will the CG be located after 2 hours and 30 minutes of flight?

A. 67.82 inches aft of datum.
B. 67.45 inches aft of datum.
C. 66.48 inches aft of datum.
D. 66.25 inches aft of datum.

Answer **(B)** is correct.
DISCUSSION: In this example, you are asked to find the CG location after 2 hours and 30 minutes (150 minutes) of flight. This airplane burns 24 gallons per hour (g.p.h.). You need to divide 24 gallons per hour by 60 minutes to get 0.4 gallons per minute fuel consumption. Next, to determine the amount of fuel that the airplane burns during this flight, multiply 0.4 g.p.m. by 150 minutes (0.4 × 150) to get 60 gallons. Then, multiply 60 gallons by 6 pounds per gal. to get 360 pounds of fuel.

$$\frac{\text{Weight Removed}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{360}{4460-360} = \frac{\Delta CG}{67-62}$$

$$\frac{360}{4000} = \frac{\Delta CG}{5}$$

ΔCG = 0.45 inches
Since the CG is moving aft, the ΔCG is added to the old CG.
New CG = Old CG + ΔCG = 67 + 0.45 = 67.45 in.

193. An airplane has a total weight of 5750 pounds and a CG located at 72 inches. This airplane is loaded with 180 gallons of fuel at station 75 inches. Assume the airplane burns 30 gallons per hour (fuel weighs 6 lb. per gal.), where will the CG be located after 4 hours and 40 minutes of flight?

A. 71.11 inches aft of datum.
B. 71.32 inches aft of datum.
C. 71.79 inches aft of datum.
D. 72.21 inches aft of datum.

Answer **(C)** is correct.
DISCUSSION: In this example, you are asked to find the CG location after 4 hours and 40 minutes (200 minutes) of flight. This airplane burns 30 gallons per hour (g.p.h.). You need to divide 30 gallons per hour by 60 minutes to get 0.5 gallons per minute fuel consumption. Next, to determine the amount of fuel that the airplane burns during this flight, multiply 0.5 g.p.m. by 200 minutes (0.5 × 200) to get 100 gallons. Then, multiply 100 gallons by 6 pounds per gal. to get 600 pounds of fuel.

$$\frac{\text{Weight Removed}}{\text{Total Airplane Weight}} = \frac{\text{Distance CG Moves}}{\text{Distance Between Arm Locations}}$$

$$\frac{600}{5750-600} = \frac{\Delta CG}{75-72}$$

$$\frac{360}{5150} = \frac{\Delta CG}{3}$$

ΔCG = 0.21 inches . Since the CG is moving forward, the ΔCG is subtracted from the old CG.
New CG = Old CG + ΔCG = 72 - 0.21 = 71.79 in.

194. What flight characteristic could be expected when the CG of the airplane is located near the forward limit?

A. The airplane becomes more stable.
B. The airplane will have a lower takeoff speed and ground roll.
C. The airplane will have a lower stall speed.
D. The airplane performance is reduced due to decreased tail-down force.

Answer **(A)** is correct.
DISCUSSION: Forward CG effects:
- More stable.
- Higher stall speed.
- Higher takeoff speed and longer ground roll.
- Reduced pitch authority.
- Slower cruise speed.
- Decrease in performance due to increased tail-down loading.
- reduced maneuverability.

195. What flight characteristic could be expected when the CG of the airplane is located at the aft limit?

A. The airplane will have a lower cruise speed for the power setting.
B. The airplane will become more stable.
C. Increased risk of stalls and spins.
D. The airplane will have a tendency to pitch-down due to the aft CG position.

Answer **(C)** is correct.
DISCUSSION: - Increased risk of stall.
- Increased risk of spin that may be difficult or impossible to recover.
- Decreased stability.
- Higher cruise speed.

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CHAPTER 4

METEROLOGY FOR PIOLTS

- **Basic Weather Theory**
- **Weather Patterns**
- **Weather Hazards**

1. A characteristics of the stratosphere is. . . . . .

A. An overall decrease of temperature with an increase in altitude.
B. A relatively even base altitude of approximately 35,000 feet.
C. Relatively small changes in temperature with an increase in altitude.

Answer **(C)** is correct.
DISCUSSION: Above the tropopause is the stratosphere. This layer is typified by relatively small changes in temperature with height expect for a warming trend near the top.

2. The average height of the troposphere in the middle latitudes is

A. 20,000 feet.
B. 25,000 feet.
C. 37,000 feet.

Answer **(C)** is correct.
DISCUSSION: The height of the troposphere varies with latitude and seasons. It slopes from about 20,000 feet over the poles, to an average of 37,000 feet over the mid-latitudes, to about 65,000 feet over the Equator, and it is higher in summer than in winter.

3. Which feature is associated with the tropopause ?

A. Absence of wind and turbulent conditions.
B. Absolute upper limit of cloud formation.
C. Abrupt change in temperature lapse rate.

Answer **(C)** is correct.
DISCUSSION: Temperature over the tropical tropopause increases remain almost constant. an abrupt change in temperature lapse rate characterizes tropopause .

4. The primary cause of all changes in the Earth's weather is

A. Variation of solar energy received by the Earth's regions
B. Changes in air pressure over the Earth's surface.
C. Movement of the air masses.

Answer **(A)** is correct.
DISCUSSION: Every physical process of weather is accompanied by or is the result of a heat exchange. Differences in solar energy create temperature variations. these temperature variations create forces that drive the atmosphere in its endless motion.

5. If the air temperature is +8°C at an elevation of 1,350 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level ?

A. 3,350 feet MSL.
B. 5,350 feet MSL.
C. 9,350 feet MSL.

Answer **(B)** is correct.
DISCUSSION: temperature normally decreases with increasing altitude throughout the troposphere. This decrease of temperature with altitude is defined as lapse rate. The average decrease of temperature (average lapse rate) in the troposphere is 2°C per 1,000 feet. An 8°C loss is necessary to reach 0°C, or freezing, in this situation. At 2°/1,000 feet the amount of altitude gain necessary would be:

1. 8°C ÷ 2 = 4 or 4,000 ft
2. 1,350 ft MSL (altitude at +8°C)
   +4,000 ft (altitude gain necessary to reach 0°C)
   _____
   5,350 ft (approximate freezing level)

6. A common type of ground or surface based temperature inversion is that which is produced by

A. Warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
B. The movement of colder air over warm air, or the movement of warm air under cold air.

Answer **(C)** is correct.
DISCUSSION: an increase in temperature with altitude is defined as an inversion. an inversion often develops near the ground on clear, cool nights when wind is light. The ground radiates and cools much faster than the overlying air. Air in contact with the ground becomes cold while

C. Ground radiation on clear, cool night when the wind is light.

the temperature a few hundred feet above change very little. Thus temperature increases with height.

7. The most frequent type of ground or surface-based temperature inversion is that produced by

A. Radiation on a clear, relatively still night.
B. Warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
C. The movement of colder air under warm air, or the movement of warm air over cold air.

Answer **(A)** is correct.
DISCUSSION: An inversion often develops near the ground on clear, cool nights when wind is light. The ground radiates and cools much faster than than the overlying air. Air in contract with the ground becomes cold while the temperature a few hundred feet above changes very little. Thus temperature increases with height.

8. What feature is associated with a temperature inversion ?

A. A stable layer of air.
B. An unstable layer of air.
C. Air mass thunderstorms.

Answer **(A)** is correct.
DISCUSSION: A temperature inversion occurs when the temperature increases with altitude. A stable layer of air is characterize by warmer air lying above colder air. With an inversion, the layer is stable and convection is suppressed.

9. A temperature inversion will normally from only

A. In stable air.
B. In unstable air.
C. When a stable form layer merges with a cumuliform mass.

Answer **(A)** is correct.
DISCUSSION: If the temperature increases with altitude through a layer (an inversion), the layer is stable and convection is suppressed. Air may be unstable beneath the inversion.

10. Which weather conditions should be expected beneath a low-level temperature inversion layer when the relative humidity high ?

A. Smooth air and poor visibility due to fog, haze, or low clouds.
B. Light wind shear and poor visibility due to haze and light than.
C. Turbulent air and poor visibility due to fog, low stratus type cloud, and showery precipitation.

Answer **(A)** is correct.
DISCUSSION: A ground-based inversion favors poor visibility by trapping fog, smoke, and other restrictions into low levels of the atmosphere. wind just above the inversion may be relatively Strong . A wind shear zone develops between the the clam and the stronger winds above. Eddies in the shear zone cause airspeed fluctuations as an aircraft climbs or descends through the inversion .

11. What causes surface winds to flow across the isobars at angle rather than parallel to the isobars ?

A. Coriolis force.
B. Surface friction.
C. The greater density of the air at the surface.

Answer **(B)** is correct.
DISCUSSION: Friction between the wind and the surface slows the wind. As frictional force slows the wind speed, Coriolis force decreases. however friction does not affect pressure gradient force. pressure gradient and coriolis force are no longer in balance. The stronger pressure bars toward lower pressure until the three forces balance the angle of surface wind to isobars is about 10° over water, increasing with roughness of terrain .

12. Winds at 5,000 feet AGL on a particular flight are southwesterly while most of the surface winds are southerly. This difference in direction is primarily due to:

A. A stronger pressure gradient at higher altitudes.
B. Friction between the wind and the surface.
C. Stronger Coriolis force at the surface.

Answer **(B)** is correct.
DISCUSSION: Surface winds and winds at altitude can differ due to friction. Friction between the wind and the surface slows the wind.

13. What relationship exists between the winds at 2,000 feet above the surface and the surface winds ?

A. The winds at 2,000 feet and the surface winds flow in the same direction, but the surface winds are weaker due to friction.
B. The winds at 2,000 feet tend to parallel the isobars while the surface winds cross the isobars at an angle toward lower pressure and are weaker.
C. The surface winds tend to veer to the right of the winds at 2,000 feet and are usually weaker.

Answer **(B)** is correct.
DISCUSSION: Close to the earth, wind direction is modified by the contours over which it passes and wind speed is reduced by friction with the surface are at an angle across the isobars due to the stronger pressure gradient. At levels 2,000 feet above the surface, the speed is greater and the direction is usually parallel to the isobars.

14. Which force, in the northern Hemisphere, acts at a right angle of the wind and deflects it to the right until parallel to the isobars ?

A. Centrifugal.
B. Pressure gradient.
C. Coriolis.

Answer **(C)** is correct.
DISCUSSION: Coriolis force is at a right angle to wind speed. In the Northern Hemisphere, the air is deflected to the right.

15. Clouds , fog or dew will always from when

A. Water vapor condenses.
B. Water vapor is present.
C. The temperature and dew point are equal.

Answer **(A)** is correct.
DISCUSSION: When temperature reaches the dew point, water vapor can no longer remain invisible but is forced to condense, becoming visible on the ground as dew, appearing in the air as fog or clouds, or falling to the earth as rain.

16. To which meteorological condition does the term "dew point" refer ?

A. The temperature to which air must be cooled to become saturated.
B. The temperature at which condensation and evaporation are equal.
C. The temperature at which dew will always from.

Answer **(A)** is correct.
DISCUSSION: Dew point is the temperature to which air must be cooled to become saturated by the water water vapor already present in the air aviation weather reports normally include the air temperature and dew point temperature. dew point, when rated to air temperature, reveals qualitatively how close the air is to saturation.

17. The amount of water vapor which air can hold largely depends on

A. Relative humidity.
B. Air temperature.
C. Stability of air.

Answer **(B)** is correct.
DISCUSSION: Temperature largely determines the maximum amount of water vapor air can hold. Warm air can hold more water vapor than cool air .

18. What enhances the growth rate of precipitation ?

A. Advection action.
B. Upward currents.
C. Downward movement.

Answer **(B)** is correct.
DISCUSSION: Cloud particles collide and merge into a larger drop in the more rapid growth process. This process produces larger precipitation particles and dose so more rapidly than the simple condensation growth process. Upward currents enhance the growth rate and also support larger drops.

19. What temperature condition is indicated if wet snow is encountered at your flight altitude ?

A. The temperature is above freezing at your altitude.
B. The temperature is below freezing at your altitude.
C. You are flying from a warm air mass into a cold air

Answer **(A)** is correct.
DISCUSSION: Wet snow at your altitude means that the temperature is above freezing since the snow has begun to melt. For snow to from, water vapor must go from the vapor state to the solid state (known as sublimation) with the temperature below freezing.

mass.

Since melting snow has been encountered, the freezing level must be at a higher altitude.

20. The presence of ice pellets at the surface is evidence that. . .

A. There are thunderstorms in the area.
B. A cold front has passed.
C. There is freezing rain at a higher altitude.

Answer **(C)** is correct.
DISCUSSION: Rain falling through colder air may become super cooled, freezing on impact as freezing rain; or it may freeze during its descent, falling as ice pellets. Ice pellets always indicate freezing rain at higher altitude.

21. Which precipitation type normally indicates freezing rain at higher altitudes ?

A. Snow
B. Hail.
C. Ice pellets.

Answer **(C)** is correct.
DISCUSSION: ice pellets always indicate freezing rain at higher altitudes.

22. Stability can be determined from which measurement of the atmosphere ?

A. Low-level winds
B. Ambient lapse rate.
C. Atmospheric pressure.

Answer **(B)** is correct.
DISCUSSION: A change in ambient temperature lapse rate of an air mass can tip the balance between stable or unstable air. The ambient lapse rate is the rate of decrease in temperature with altitude.

23. What determines the structure or type of clouds which from as a result of air being forced to ascend ?

A. The method by which air is lifted.
B. The stability of the air before lifting occurs.
C. The amount of condensation nuclei present after lifting occurs.

Answer **(B)** is correct.
DISCUSSION: Clouds type or structure is determined by whether the air is stable or unstable within the layer forced upward, when stable air is forced upward, the air tends to retain horizontal flow and any cloudiness is flat and disturbance grows, and stratified. when unstable air is forced upward, the disturbance grows, and resulting cloudiness shows “head ped” or cumulus development.

24. Unsaturated air flowing up slope will cool that the rate of approximately (dry adiabatic lapse rate).

A. 3°C per 1,000 feet.
B. 2°C per 1,000 feet.
C. 2.5°C per 1,000 feet.

Answer **(A)** is correct.
DISCUSSION: Unsaturated air flowing up slope will cools and warms at about 3°C (5.4 °F) per 1,000 feet.

25. What type of clouds will be formed if very stable moist air is forced up slope ?

A. First stratified clouds and then vertical clouds.
B. Vertical clouds with increasing height.
C. Stratified clouds with little vertical development.

Answer **(C)** is correct.
DISCUSSION: When stable air is forced upward the air tends to retain horizontal flow and any cloudiness is flat and stratified. when unstable air is forced upward, the disturbance grows and any resulting cloudiness show extensive vertical development.

26. When type clouds can be expected when an unstable air mass is forced to ascend a mountain slope ?

A. Layered clouds with little vertical development.
B. Stratified clouds with considerable associated turbulence.

Answer **(C)** is correct.
DISCUSSION: When stable air is forced upward, the air tends to retain horizontal flow and any cloudiness is flat and stratified. When unstable air is forced upward, the disturbance grows and any resulting cloudiness shows extensive vertical

C. Clouds with extensive vertical development.

development.

27. Which of the following combinations of weather producing variables would likely result in cumuliform type clouds, good visibility, rain showers, and possible clear-type icing in clouds ?

A. Unstable, moist air, and no lifting mechanism.
B. Stable, dry air, and orographic lifting.
C. Unstable, moist air, and orographic lifting.

Answer **(C)** is correct.
DISCUSSION: Unstable air favors convection. A cumulus cloud forms in a convective updraft and builds upward. The initial lifting that triggers a cumuliform cloud can be either orographic (topographical, i.e., mountains) or by surface heating. For convective cumuliform clouds to develop, the air must be unstable after saturation.

28. The suffix "nimbus", used in naming clouds. means a

A. Cloud with extensive vertical development.
B. Rain cloud.
C. Huge massive, towering cloud.

Answer **(B)** is correct.
DISCUSSION: The prefix "nimbus -" or suffix "-nimbus" means raincloud. Thus, stratified clouds from which rain is falling are called nimbostratus. A heavy, swelling cumulus-type cloud which produces precipitation is a cumulonimbus.

29. What are four families of clouds ?

A. Stratus, Cumulus, nimbus, and cirrus.
B. Clouds formed by updrafts, fronts, cooling layers of air, and precipitation into warm air.
C. High, middle, low, and those with extensive vertical development.

Answer **(C)** is correct.
DISCUSSION: For identification purposes, cloud types are divided into four "families". The families are high clouds, middle clouds, low clouds, and clouds with extensive vertical development.

30. A high cloud is composed mostly of

A. Ozone.
B. Condensation nuclei.
C. Ice crystals.

Answer **(C)** is correct.
DISCUSSION: The high cloud family is cirrus form and includes cirrus, cirrocumulus, and cirrostratus they are composed almost entirely of ice crystals.

31. Which family of clouds is least likely to contribute to structural icing on an aircraft ?

A. Low clouds.
B. High clouds.
C. Clouds with extensive vertical development.

Answer **(B)** is correct.
DISCUSSION: Tow conditions are necessary for structural icing in flight :
1. The aircraft must be flying through invisible water such as rain or cloud droplets, and
2. The temperature, at the point where the moisture strikes the aircraft must be 0°C or colder.
The high cloud family is composed almost entirely of ice crystals. Because ice crystals are already frozen, they most likely won't stick to an aircraft.

32. Which clouds have the greatest turbulence ?

A. Towering cumulus.
B. Cumulonimbus.
C. Altocumulus castellans.

Answer **(B)** is correct.
DISCUSSION: Cumulonimbus clouds are the ultimate manifestation of instability. They are vertically developed clouds of large dimensions with dense boiling tops, often crowned with thick veils of cirrus (the anvil). nearly the entire spectrum of flying hazard are contained in these clouds , including violent turbulence. They should be avoided at all times.

33. Standing lenticular clouds, in mountainous areas,

Answer **(C)** is correct.

indicate

A. An inversion.
B. Unstable air.
C. Turbulence.

DISCUSSION: Standing lenticular altocumulus clouds are formed on the crests of waves created by barriers to the wind flow. The clouds show little movement, hence the name “standing.” However, wind can be quite strong blowing through such clouds. The presence of these clouds is a good indication of very strong turbulence and should be avoided.

34. The presence of standing lenticular altocumulus clouds is a good indication of

A. A jet stream.
B. Very short turbulence.
C. Heavy icing conditions.

Answer **(B)** is correct.
DISCUSSION: Standing lenticular altocumulus clouds are formed on the crests of waves created by barriers to the wind flow. the clouds show little movement, hence the name “standing” However wind can be quite strong blowing through such clouds. The presence of these clouds is a good indication of very strong turbulence and they should be avoided.

35. Fair weather cumulus clouds often indicate

A. Turbulence at and below the cloud level.
B. Poor visibility.
C. Smooth flying conditions.

Answer **(A)** is correct.
DISCUSSION: Fair weather cumulus clouds often indicate bumpy turbulence beneath and in the clouds but good visibility. The cloud tops indicate the approximate upper limit of convection; flight above is usually smooth.

36. Fog is usually prevalent in industrial areas because of

A. Atmospheric stabilization around cities.
B. An abundance of condensation nuclei from combustion products.
C. Increased temperatures due to industrial heating.

Answer **(B)** is correct.
DISCUSSION: Abundant condensation nuclei enhance the formation of fog . Thus , fog is prevalent in industrial area where byproducts of these nuclei.

37. Under which condition does advection fog usually form?

A. Moist air moving over colder ground or water.
B. Warm, moist air settling over a cool surface under no-wind conditions.
C. A land breeze blowing a cold air mass over a warm water water current.

Answer **(A)** is correct.
DISCUSSION: Advection fog forms when moist air moves over colder ground or water.

38. In which situation is advection fog most likely to form ?

A. An air mass moving inland from the coast in winter.
B. A light breeze blowing colder air out to sea.
C. Warm, moist air settling over a warmer surface under no-wind conditions.

Answer **(A)** is correct.
DISCUSSION: Advection fog forms when moist air moves over colder ground or water. During the winter, Advection fog over the central and eastern United State results when moist air from the gulf of Mexico spreads northward over cold ground. the fog may extend as far north as the Great lakes.

39. In what localities is advection fog most likely to occur ?

A. Coastal areas.
B. Mountain slopes.
C. Level inland areas.

Answer **(A)** is correct.
DISCUSSION: Advection fog forms when moist air moves over colder ground or water. It is most common along coastal areas but often develops deep into continental areas.

40. What types of fog depend upon a wind in order or exist ?

A. Steam fog and down slope fog.
B. Precipitation-induced fog and ground fog
C. Advection fog and up slope fog.

Answer **(C)** is correct.
DISCUSSION: Advection fog forms when moist air moves colder ground or water. Upslope fog forms as a result of moist, stable air being cooled adiabatically as it moves up sloping terrain.

41. What situation is most conducive to formation of radiation fog ?

A. Warm, moist air over low, flatland areas on clear, clam nights.
B. Moist, tropical air moving over cold, offshore water.
C. The movement of cold air over much warmer water.

Answer **(A)** is correct.
DISCUSSION: Conditions favorable for radiation fog are clear skies little or no wind, and small temperature/dew point spread (high relative humidity). The fog forms almost exclusively at night or near daybreak.

42. Which conditions are favorable for the formation of radiation fog ?

A. Moist air moving over colder ground or water.
B. Cloudy sky and a light wind moving saturated warm air over a cool surface.
C. Clear sky, little or no wind, small temperature. dew point spread, and over a land surface.

Answer **(C)** is correct.
DISCUSSION: Conditions favorable for radiation fog are clear skies, little or no wind, and small temperature/dew point spread (high relative humidity). the fog forms almost exclusively at night or near daybreak.

43. Which weather condition can be expected when moist air flows from a relatively warm surface to a colder surface ?

A. Increased visibility.
B. Convective turbulence due to surface heating.
C. Fog.

Answer **(C)** is correct.
DISCUSSION: Advection fog forms when moist air moves over colder ground or water.

44. An air mass is a body of air that

A. Has similar cloud formations associated with it.
B. Creates a wind shift as it moves across the Earth's surface.
C. Covers an extensive area and has fairly uniform properties of temperature and moisture.

Answer **(C)** is correct.
DISCUSSION: if a body of air (or air mass) comes to rest, or moves slowly over a large geographical area that has fairly uniform temperatures and moisture content, the body of air (or air mass) acquires the temperature/moisture properties of the geographical area it covers. Therefore it becomes fairly uniform in these properties over an extensive area.

45. The general characteristic of unstable air are

A. Good visibility, showery precipitation, and cumuli-form-type clouds.
B. Good visibility, steady precipitation, and stratiform type clouds.
C. Poor visibility, intermittent precipitation, and cumuliform-type clouds.

Answer **(A)** is correct.
DISCUSSION: The stability of an air mass determines its typical weather characteristics. when one type of air mass overlies another, conditions change with height. characteristics typical of an unstable and a a stable air mass are shown in the figure below .

46. What are some characteristics of unstable air ?

A. Nimbostratus clouds and good surface visibility.
B. Turbulence and poor surface visibility.
C. Turbulence and good surface visibility.

Answer **(C)** is correct.
DISCUSSION: The stability of an air mass determines its typical weather characteristics. When one type of air mass overlies another conditions change with height. Characteristic typical of an unstable and air mass are shown in the figure above.

47. Which are characteristics of an unstable cold air mass moving over a warm surface ?

A. Cumuliform clouds, turbulence, and poor visibility.
B. Cumuliform clouds, turbulence, and good visibility.
C. Stratiform clouds, smooth air, and poor visibility.

Answer **(B)** is correct.
DISCUSSION: Cool air moving over a warm surface is heated from below, generating instability of of showers. Stability of an air mass determines its typical weather characteristics. When one type of air mass overlies another, conditions change with height. characteristic typical of an unstable air mass are cumuliform clouds, turbulence , and good visibility .

48. Which is a characteristic of stable air ?

A. Fair weather cumulus clouds.
B. Stratiform clouds.
C. unlimited visibility.

Answer **(B)** is correct.
DISCUSSION: The stability of an air mass determines its typical weather characteristics. When one type of air mass overlies another, conditions change with height.

49. What are the characteristics of stable air ?

A. Good visibility, steady precipitation, and stratus-type clouds.
B. Poor visibility, intermittent precipitation, and cumulus -type clouds.
C. poor visibility, steady precipitation, and stratus-type clouds.

Answer **(C)** is correct.
DISCUSSION: The stability of an air mass determines its typical weather characteristics. When one type of air mass overlies another, conditions change with height. Characteristics typical of an unstable and a stable air mass are shown in the figure above.

50. Steady precaution , in contrast to showers, preceding a front is an indication of

A. Stratiform clouds with moderate turbulence.
B. Cumuliform clouds with little or no turbulence.
C. Stratiform clouds with little or no turbulence.

Answer **(C)** is correct.
DISCUSSION: Steady precipitation is a characteristics of stable air, which has little or no turbulence . Stratiform clouds are associated with stable air .

51. Frontal waves normally from on

A. Slow moving cold fronts or stationary fronts.
B. Slow moving warm fronts and strong occluded front .
C. Rapidly moving cold fronts or warm fronts.

Answer **(A)** is correct.
DISCUSSION: Frontal waves and cyclones (areas of law pressure) usually from on slow-moving cold fronts or stationary fronts.

52.Which weather phenomenon is always associated with the passage of a frontal system ?

A. A wind change.
B. An abrupt decrease in pressure.
C. Clouds, either ahead or behind the front.

Answer **(A)** is correct.
DISCUSSION: Wind always changes across a front . wind discontinuity may be in direction, in speed, or in both. Temperature and humidity also may change.

53. If you into severe turbulence, which flight condition should you attempt to maintain ?

A. Constant airspeed. (Va)
B. Level flight attitude.
C. Constant altitude and constant airspeed

Answer **(B)** is correct.
DISCUSSION: when flying in severe turbulence, maintaining positive aircraft control may be nearly impossible to do. In attempting to maintain a constant altitude, the stresses applied to the aircraft are greatly increased.

54. If severe turbulence is encountered during your VFR flight, the airplane should be slowed to design maneuvering speed because the

A. Maneuverability of the airplane will increased.
B. Amount of excess load that can be imposed on the wing will be decreased.
C. Airplane will stall at a lower angle of attack, giving an increased margin of safety.

Answer **(B)** is correct.
DISCUSSION: if during flight, rough air or sever turbulence is encountered, the airspeed should be reduced to maneuvering speed or less to minimize the stress on the airplane structure.

55. A pilot reporting turbulence that momentarily causes slight, erratic changes in altitude and/or altitude should report it as

A. Light turbulence.
B. Moderate turbulence.
C. Light chop.

Answer **(A)** is correct.
DISCUSSION: Light turbulence is defined as turbulence that momentarily causes, erratic changes in altitude and in altitude and/or altitude.

56. What are the requirement for the formation of a thunderstorm ?

A. A cumulus cloud with sufficient moisture.
B. A cumulus cloud with sufficient moisture and an inverted lapse rate.
C. Sufficient moisture, and unstable lapse rate, and a lifting action.

Answer **(C)** is correct.
DISCUSSION: For a thunderstorm to form the air must have :
1. Sufficient water vapor,
2. An unstable lapse rate, and
3. An initial upward boost (lifting) to start the storm process in motion.

57. Which weather phenomenon signals the beginning of the mature stage of a thunderstorm ?

A. The start of rain at the surface.
B. Growth rate of cloud is maximum.
C. Strong turbulence in the cloud.

Answer **(A)** is correct.
DISCUSSION: Precipitation beginning to fall from the cloud base signals that a downdraft has developed and a cell has entered the mature stage.

58. During the life cycle of thunderstorm, which stage is characterized predominately by downdrafts?

A. Cumulus.
B. Dissipating.
C. Mature.

Answer **(B)** is correct.
DISCUSSION: A thunderstorm cell during its life cycle progress through three stages: the cumulus, the mature , and the dissipating. Downdrafts characterize the dissipating stage.

59. What is an indication that downdrafts have developed and the thunderstorm cell has entered the mature stage ?

Answer **(B)** is correct.
DISCUSSION: precipitation begging to fall from the cloud base signals that a downdraft has developed./ and a cell has entered the mature stage.

A. The anvil top has completed its development.
B. Precipitation begins to fall from the cloud base.
C. A gust front forms.

60. Where do squall lines most often develop?

A. In an occluded front.
B. In a cold air mass.
C. Ahead of a cold front.

Answer **(C)** is correct.
DISCUSSION: A squall line (instability line) is a non frontal, narrow band of active thunderstorm often it develops ahead of a cold front in moist unstable air, but but it may develop in unstable air far removed from front.

61. If squalls are reported at your destination, what wind conditions should are anticipate ?

A. Sudden increases in wind speed of at least 16 knots rising to 22 knots or more, lasting for at last 1 minute.
B. Peak gusts of at least 35 knots for a sustained period of 1minute or longer.
C. Rapid variation in wind direction of at least 20° and changes in speed of at least 10 knots between peaks and lulls.

Answer **(A)** is correct.
DISCUSSION: A squall is a sudden increase in speed of at least 16 knots to a sustained speed of 22 knots or more, lasting for at least one minute.

62. Which thunderstorms generally produce the most sever conditions, such as heavy hail and destructive winds ?

A. Warm front.
B. Squall line.
C. Air mass.

Answer **(B)** is correct.
DISCUSSION: A squall line often contains severe steady-state thunderstorms and present the single most intense weather hazard to aircraft. It usually forms rapidly, generally reaching maximum intensity during the late afternoon and the first few hours of darkness. hail competes with turbulence as the greatest thunderstorm hazard to aircraft

63. What is indicated by the term “embedded thunder-storms” ?

A. Severe thunderstorms are embedded within squall line.
B. Thunderstorms are predicated to develop in stable air mass.
C. Thunderstorms are obscured by massive cloud layers and cannot be seen.

Answer **(C)** is correct.
DISCUSSION: Usually, thunderstorms are quite visible to the pilot however, when a thunderstorm is present but not visible to the pilot due to cloud cover, such as a thick stratus layer, the thunder-storm is said to be “embedded.”

64. Which weather phenomenon is always associated with a thunderstorm ?

A. Lightning.
B. Heavy rain showers.
C. Super cooled raindrops.

Answer **(A)** is correct.
DISCUSSION: A thunderstorm is a local storm produced by a cumulonimbus cloud. it is always accompanied by lightning and thunder, usually with strong gusts of wind, heavy rain and some-times, with hail.

65. Which procedure is recommended if a pilot should unintentionally penetrate embedded thunderstorm activity ?

Answer **(C)** is correct.
DISCUSSION: following are some do’s and do not during thunderstorm penetration:
1. Do keep your eyes on your instruments. looking

A. Reserve aircraft heading or proceed toward an area of known VFR conditions.
B. Reduce airspeed to maneuvering speed and maintain a constant altitude.
C. Set power for recommended turbulence penetration airspeed and attempt to maintain a level flight attitude.

outside the cockpit can increase the danger of temporary blindness from lighting.
2. don't change power settings; maintain setting for reduced airspeed.
3. Do maintain a constant attitude; left the aircraft "ride the waves." maneuvers that try to maintain constant altitude increase stresses on the aircraft.
4. Don't turn back once you are in the thunderstorm A straight course through the storm most likely is the quickest way out of the hazards. In addition turning maneuvers increase stresses on the aircraft.

66. What is the expected duration of an individual microburst ?

A. Two minutes with maximum winds lasting approximately 1minute.
B. One microburst may continue for as long as 2 to 4 hours.
C. Seldom longer than 15 minutes from the time the burst strikes the ground until dissipation.

Answer **(C)** is correct.
DISCUSSION: An individual microburst will seldom last longer than 15 minutes from the time it strikes the ground until dissipation. However, they may be multiple microburst's in the area.

67. Maximum downdrafts in a microburst encounter may be as strong as

A. 8,000 feet per minute.
B. 7,000 feet per minute.
C. 6,000 feet per minute.

Answer **(C)** is correct.
DISCUSSION: The downdrafts can be as strong as 6,000 feet per minute in a microburst encounter.

68. An aircraft that encounters a headwind of 45 knots, within a microburst, may expect a total shear across the microburst of

A. 40 knots.
B. 80 knots.
C. 90 knots.

Answer **(C)** is correct.
DISCUSSION: Horizontal winds near the surface can be as strong as 45 knots resulting in a 90-knots shear (headwind to tailwind) across the micro-burst. These strong horizontal winds occur within a few hundred feet of the ground.

68. Which conditions result in the formation of frost ?

A. The temperature of the collecting surface is at or below freezing and small droplets of moisture are falling.
B. When dew forms and the temperature is below freezing .
C. Temperature of the collecting surface is below the dew point of surrounding air and the dew point is colder than freezing.

Answer **(C)** is correct.
DISCUSSION: In order for frost to form, the air temperature must be below the dew point and the dew point of the surrounding air must be colder than freezing. water vapor will then sublimate directly as ice crystals or frost.

69. In which meteorological environment is aircraft structural icing most likely to have the highest rate of accumulation ?

A. Cumulonimbus clouds.
B. High humidity and freezing temperature.
C. Freezing rain.

Answer **(C)** is correct.
DISCUSSION: The condition most favorable for very hazardous icing is the presence of many large, super cooled water droplets, also called freezing rain.

70. Which is an operational consideration if you fly into rain which freezes on impact ?

A. You have flown into an area of thunderstorms.
B. Temperatures are above freezing at some higher altitude.
C. You have flown through a cold front.

Answer **(B)** is correct.
DISCUSSION: As the rain falls through air that is below freezing, its temperature begins to fall below freezing yet without freezing solid. This is freezing rain. The process requires that the temperature of the rain must be above freezing before it becomes super cooled. Therefore, when freezing rain is encountered , it indicates that warmer temperature are above.

71. Test data indicate that ice, snow or frost having a thickness and roughness similar to medium or coarse sandpaper on the leading edge and upper surface of an airfoil.

A. Reduce lift by as much as 50 percent and increase drag by such much as 50 percent.
B. Increase drag and reduce lift by as much as 25 percent
C. Reduce lift by as much as 30 percent and increase drag by 40 percent.

Answer **(C)** is correct.
DISCUSSION: Test data indicate that ice, snow, or frost formations having a thickness and surface roughness similar to medium or coarse sandpaper on the leading edge and upper surface of a wing can reduce wing lift by as much as 30% and increase drag by 40%

72. Why is frost considered hazardous flight operation ?

A. Frost changes the basic aerodynamic shape of the airfoil
B. Frost decreases control effectiveness.
C. Frost causes early airflow separation resulting in a loss of lift.

Answer **(C)** is correct.
DISCUSSION: Frost does not change the basic aerodynamic shape of the wing, but the roughness of its surface spoils the smooth flow of air, thus causing a slowing of the airflow. This slowing of the air causes early air flow separation over the affected airfoil. resulting in a loss of lift.

73. Where does wind shear occur ?

A. Exclusively in thunderstorms.
B. Whenever there is an abrupt decrease in pressure and/or temperature.
C. With either a wind shift of a wind speed gradient at any level in the atmosphere.

Answer **(C)** is correct.
DISCUSSION: Wind shear may be associated with either a wind shift or a wind speed gradient at any level in the atmosphere.

74. What is an important characteristic of wind shear ?

A. Created by thunderstorms.
B. It usually exist only in the vicinity of thunderstorms, but many be found near a strong temperature inversion.
C. It may be associated with either a wind shift or a wind speed gradient at any level in the atmosphere.

Answer **(C)** is correct.
DISCUSSION: Wind shear may be associated with either a wind shift or a wind speed gradient at any level in the atmosphere. Low-level wind shear may result from a frontal passage thunderstorm activity, or low-level temperature inversion .

77. What is an important characteristic of wind shear ?

A. It is an atmospheric condition that is associated exclusively with zones of convergence.
B. The Coriolis phenomenon in both high- and low-level air masses is the principal generating force.
C. It is an atmospheric condition that may be associated with a low-level temperature inversion, a jet stream, or a frontal zone.

Answer **(C)** is correct.
DISCUSSION: Wind shear may be associated with either a wind shift or a wind speed gradient at any level in atmosphere.

78. Which is a characteristic of low-level wind shear

Answer **(A)** is correct.

as it relates to frontal activity ?

A. With a warm front, The most critical period is before the front passes the airport
B. With a cold front, the most critical period is just before the front passes the airport.
C. Turbulence will always exist in wind-shear conditions.

DISCUSSION: wind shear occurs with a cold front just after the front passes the airport and for a short period thereafter. if the front is moving 30 knots or more, the frontal surface will usually be 5,000 feet above the airport about three hours after the frontal passage.

79. Hazardous wind shear is commonly encountered near the ground

A. During periods when the wind velocity is stronger than 35 knots
B. During periods when the wind velocity is stronger than 35 knots and near mountain valleys.
C. During periods of strong temperature inversion and near thunderstorms

Answer **(C)** is correct.
DISCUSSION: You can relatively certain of a shear zone in a low-level temperature inversion, if you know that the wind at 2,000 to 4,000 feet is 25 knots or more. wind shear turbulence is also found near the ground outside thunderstorm clouds .

80. Where can wind shear associated with a thunderstorm be fount ? Choose the most complete answer

A. In front of the thunderstorm cell (anvil side) and on the right side of the cell.
B. In front of the thunderstorm cell and directly under the cell.
C. On all sides of the thunderstorm cell and directly under the cell.

Answer **(C)** is correct.
DISCUSSION: The winds around a thunderstorm are complex Wind shear can be found on all sides of a thunderstorm cell and in the downdraft directly under the cell The wind shift line or gust front associated with thunderstorms can precede the actual storm by 15 nautical miles or more

81. The wind at 5,000 feet AGL is southwesterly while the surface wind is southerly. This difference in direction is primarily due to

A. Stronger pressure gradient at higher altitudes.
B. Friction between the wind and the surface.
C. Stronger Coriolis force at the surface.

Answer **(B)** is correct.
DISCUSSION: Friction between the wind and the surface slows the wind. The Coriolis force has less effect on slower winds, therefore there will be less deflection with surface winds than with winds at 5,000 feet AGL

82. What is the proper airspeed to use when flying between thermals on a cross-country flight against a headwind ?

A. The best lift/drag speed increased by one-half the estimated wind velocity.
B. The minimum sink speed increased by one-half the estimated wind velocity.
C. The best lift/drag speed decreased by one-half the estimated wind velocity.

Answer **(A)** is correct.
DISCUSSION: When gliding into a headwind, maximum distance will be achieved by adding approximately one-half the estimated headwind velocity to the best L/D speed.

83. A temperature inversion would most likely result in which weather condition ?

A. Clouds with extensive vertical development above an inversion aloft
B. Good visibility in the lower levels of the atmosphere and poor visibility above an inversion aloft.
C. An increase in temperature as altitude is increased.

Answer **(C)** is correct.
DISCUSSION: An increase in temperature with altitude is defined as an inversion. An inversion often develops near the ground on clear, cool nights when wind is light. The ground radiates heat and cools much faster than the overlying air. Air in contact with the ground becomes cold while the temperature a few hundred feet above changes very little. Thus, the temperature increases with height. A ground-based inversion usually means poor visibility.

84. The most frequent type of ground or surface-based temperature inversion is that which is produced by

A. Terrestrial radiation on a clear, relatively still night.
B. Warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
C. The movement of colder air under warm air, or the movement of warm air over cold air.

Answer **(A)** is correct.
DISCUSSION: An inversion often develops near the ground on clear, cool nights when wind is light. The ground radiates heat and cools much faster than the overlying air. Air in contract with the ground becomes cold while the temperature a few hundred feet above changes very little.
Thus, the temperature increases with height.

85. What is meant by the term “dew point” ?

A. The temperature at which condensation and evaporation are equal.
B. The temperature at which dew will always form.
C. The temperature to which air must be cooled to become saturated.

Answer **(C)** is correct.
DISCUSSION: Dew point is the temperature to which air must be cooled to become saturated by the water vapour already present in the air.

86. The amount of water vapour which air can hold depends on the

A. Dew point.
B. Air temperature.
C. Stability of the air.

Answer **(B)** is correct.
DISCUSSION: Temperature largely determines the maximum amount of water vapour air can hold.

87. Clouds, fog, or dew will always from when

A. Water vapour condenses.
B. Water vapour is present.
C. Relative humidity reaches 100 %.

Answer **(A)** is correct.
DISCUSSION: As water vapour condenses or sublimates on condensation nuclei, liquid or ice particles begin to grow. Some condition nuclei an affinity for water and can induce condensation or sublimation even when air is, but not completely, saturated.

88. What are the processes by which moisture is added to unsaturated air ?

A, Evaporation and sublimation.
B. Heating and condensation.
C. Super saturation and evaporation.

Answer **(A)** is correct.
DISCUSSION: Evaporation is the changing of liquid water to invisible water vapour. Sublimation is the changing of solid water directly to the vapour phase or water vapour to ice, by passing the liquid state in each process.

89. Of the temperature/dew point spread is small and decreasing, and the temperature is 62°F, What type weather is most likely to develop ?

A. Freezing precipitation.
B. Thunderstorms.
C. Fog or low clouds.

Answer **(C)** is correct.
DISCUSSION: With a small temperature/dew point spread, the air is close to saturation. This will usually result in fog or low clouds. anticipate fog when the temperature/dew point spread is 5°F or less and decreasing.

90. The boundary between two different air masses is referred to as a

Answer **(C)** is correct.
DISCUSSION: A front is the boundary between two spread, the air is masses.

A. Frontolysis
B. Frontogenesis.
C. Front.

91. One of the most easily recognized discontinuities across a front is

A. A change in temperature
B. An increase in cloud coverage.
C. An increase in relative humidity.

Answer **(A)** is correct.
DISCUSSION: Temperature is one of the most easily recognized discontinuities across a front.

92. One weather phenomenon which will always occur when flying across a front is a change in the

A. Wind direction
B. Type of precipitation.
C. Stability of the air mass.

Answer **(A)** is correct.
DISCUSSION: Wind direction always changes across a front.

93. During which period is a sea breeze front most suitable for soaring flight ?

A. Shortly after sunrise.
B. During the early forenoon.
C. During the afternoon.

Answer **(C)** is correct.
DISCUSSION: A sea breeze begins during early afternoon and reaches a maximum in the afternoon, subsiding around dusk.

94. Which weather conditions should be expected beneath a low-level temperature inversion layer when the relative humidity is high ?

A. Smooth air, poor visibility, fog, haze, or low clouds.
B. Light wind shear, poor visibility, haze , and light rain.
C. Turbulent air, poor visibility, fog, low stratus type clouds, and showery precipitation.

Answer **(A)** is correct.
DISCUSSION: A ground-based inversion leads to poor visibility by trapping fog, smoke, and other restrictions into low levels of the atmosphere. The layer is stable and convection is suppressed.

95. What measurement can be used to determine the stability of the atmosphere ?

A. Atmospheric pressure.
B. Actual lapse rate.
C. Surface temperature.

Answer **(B)** is correct.
DISCUSSION: The difference between the existing lapse rate of a given mass of air and the adiabatic rates of cooling in upward moving air determines if the air is stable or unstable.

96. What would decrease the stability of an air mass ?

A. Warming from below.
B. Cooling from below.
C. Decrease in water vapour.

Answer **(A)** is correct.
DISCUSSION: When air near the surface is warm and moist, suspect instability. Surface heating, cooling aloft, converging or upslope winds, or an invading mass of colder air may lead to instability and cumuliform clouds.

97. What is a characteristic of stable air ?

A. Stratiform clouds.
B. Unlimited visibility.

Answer **(A)** is correct.
DISCUSSION: Since stable air resists convection, clouds in stable air from in horizontal, sheet-like layers of " strata"

C. Cumulus clouds.

98. What feature is associated with a temperature inversion ?

A. A stable layer of air.
B. An unstable layer of air.
C. Chinook winds on mountain slopes.

Answer **(A)** is correct.
DISCUSSION: If the temperature increases with altitude through a layer (an inversion), the layer is stable and convection is suppressed.

99. What are characteristics of a moist, unstable air mass ?

A. Cumuliform clouds and showers precipitation.
B. Poor visibility and smooth air.
C. Stratiform clouds and showers precipitation.

Answer **(A)** is correct.
DISCUSSION: Characteristics of a moist, unstable air mass include cumuliform clouds, showery precipitation, rough air (turbulence), and good visibility (except in blowing obstructions).

100. What are characteristics of unstable air ?

A. Turbulence and good surface visibility.
B. Turbulence and poor surface visibility.
C. Nimbostratus clouds and good surface visibility.

Answer **(A)** is correct.
DISCUSSION: Characteristics of an unstable air mass include cumuli-form, clouds, showery precipitation, rough air (turbulence), and good visibility (except in blowing obstructions).

101. A stable air mass is most likely to have which characteristic ?

A. Showery precipitation
B. Turbulent air.
C. Poor surface visibility.

Answer **(C)** is correct.
DISCUSSION: Characteristics of a stable air mass include stratiform clouds and fog, continuous precipitation, smooth air, and fair too poor visibility in haze and smoke.

102.Moist, Stable air flowing upslope can be expected to

A. Produce stratus type clouds.
B. Cause showers and thunderstorms.
C. Develop convective turbulence.

Answer **(A)** is correct.
DISCUSSION: When stable air is forced upward the air tends to train horizontal flow and any cloudiness is flat and stratified.

103. If an unstable air mass is forced upward, what type clouds can be expected ?

A. Stratus clouds with little vertical development.
B. Stratus clouds with considerable associated turbulence.
C. Clouds with considerable vertical development and associated turbulence.

Answer **(C)** is correct.
DISCUSSION: When unstable air is forced upward, the disturbance grows. Any resulting cloudiness shows extensive vertical development

104. Steady precipitation preceding a front is an indication of

A. Stratiform clouds with moderate turbulence.
B. Cumuliform clouds with little or no turbulence.
C. Stratiform clouds with little or no turbulence.

Answer **(C)** is correct.
DISCUSSION: Precipitation from stratiform clouds is usually steady and there is little or no turbulence.

105. The conditions necessary for the formation of cumulonimbus clouds are a lifting action and

Answer **(B)** is correct.
DISCUSSION: For a cumulonimbus cloud or thunder storm to form

A. Unstable air containing an excess of condensation nuclei.
B. Unstable, moist air.
C. Either stable or unstable air.

the air must have :
1. Sufficient water vapour,
2. An unstable lapse rate and
3. An initial upward boost (lifting) to start the storm process in motion

106. What is the approximate base of the cumulus clouds if the surface air temperature at 1,000 feet MSL is 70° and the dew point is 48°F ?

A. 4,000 feet MSL.
B. 5,000 feet MSL.
C. 6,000 feet MSL.

Answer **(C)** is correct.
DISCUSSION: When lifted, unsaturated air cools at approximately 5.4°F per 1,000 feet. Therefore, the convergence of the temperature and dew point lapse rates is 4.4°F per 1,000 feet. The base of a cloud (AGL) that is formed by vertical currents can be roughly calculated by dividing the difference between the surface temperature and the dew point by 4.4 and multiplying the remainder by 1,000

107. At approximately that altitude above the surface would the pilot expect the base of cumuliform clouds if the surface air temperature is 82°F and the dew point is 38°F ?

A. 9,000 feet AGL.
B. 10,000 feet AGL.
C. 11,000 feet AGL.

Answer **(B)** is correct.
When lifted, unsaturated air cools at approximately 5.4°F per 1,000 feet. The dew point cools at approximately 1°F per 1,000 feet. There fore, the convergence of the temperature and dew point lapse rates is 4.4°F per 1,000 feet. The base of a cloud (AGL) that is formed by vertical currents can be roughly calculated by dividing the difference between the surface temperature and the dew point by 4.4 and multiplying the remainder by 1,000
1. 82°F surface temperature
- 38°F dew point
22°F
2. 44 ÷ 4.4 = 10
3. 10 x 1,000 = 10,00 feet AGL

108. The suffix “nimbus,” used in naming clouds, means

A. A cloud with extensive vertical development.
B. A rain cloud.
C. A middle cloud containing ice pellets.

Answer **(B)** is correct.
DISCUSSION: The prefix “nimbo-“ or suffix “-nimbus” means rain cloud.

109. Clouds are divided into four families according to their

A. Outward shape.
B. Height range.
C. Composition.

Answer **(B)** is correct.
DISCUSSION: For identification purposes, clouds are divided into four families : high clouds, middle clouds, low clouds and clouds with extensive vertical development.

110.What clouds have the greatest turbulence ?

A. Towering cumulus.
B. Cumulonimbus.
C. Nimbostratus.

Answer **(B)** is correct.
DISCUSSION: Cumulonimbus are the ultimate manifestation of instability. They are vertically-developed clouds of large dimensions with dense boiling tops, often crowned with thick veils of dense cirrus (the anvil). Nearly the clouds including violent turbulence.

111. An almond or lens-shaped cloud which appears stationary, but which may contain winds of 50 knots or more, is referred to as

A. An inactive frontal cloud.

Answer **(C)** is correct.
DISCUSSION: Crests of standing waves may be marked by stationary, lens-shaped clouds known as standing lenticular clouds.

B. A funnel cloud.
C. A lenticular cloud.

112. Crest of standing mountain waves may be marked by stationary, lens-shaped clouds known as

A. Alto cumulus clouds.
B. Standing lenticular clouds.
C. Roll clouds.

Answer **(B)** is correct.
DISCUSSION: Crest of standing waves may be marked by stationary, lens-shaped clouds known as standing lenticular clouds.

113. What cloud types would indicate convective turbulence ?

A. Cirrus clouds.
B. Nimbostratus clouds.
C. Towering cumulus clouds.

Answer **(C)** is correct.
DISCUSSION: Towering cumulus signifies a relatively deep layer of unstable air. They show considerable vertical development and have billowing cauliflower tops. showers can result from these clouds . Expect very strong turbulence, and perhaps some clear icing above the freezing level.

114. Possible mountain wave turbulence cloud be anticipated when winds of 40 knots or greater blow

A. Across a mountain ridge, and the air is stable.
B. Down a mountain valley, and the air is unstable.
C. Parallel to a mountain peak, and the air is stable

Answer **(A)** is correct.
DISCUSSION: Always anticipate possible mountain wave turbulence when strong winds of 40 knots or greater blow across a mountain or ridge and the air is stable.

115. Upon encountering severe turbulence , which flight condition should be the pilot attempt to maintain ?

A. Constant altitude and airspeed.
B. Constant angle of attack.
C. Level flight attitude.

Answer **(C)** is correct.
DISCUSSION: The primary concern is to avoid undue stress on the air-frame. This can best be done by attempting to maintain a constant attitude while keeping the air speed below design manoeuvring speed

116. What feature is normally associated with the cumulus stage of a thunderstorm ?

A. Roll cloud.
B. Continuous updraft.
C. Frequent lighting.

Answer **(B)** is correct.
DISCUSSION: The key feature of the cumulus stage is an updraft. Precipitation beginning to fall from the cloud base is the signal that a downdraft has developed also and a cell has entered the mature stage.

117. Which weather phenomenon signals the beginning of the mature stage of a thunderstorm ?

A. The appearance of an anvil top.
B. Precipitation beginning to fall.
C. Maximum growth rate of the clouds.

Answer **(B)** is correct.
DISCUSSION: The key feature of the cumulus stage is an updraft Precipitation beginning to fall from the cloud base is the signal that a downdraft has developed also and a cell has entered the mature stage.

118. What conditions are necessary for the formation of thunderstorms ?

Answer **(A)** is correct.
DISCUSSION: For a cumulonimbus cloud or thunderstorm to form, the air must have :

A. High humidity, lifting force, and unstable conditions.
B. Hugh humidity, high temperature and cumulus clouds.
C. Lifting force, moist air, and extensive cloud cover.

1. Sufficient water vapour,
2. An unstable lapse rate, and
3. An initial upward boost (lifting) to start the storm process in motion.

119. During the life cycle of a thunderstorm, which stage is characterized predominately by downdrafts ?

A. Cumulus.
B. Dissipating.
C. Mature.

Answer **(B)** is correct.
DISCUSSION: Downdrafts characterize the dissipating stage of the thunderstorm cell and the storm dies rapidly.

120. Thunderstorm reach their greatest intensity during the

A. Mature stage.
B. Downdraft stage.
C. Cumulus stage.

Answer **(A)** is correct.
DISCUSSION: All thunderstorm hazards reach their greatest intensity during the mature stage.

121. Thunderstorms which generally produce the most intense hazard to aircraft are

A. Squall line thunderstorms.
B. Steady-state thunderstorms.
C. Warm front thunderstorms.

Answer **(A)** is correct.
DISCUSSION: A squall line is a none-frontal, narrow band of active thunderstorms. The line may be too long to easily detour and too wide and sever to penetrate. It often contains sever steady-state thunderstorms and presents the single, most intense weather hazard to aircraft.

122. A non-frontal, narrow band of active thunderstorms that often develop ahead of a cold front is known as a

A. Prefrontal system.
B. Squall line.
C. Dry line.

Answer **(B)** is correct.
DISCUSSION: A squall line is a non-frontal, narrow band of active thunderstorms. The line may be too long to easily detour and too wide and sever to penetrate. It often contains sever steady-state thunderstorms and presents the single, most intense weather hazard to aircraft.

123.If there is thunder storm activity in the vicinity of an airport at which you plan to land, which hazardous atmospheric phenomenon might be expected on the landing approach ?

A. Precipitation static.
B. Wind-shear turbulence.
C. Steady rain.

Answer **(B)** is correct.
DISCUSSION: Wind shear is an invisible hazard associated with all thunderstorms. Shear turbulence has been encountered 20 miles laterally from a severe storm.

124. Which weather phenomenon is always associated with a thunderstorm ?

A. Lightning.
B. Heavy rain.
C. Hail.

Answer **(A)** is correct.
DISCUSSION: A thunderstorm is, in general, a local storm invariably produced by a cumulonimbus cloud, and is always accompanied by lightning and thunder.

125. Which is considered to be the most hazardous condition when soaring in the vicinity of thunderstorms ?

Answer **(C)** is correct.
DISCUSSION: During the mature stage of a thunderstorm, updrafts

A. Static electricity.
B. Lightning.
C. Wind shear and turbulence.

and downdrafts in close proximity create strong vertical shears and a heavy turbulent environment. A lightning strike can puncture the skin of an aircraft and damage communication and navigation equipment.

126. Where does wind shear occur ?

A. Only at higher altitudes.
B. Only at lower altitudes.
C. At all altitudes, in all directions.

Answer **(C)** is correct.
DISCUSSION: Wind shear may be associated with either a wind direction or a wind speed at any level in the atmosphere.

127. When may hazardous wind shear be expected ?

A. When stable air crosses a mountain barrier where it tends to flow in layers forming lenticular clouds.
B. In areas of low-level temperature inversion, frontal Zone , and clear air turbulence.
C. Following frontal passage when stratocumulus clouds form indicating mechanical mixing.

Answer **(B)** is correct.
DISCUSSION: Hazardous wind shear can occur near the ground with either thunderstorms or a strong temperature inversion.

128. A pilot can be expect a wind-shear in a temperature inversion whenever the wind speed at 2,000 to 4,000 feet above the surface is at least.

A. 10 knots.
B. 15 knots.
C. 25 knots.

Answer **(B)** is correct.
DISCUSSION: An increase in temperature with altitude is defined as a temperature inversion. A pilot can be relatively certain of a shear zone in the inversion if the pilot knows the wind at 2,000 to 4,000 feet is 25 knots or more.

129. The Presence of ice pellets at the surface is evidence that there

A. Are thunderstorms in the area.
B. Has been cold frontal passage.
C. Is a temperature inversion with freezing rain at a higher altitude.

Answer **(C)** is correct.
DISCUSSION: ice pellets always indicate freezing rain at higher altitude.

130. One in-flight condition necessary for structural icing to form is

A. Small temperature/dew point spread.
B. Stratiform clouds.
C. Visible moisture.

Answer **(C)** is correct.
DISCUSSION: Two conditions are necessary for structural icing in flight :
1. The aircraft must be flying through visible water such as rain or cloud droplets, and
2. The temperature at the point where the moisture strikes the aircraft must be 0°C (32° F) or colder.

131. In which environment is aircraft structural ice most likely to have the highest accumulation rate ?

A. Cumulus clouds with below freezing temperatures
B. Freezing drizzle.
C. Freezing rain.

Answer **(C)** is correct.
DISCUSSION: A condition favourable for rapid accumulation of clear icing is freezing rain below a frontal surface.

132. During an VFR cross-country flight you picked up rime icing which you estimate is 1/2" thick on the leading edge of the wings. you are now below the clouds at 2000

Answer **(A)** is correct.
DISCUSSION: ice will accumulate unevenly on the airplane. It will add weight and drag, and decrease thrust and lift. With

feet AGL and are approaching your destination airport under VFR. Visibility under the clouds is more than 10 miles, winds at the destination airport are 8 knots right down the runway, and the surface temperature is 3 degrees Celsius. you decide to :

A. Use a faster than normal approach and landing speed.
B. Approach and land at your normal speed since the ice is not thick enough to have any noticeable effect.
C. Fly your approach slower than normal to lessen the "wind chill" effect and break up the ice.

ice accumulations, landing approaches should be made with a minimum wing flap setting and with an added margin of airspeed. sudden and large configuration and airspeed changes should be avoided.

133. What situation is most conducive to the formation of radiation fog ?

A. Warm, moist air over low, flatland areas on clear, clam nights.
B. Moist, tropical air moving over cold, offshore water.
C. The movement of cold air over much warmer water.

Answer **(A)** is correct.
DISCUSSION: Conditions favourable for radiation fog are clear sky little, or no wind, and small temperature/dew point spread (high relative humidity). Radiation fog is restricted to land because water surfaces cool little from night time radiation.

134. In which situation is advection fog most likely to form ?

A. A warm, moist air mass on the windward side of mountains.
B. An air mass moving inland from the coast in winter.
C. A light breeze blowing colder air out to sea.

Answer **(B)** is correct.
DISCUSSION: Advection fog forms when moist air moves over colder ground or water. It is most common along coastal areas. This fog frequently forms offshore as a result of cold water, then is carried inland by the wind.

135. What types of fog depend upon wind in order to exist ?

A. Radiation fog and ice fog.
B. Steam fog and ground fog.
C. Advection fog and upslope fog.

Answer **(C)** is correct.
DISCUSSION: Advection fog forms when moist air moves over colder ground or water. It is most common along coastal areas but often developments as wind speed increases up to about 15 knots. Wind much stronger than 15 knots lifts the fog into a layer of low stratus or stratocumulus. Upslope fog forms as a result of moist, stable air being cooled adiabatically as it moves up sloping terrain . Once upslope wind ceases, the fog dissipates.

136. Low-level turbulence can occur and icing can become hazardous in which type of fog ?

A. Rain-induced fog.
B. Upslope fog.
C. Steam fog.

Answer **(C)** is correct.
DISCUSSION: Steam fog forms in the winter when cold, dry air presses from land areas over comparatively warm ocean waters. Low-level turbulence can occur and icing can become become hazardous in a steam fog.

137. Which conditions result in the formation of frost ?

A. The temperature of the collecting surface is at or below freezing when small droplets of moisture fall on the surface
B. The temperature of the collecting surface is at or below the dew point of the adjacent air and the dew point is below freezing.
C. The temperature of the surrounding air is at or below freezing when small drops of moisture fall on the collecting surface.

Answer **(B)** is correct.
DISCUSSION: Frost forms in much the same way as dew. The differ-difference is that the dew point of surrounding air must be colder than freezing.

138. How does frost affect the lifting surfaces of an airplane on takeoff ?

A. Frost may prevent the airplane from becoming airborne at normal takeoff speed.
B. Frost will change the camber of the wing, increasing lift during takeoff.
C. Frost may cause the airplane to become airborne with a lower angle of attack at a lower indicated airspeed.

Answer **(A)** is correct.
DISCUSSION: The roughness of the surface of frost spoils the smooth flow of air, thus causing a slowing of the airflow. This slowing of the air causes early air flow separation over the affected airfoil resulting in a loss of lift even a small amount of frost on airfoils may prevent an aircraft from becoming airborne at normal takeoff speed.

139. How will frost on the wings of an airplane affect takeoff performance ?

A. Frost will disrupt the smooth flow of air over the wing, adversely affecting its lifting capability.
B. Frost will change the camber of the wing, increasing its lifting capability.
C. Frost will cause the airplane to become airborne with a higher angle of attack, decreasing the stall speed.

Answer **(A)** is correct.
DISCUSSION: The roughness of the surface of spoils the smooth flow of air, thus causing a slowing of the airflow. This slowing of the air causes early air flow separation over amount of frost on airfoils may prevent an aircraft from becoming airborne at normal takeoff speed.

140. Why is frost considered hazardous to flight ?

A. Frost changes the basic aerodynamic shape of the airfoils, thereby decreasing lift.
B. Frost slows the airflow over the airfoils, thereby increasing control effectiveness.
C. Frost spoils the smooth flow of air over the wings, thereby decreasing lifting capability

Answer **(C)** is correct
DISCUSSION: The roughness of the surface of frost spoils the smooth flow of air, thus causing a slowing of the airflow. This slowing of the air causes early air flow separation over the affected airfoil, resulting in a loss of lift. Even a small amount of frost of airfoils may prevent an aircraft from becoming airborne at normal takeoff speed.

141. Every physical process of weather is accompanied by or is the result of

A. A heat exchange.
B. The movement of air.
C. A pressure differential.

Answer **(A)** is correct.
DISCUSSION: Every physical of weather is accompanied by, or result of, a heat exchange.

142. Moisture is added to a parcel of air by

A. Sublimation and condensation.
B. Evaporation and condensation.
C. Evaporation and sublimation.

Answer **(C)** is correct.
DISCUSSION: Moisture is added to a parcel of air when liquid water or ice are changed into water vapor .Evaporation is the change from liquid water to water vapor. Sublimation is the change from ice directly to water vapour, without the intervening liquid stage.

143. In the northern Hemisphere, the wind is deflected to the

A. Right by Coriolis force.
B. Right by surface friction.
C. Left by Coriolis force.

Answer **(A)** is correct.
DISCUSSION: Coriolis force, caused by the Earth's rotation, deflects air movements to the right in the northern Hemisphere and to the left in the southern Hemisphere. Coriolis force is at a right angle to wind direction and is directly proportional to wind speed.

144. Why does the wind have a tendency to flow

Answer **(A)** is correct.

parallel to the isobars above the friction level ?

A. Coriolis force tends to counterbalance the horizontal pressure gradient.
B. Coriolis force acts perpendicular to a line connecting the highs and lows.
C. Friction of the air with the Earth deflects the air perpendicular to the pressure gradient.

DISCUSSION: Normally, wind flows from areas of high pressure to areas of low pressure. Wind is deflected by the Coriolis force, however. This force which is the result of the Earth's rotation. Deflects wind to the right in the northern hemisphere, counterbalancing the horizontal pressure gradient. its effects are lessened by friction with the Earth's surface at altitudes closer to the surface.

145. With regard to wind flow patterns shown on surface analysis charts; when the isobars are

A. Close together, the pressure gradient force is slight and wind velocities are weaker.
B. Not close together, the pressure gradient force is greater and wind velocities are stronger.
C. Close together, the pressure gradient force is greater and wind velocities are stronger.

Answer **(C)** is correct.
DISCUSSION: Pressure differences create a force, the pressure gradient force, which drives the wind from higher pressure to lower pressure. This force is perpendicular to isobars, or pressure contours. The closer the spacing of isobars, the stronger the pressure gradient force and the stronger the wind.

146. What causes wind ?

A. The Earth's rotation.
B. Air mass modification.
C. Pressure differences.

Answer **(C)** is correct.
DISCUSSION: Wind is caused by pressure differences with wind flowing from high-pressure areas to low pressure areas. These pressure differences arise from the different heating of the Earth's surface.

147. Which is true regarding a cold front occlusion ? the air ahead of the warm front

A. Is colder than the air behind the overtaking cold front.
B. Is warmer than the air behind the overtaking cold front
C. Has the same temperature as the air behind the overtaking cold front.

Answer **(B)** is correct.
DISCUSSION: wind is caused by pressure differences with wind flowing from high-pressure areas to low-pressure areas. These pressure differences arise from the different heating of the Earth's surface.

148. Which is true with respect to a high-or-low-pressure system ?

A. A high-pressure area or ridge is an area of rising air.
B. A low-pressure area or trough is an area of descending air.
C. A high-pressure area or ridge is an area of descending air.

Answer **(C)** is correct.
DISCUSSION: High-pressure air descends because it is heavier than low-pressure air. Ridge refers to an elongated area of high pressure.

149. Which is true regarding high-or-low-pressure systems?

A. A high-pressure area or ridge is an area of rising air.
B. A low pressure area or trough is an area of rising air.
C. Both high-and-low-pressure areas are characterized by descending air.

Answer **(B)** is correct.
DISCUSSION: Low-pressure air rises because it weighs less than high-pressure air. Trough refers to an elongated area of low pressure.

150. While flying cross-country in the Northern Hemisphere you experience a continuous left crosswind which is associated with a major wind system. This indicates that you

Answer **(A)** is correct.
DISCUSSION: Due to the counter clockwise circulation around a low pressure area in the Northern Hemisphere, a continuous left

A. Are flying toward an area to generally unfavourable weather conditions.
B. Have flown from an area of unfavourable weather conditions.
C. Cannot determine weather conditions without knowing pressure changes.

crosswind indicates that you are flying into such an area. Low pressure areas are areas of rising air which are conducive to cloudiness and precipitation – generally unfavourable weather conditions.

151. When flying into a low-pressure area in the Northern hemisphere, the wind direction and velocity will be form the

A. left and decreasing
B. left and increasing.
C. Right and decreasing.

Answer **(B)** is correct.
DISCUSSION: When flying into a low-pressure area, the wind is flowing counter clockwise and thus will be from the left. Also, winds tend to be greater in low-pressure systems than in high-pressure systems, so the velocity will increase as you fly into the area.

152. What prevents air from flowing directly from high-pressure areas to low-pressure areas ?

A. Coriolis force.
B. Surface friction.
C. Pressure gradient force.

Answer **(A)** is correct.
DISCUSSION: Coriolis force, caused by the Earth's rotation deflects air movements to the right in the Northern Hemisphere and to the let in the southern Hemisphere.

163. The general circulation of air associated with a high-pressure area in the northern Hemisphere is

A. Outward, downward, and clockwise.
B. Outward, upward, and clockwise
C. Inward, downward, and clockwise.

Answer **(A)** is correct.
DISCUSSION: Air flows outward from a high-pressure area, causing a descending column of air within the high. As the air moves outward, it is deflected to the right by Coriolis force resulting in a clockwise rotation.

154. The wind system associated with a low-pressure area in the northern Hemisphere is

A. An anticyclone and is caused by descending cold air.
B. A cyclone and is caused by Coriolis force.
C. An anticyclone and Is caused by Coriolis force.

Answer **(B)** is correct.
DISCUSSION: Air flowing into a low-pressure area is deflected to the right in the northern hemisphere, resulting in a counter clockwise (or cyclonic) circulation.

155. A common location of clear air turbulence is

A. In an upper trough on the polar side of a jet stream.
B. Near a ridge aloft on the equatorial side of a high-pressure flow.
C. South of an east/west oriented high-pressure ridge in its dissipating stage.

Answer **(A)** is correct.
DISCUSSION: The typical location of clear air turbulence is an uppr trough on the cold (polar) side of the jet stream.

156. The jet stream and associated clear air turbulence can sometimes be visually identified in

A. Dust or haze at flight level.
B. ling streaks of cirrus clouds.
C. A constant outside air temperature.

Answer **(B)** is correct.
DISCUSSION: Streamlined, windswept cirrus clouds always indicate very strong upper winds.

157. A strong wind shear can be expected.

Answer **(C)** is correct.
DISCUSSION: When the speed of the jet stream is in excess of 110kt,

A. In the Jet stream front above a core having a speed of 60 to 90 knots
B. If the 5°C isotherms are spaced between 7°to 10° of latitude.
C. On the low-pressure side of a Jet stream core where the speed at the core is stronger than 110 knots.

strong wind shears can be expected on the low-pressure side.

158. Which type of Jet stream can be expected to cause the greater turbulence ?

A. A straight Jet stream associated with a low-pressure trough.
B. A curving jet stream associated with a deep low-pressure trough.
C. A Jet stream occurring during the summer at the lower altitudes.

Answer **(B)** is correct.
DISCUSSION: A curving jet stream indicates abrupt weather system changes, which lend themselves to more violent turbulence In general, the more pronounced the difference in weather systems, the greater the potential for very strong turbulence.

159. which feature is associated with the tropopause ?

A. Constant height above the Earth.
B. Abrupt change in temperature lapse rate.
C. Absolute upper limit of cloud formation.

Answer (B) is correct.
DISCUSSION: the tropopause is the transition layer of atmosphere between the troposphere and the stratosphere. Height of the tropos-here varies from about 65,000 ft. over the Equator to 2,000 ft. or lower over the poles. A characteristic of the tropopause is an abrupt change in temperature decreases with height.

160. What is the standard temperature at 10,000 feet ?

A. -5°C
B. -15°C
C. +5°C

Answer **(A)** is correct.
DISCUSSION: Standard temperature is 15°C at sea level and the standard lapse rate is 2°C per 1,000 ft. Thus, at 10,000 ft the standard temperature would be 20°C colder than at sea level. or -5°C (15°C-20°C)

161. what are the standard temperature and pressure values for sea level ?

A. 15°C and 29.92" Hg.
B. 59°F and 1013.2" Hg.
C. 15°C and 29.93 Mb.

Answer **(A)** is correct.
DISCUSSION: standard temperature at sea level is defined as 15°C or 59°F. Standard sea-level pressure is 29.92 in. Hg or 1013.2 mb.

162. What is the standard temperature at 20,000 feet?

A. -15°C
B. -20°C
C. -25°C

Answer **(C)** is correct
DISCUSSION: Standard temperature is . 15°C at sea level and the standard lapse rate is 2°C per 1,000 ft. Thus, at 20,000 ft. the standard temperature would be 40°C colder than at sea-level or -25°C

163. Which is true regarding actual air temperature and dew point temperature spread? the temperature spread.

A. Decreases as the relative humidity decreases.
B. Decreases as the relative humidity increases.
C. Increases as the relative humidity increases.

Answer **(B)** is correct.
DISCUSSION: dew point refers to the temperature to which air must be cooled to become saturated by the water vapour already present in the air. Thus, as the relative humidity increases, the dew point temperature spread decreases. As relative humidity increases to 100% the dew point approaches the temperature and the spread approaches zero.

164. Which cloud types would indicate convective turbulence ?

Answer **(C)** is correct.
DISCUSSION: Towering cumulus clouds signify a relatively deep layer of unstable air, thus

A. Cirrus clouds.
B. Nimbostratus clouds.
C. Towering cumulus clouds.

indicating very strong convective turbulence.

165. Which combination of weather-producing variables would likely result in cumuliform-type clouds, good visibility, and showery rain ?

A. Stable, moist air and orographic lifting.
B. Unstable, moist air and orographic lifting.
C. Unstable , moist air and no lifting mechanism.

Answer **(B)** is correct.
DISCUSSION: Unstable , moist air accompanied by lifting usually results in showery rain, good visibility and cumuliform clouds. orographic lifting is caused by mountain forces .

166. Which are characteristics of a cold air mass moving over a warm surface ?

A. Cumuliform clouds, turbulence, and poor visibility
B. Cumuliform clouds, turbulence, and good visibility
C. Stratiform clouds, smooth air, and poor visibility.

Answer **(B)** is correct.
DISCUSSION: When a cold mass moves over a warm surface, the warm air near the surface rises and creates an unstable condition. These convective currents give rise to cumuliform clouds, turbulence, and good visibility.

167.What is the approximate base of the cumulus clouds if the temperature at 2,000 feet MSL is 10°C and the dew point is 1°C ?

A. 3,000 feet MSL
B 4,000 feet MSL
C. 6,000 feet MSL.

Answer **(C)** is correct.
DISCUSSION: The height of cumuliform cloud bases can be estimated using the surface temperature/dew point spread. Unsaturated air in a convective current cools at about 3°C per 1,000 ft, and dew point decreases about 0.5°C per 1,000 ft. Thus, temperature and dew point converge at about 2.5°C per 1,000 ft. Since the temperature/dew point will converge at 3,600 ft AGL (9÷ 2.5 = 3.6 or 3,600). The base of cumulus cloud is approximately 5,600 ft. MSL (3,600 + 2,000).

168. What determines the structure or type of clouds which will form as a result of air being forced to ascend ?

A. The method by which the air is lifted.
B. The stability of the air before lifting occurs.
C. The relative humidity of the air after lifting occurs.

Answer **(B)** is correct.
DISCUSSION: The structure of cloud types that form as a result of air being forced to ascend is determined by the stability of the air before lifting occurs. The difference between the existing lapse rate (the actual decrease in temperature with altitude) and the adiabatic rates of cooling in upward-moving air determines the stability of the air.

169. The presence of standing lenticular altocumulus clouds is a good indication of

A. Lenticular ice formation in calm air.
B. Very strong turbulence.
C. Heavy icing conditions.

Answer **(B)** is correct.
DISCUSSION: When stable air crosses a mountain barrier, turbulence usually results. Air flowing up the windward side is relatively smooth Wind flow across the barrier is laminar; i.e., it tends to flow in layers

170. Virga is best described as

A. Streams of precipitation trailing beneath clouds which evaporate before reaching the ground
B. Wall clouds which dissipate before reaching the ground.
C. Turbulent areas beneath cumulonimbus clouds.

Answer **(A)** is correct.
DISCUSSION: Virga is streamers of precipitation, either water of ice particles, falling from a cloud in wisps or streaks and evaporating before reaching the ground.

171. Fog produced by frontal activity is a result of saturation due to

Answer **(C)** is correct.
DISCUSSION: Fog produced by frontal activity is known as precipitation induced fog. it arise from drops of warm rain or

A. Nocturnal cooling.
B. Adiabatic cooling.
C. Evaporation of precipitation.

drizzle falling through cool air land forms fog.

172. Which in-flight hazard is most commonly associated with warm fronts ?

A. Advection fog.
B. Radiation fog.
C. Precipitation-induced fog.

Answer **(C)** is correct.
DISCUSSION: Precipitation-induced fog arises from drops of warm rain or drizzle evaporating as it falls through cool air. This evaporation saturates the cool air and forms fog.

173. A situation most conducive to the formation of advection fog is

A. A light breeze moving colder air over a water surface.
B. An air mass moving inland from the coastline during the water
C. A warm, moist air mass setting over a cool surface under no-wind conditions.

Answer **(B)** is correct.
DISCUSSION: Advection fog forms when moist air moves over colder ground or water. This type of fog is, common when comparatively warm moist oceanic air moves inland from the coastline during winter.

174. Advection fog has drifted over a coastal airport during the day. what may tend to dissipate or lift this fog into low stratus clouds ?

A. Night time cooling.
B. Surface radiation
C. Wind 15 knots or stronger.

Answer **(C)** is correct.
DISCUSSION: Advection fog deepens as wind speed increases up 15 kt. will lift the fog into a layer of low stratus or stratocumulus.

175. What lifts advection fog into low stratus clouds ?

A. Night time cooling.
B. Dryness of the underlying land mass.
C. Surface winds of approximately 15 knots or stronger.

Answer **(C)** is correct.
DISCUSSION: Advection fog deepens as wind speed increases up to 15 kt. wind much stronger than 15 kt. lifts the fog into a layer of low stratus or stratocumulus.

176. Which conditions are favourable for the formation of a surface based temperature inversion ?

A. Clear, cool nights with clam or light wind.
B. Area of unstable air rapidly transferring heat from the surface
C. Broad areas of cumulus clouds with smooth, level bases at the same altitude.

Answer **(A)** is correct.
DISCUSSION: A temperature inversion occurs when warm air exists over cooler air. When ground heat radiates out on clear nights, the cool ground surface cools still air at the surface to a temperature below the air above it.

177. In what ways do advection fog, radiation fog and steam fog differ in their formation or location ?

A. Radiation fog is restricted to land areas; advection fog is most common along coastal areas; steam fog forms over a water surface.
B. Advection fog deepens as wind speed increases up to 20 knots; steam fog requires clam or very light wind; radiation fog forms when the ground or water cools the air by radiation.
C. Steam fog forms from moist air moving over a colder surface; advection fog requires cold air over a warmer surface; radiation

Answer **(A)** is correct.
DISCUSSION: Radiation fog is restricted to land because water surfaces cool little from night time radiation. Advection fog forms when moist air moves over colder ground or water. It is most common along coastal areas. Steam fog occurs when cold air moves over relatively warm water or wet ground.

fog is produced by radiation cooling of the ground.

178. With respect to advection fog, which statement is true ?

A. It is slow to develop and dissipates quite rapidly.
B. It forms almost exclusively at night or near daybreak.
C. It can appear suddenly during day or night, and it is more persistent than radiation fog.

Answer **(C)** is correct.
DISCUSSION: Advection fog is usually more extensive and much more persistent than radiation fog. advection fog can move in rapidly regardless of the time of day or night.

179. What are characteristics of stable air ?

A. Good visibility, Steady precipitation; stratus clouds.
B. Poor visibility; steady precipitation; stratus clouds.
C. Poor visibility; intermittent precipitation; cumulus clouds.

Answer **(B)** is correct.
DISCUSSION: Stable air is still or moving horizontally but without vertical movement. As a result, the pollutants in the air are not swept away and visibility is poor .Also stable air forms layer-like clouds since the air is moving in layers.

180. Which would decrease the stability of an air mass ?

A. Warming from below.
B. Cooling from below.
C. Decrease in water vapour.

Answer **(A)** is correct.
DISCUSSION: When air is warmed from below, it tends to rise resulting in instability ;i.e., vertical movement occurs.

181. What is a characteristic of stable air ?

A. Stratiform clouds.
B. Fair weather cumulus clouds.
C. Temperature decreases rapidly with altitude.

Answer **(A)** is correct.
DISCUSSION: Stable air is still or moving horizontally but without vertical movement. As a result, the pollutants in the air are not swept away and visibility is poor. Also stable air forms layer-like clouds since the air is moving in layers

182.From which measurement of the atmosphere can stability be determined ?

A. Atmospheric pressure.
B. The ambient lapse rate.
C. The dry adiabatic lapse rate.

Answer **(B)** is correct.
DISCUSSION: The stability of the atmosphere is determined by vertical movements of air. Warm air rises when the air above is cooler. The lapse rate, which is decrease of temperature with altitude, is therefore a measure of stability.

183. The difference found by subtracting the temperature of a parcel of air theoretically lifted from the surface to 500 millibars and the existing temperature at 500 millibars is called the

A. Lifted index.
B. Negative index.
C. Positive index.

Answer **(A)** is correct.
DISCUSSION: The lifted index is computed as if a parcel of air near surface were lifted to 500 mb (18,000 ft MSL) As the air is lifted, it cools by expansion. The temperature the parcel would have at 500 is then subtracted from the environmental 500 mb, temperature.

184. The conditions necessary for the formation of stratiform clouds are a lifting action and

A. Unstable, dry air.
B. Stable moist air.
C. Unstable, moist air.

Answer **(B)** is correct.
DISCUSSION: Stable , moist air and adiabatic cooling, e.g., upslope flow or lifting over colder air, are need to form stratiform clouds.

185. What visible signs indicate extreme turbulence in thunderstorms ?

A. Base of the clouds near the surface, heavy rain, and hail.

Answer **(C)** is correct.
DISCUSSION: Cumulonimbus clouds are thunderstorms by definition. Their intensity can be gauged by the presence of roll

B. Low ceiling and visibility, hail, and precipitation static
C. Cumulonimbus clouds, very frequent lightning and roll clouds

clouds on the lower leading edge of the storm, which mark the eddies in the shear. Roll clouds are prevalent with clod frontal or squall line thunderstorms and signify an extremely turbulent zone.

186. What feature is normally associated with the cumulus stage of thunderstorm ?

A. Roll cloud.
B. Continuous updraft.
C. Beginning of rain at the surface.

Answer **(B)** is correct
DISCUSSION: The cumulus stage of a thunderstorm has continuous updrafts that build the cloud up. The water droplets are carried up until they become too heavy. Once they begin falling and creating downdrafts, the storm changes from the cumulus to the mature stage.

187. The conditions necessary for the formation of cumulonimbus clouds are a lifting action and

A. Unstable, dry air.
B. Stable, moist air.
C. Unstable, moist air

Answer **(C)** is correct.
DISCUSSION: Unstable moist air and a lifting action i.e., convective activity, are needed to form cumulonimbus clouds.

188. The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with

A. Slow-moving warm fronts which slope above the tropopause.
B. Squall lines.
C. Fast-moving occluded fronts.

Answer **(B)** is correct.
DISCUSSION: A squall line is a non-frontal, narrow band of thunder-storms that often develops ahead of a cold front. it often contains severe steady-state thunderstorms and presents the single most intense weather

189. Of the following, which is accurate regarding turbulence associated with thunderstorms ?

A. Outside the clouds, shear turbulence can be encountered 50 miles laterally from a severe storm.
B. Shear turbulence is encountered only inside cumulonimbus clouds or within a 50mile radius.
C. Outside the cloud, shear turbulence can be encountered 20 miles laterally from a severe storm.

Answer **(C)** is correct.
DISCUSSION: Hazardous turbulence is present in and around all thunderstorms. Outside the cloud, shear turbulence has been encounter several thousand feet above and 20 NM laterally from a severe storm. The roll cloud signifies an extremely turbulent zone.

190. Which statement is true concerning squall lines ?

A. They form slowly, but move rapidly
B. They are associated with frontal systems only.
C. They offer the most intense weather hazards to aircraft.

Answer **(C)** is correct.
DISCUSSION: A squall line is a non-frontal narrow band of active thunderstorms. It often contains severe steady-state thunderstorms and presents the single most intense weather hazard to aircraft.

191. Which statement is true regarding squall lines ?

A. They are always associated with cold fronts
B. They are slow in forming, but rapid in movement
C. They are non-frontal and often contain severe, steady-state thunderstorms.

Answer **(C)** is correct.
DISCUSSION: A squall line is a non-frontal, narrow band of active thunderstorms that frequently develops ahead of a cold front. it can, however, occur in any area of moist, unstable air. it often contains severe steady-state thunderstorms and presents the single most intense weather hazard to aircraft.

192. Which is true regarding the use of airborne weather-avoidance radar for the recognition of certain weather conditions ?

Answer **(A)** is correct.
DISCUSSION: Airborne weather avoidance radar is designed to identify areas of precipitation, especially heavy precipitation

A. The radarscope provides no assurance of avoiding instrument weather conditions.
B. The avoidance of hail assured when flying between and just clear of the most intense echoes.
C. The clear area between intense echoes indicates that visual sighting of storms can be maintained when flying between the echoes.

which may signify an active thunderstorm. Instrument weather conditions are restricted visibility due to clouds or fog which are not indicated on radar screens.

193. Which weather phenomenon signals the beginning of the mature stage of a thunderstorm ?

A. The start of rain.
B. The appearance of an anvil top.
C. Growth rate of cloud is maximum.

Answer **(A)** is correct.
DISCUSSION: Thunderstorms have three stage in their life cycle: cumulus, mature, and dissipating. The beginning of rain at Earth's surface indicates the mature stage, which is characterized by numerous updrafts and downdrafts

194. During life cycle of a thunderstorm, which stage is characterized predominately by downdrafts ?

A. Mature
B. Developing.
C. Dissipating.

Answer **(C)** is correct.
DISCUSSION: Thunderstorms have three stage in their life cycle: cumulus, mature, and dissipating. The beginning of rain at Earth's surface indicates the mature stage, which is characterized by numerous updrafts and downdrafts

195. What minimum distance should exist between intense radar echoes before any attempt is made to fly between these thunder storms ?

A. 20 miles
B.30 miles
C.40 miles

Answer **(C)** is correct.
DISCUSSION: Wind shear turbulence has been encountered as far as 20 NM laterally from a severe thunderstorm. Thus, a minimum distance of 40 NM should exist between intense radar echoes before any attempt is made to fly between them.

196. Which situation would most likely result in freezing precipitation ? rain falling from a which has temperature of

A. 32°F or less into air having a temperature.
B. 0°C or less into air having a temperature of 0°C or more.
C. More than 32°F into air having a temperature of 32°F or less.

Answer **(C)** is correct..
DISCUSSION: A condition favourable for rapid accumulation of clear icing is freezing rain. rain forms at temperature warmer than freezing. then falls through air at temperature below freezing and becomes Super cooled.

197. If airborne radar is indicating an extremely intense thunderstorm echo, this thunderstorm should be avoided by a distance at least

A. 20 miles
B. 10 miles
C. 5miles

Answer **(A)** is correct.
DISCUSSION: wind shear turbulence has been encountered as far as 20 NM laterally from a severe thunderstorm.

198. Which statement is true concerning the hazards of hail ?

Answer **(C)** is correct.

A. Hail damage in horizontal flight is minimal due to the vertical movement of hail in the clouds.
B. Rain at the surface is a reliable indication of no hail aloft.
C. Hailstones may be encountered in clear air several miles from from thunderstorm.

DISCUSSION: Hail competes with turbulence as the greatest thunderstorm hazard to aircraft. Hail has been observed in clear air several miles from the parent thunderstorm. you should beneath the anvil of a large cumulonimbus cloud.

199. Hail is most likely to be associated with

A. Cumulus clouds.
B. Cumulonimbus clouds.
C. Stratocumulus clouds.

Answer **(B)** is correct.
DISCUSSION: Hail competes with turbulence as the greatest thunderstorm hazard to aircraft. hail has been observed in clear air in several miles from the parent thunderstorm. you should beneath the anvil of a large cumulonimbus cloud.

200. Ice pellets encountered during flight normally are evidence that

A. A warm front has passed.
B. A warm front is about to pass.
C. There are thunderstorms in the area.

Answer **(B)** is correct.
DISCUSSION: Ice pellets from as a result of rain freezing at a higher altitude. This indicates that there is a layer of warm air above in which it is raining and the rain freezes as it falls through to colder air.

201. Ice pellets encountered during flight are normally evidence that

A. A cold front has passed.
B. There are thunderstorms in the area
C. Freezing rain exist at higher altitude.

Answer **(C)** is correct.
DISCUSSION: Rain falling through subfreezing cold air may become super cooled , freezing on impact as freezing rain; or it may freeze during its descent. falling as ice pellets . ide pellets always indicate freezing rain at higher altitude.

202. What is indicated if ice pellets are encountered at 8,000 feet ?

A. Freezing rain at higher altitude.
B. You are approaching an area of thunderstorms.
C. You will encounter hail if you encounter your flight.

Answer **(A)** is correct.
DISCUSSION: Ice pellets from as a result of rain freezing at a higher altitude. There is a layer of warm air above in which it is raining and the rain freezes as it falls through the colder air.

203. A pilot reporting turbulence that momentarily causes slight, erratic changes in altitude and/or attitude should report as

A. Light chop
B. Light turbulence
C. Moderate turbulence.

Answer **(B)** is correct.
DISCUSSION: Light turbulence momentarily causes slight, erratic change in altitude and/or attitude.

204. When turbulence causes changes in altitude and/or attitude, but aircraft control remains positive that

A. Light
B. Severe.
C. Moderate.

Answer **(C)** is correct.
DISCUSSION: Moderate turbulence is similar to reported as light should be turbulence but of greater intensity

205. Turbulence that is encountered above 15,000 feet AGL no associated with cumuliform cloudiness, including thunderstorms, should be reported as

A. Severe turbulence.
B. Clear air turbulence.
C. Convective turbulence.

Answer **(B)** is correct.
DISCUSSION: CAT (clear air turbulence) is turbulence encountered in air where no clouds are present.

206. The minimum vertical wind shear value critical for probable moderate of greater turbulence is

A. 4 knots per 1,000 feet
B. 6 knots per 1,000 feet
C. 8 knots per 1,000 feet.

Answer **(B)** is correct.
DISCUSSION: Moderate or greater turbulence should be expected where vertical wind shears exceed 6 kt. per 1,000 ft.

207. One of the most dangerous features of mountain waves is the turbulence area is and

A. Below rotor clouds.
B. Above rotor clouds.
C. Below lenticular clouds.

Answer **(A)** is correct.
DISCUSSION: when stable air flows across a mountain rage, large waves occur downwind from the mountains . Underneath each wave crest is a rotary circulation called a rotor turbulence is most frequent and most severe in and below the rotor clouds.

208. To conditions most favourable to wave formation over mountainous areas are a layer of

A. Stable air at mountaintop altitude and a wind of at least 20 knots blowing across the ridge.
B. Unstable air at mountaintop altitude and a wind of at least 20 knots blowing across the ridge.
C. Moist unstable air at mountaintop altitude and a wind of less than 5 knots blowing across the ridge.

Answer **(A)** is correct.
DISCUSSION: A mountain wave requires a layer of stable air at mountain top altitude and a wind of at least 20 kt. blowing across the ridge.

209. When flying low over hilly with a tailwind. mountain ranges, the greatest potential danger from turbulent air currents will usually be encountered on the

A. Leeward side when flying with a tailwind.
B. Leeward side when flying into the wind.
C. Windward side when flying into the wind.

Answer **(B)** is correct.
DISCUSSION: When wind flows over ridges or mountain ranges it flows up the windward side and down the leeward side.

210. Convective currents are most active on warm summer afternoons when winds are

A. Light.
B. Moderate.
C. Strong

Answer **(A)** is correct.
DISCUSSION: Convective currents are localized vertical air movement both ascending and descending. They are most active on warm summer afternoons when wind are light.

211. During departure under conditions of suspected low-level wind shear, a sudden decrease in headwind will cause.

Answer **(A)** is correct.
DISCUSSION: In such low-airspeed operations wind Shears causing a sudden decrease in headwind are critical.

A. A loss in airspeed equal to the decrease in wind velocity
B. A gain in airspeed equal to the decrease in wind velocity
C. No change in airspeed, but groundspeed will decrease.

A sudden decrease in headwind will decrease airspeed equal to the decrease in the wind velocity.

212. During an approach the most important and most easily recognized means of being alerted to possible wind shear is monitoring the

A. Amount of trim required to relieve control pressure.
B. Heading changes necessary to remain on the runway centreline.
C. Power and vertical velocity required to remain on the proper glide path.

Answer **(C)** is correct.
DISCUSSION: If substantial power and vertical speed adjusts are required to remain on the proper glide path during an approach, wind shear factor exist.

213. What is an important characteristic of wind shear.

A. It is present at only lower levels and exist in a horizontal direction
B. It is present at any level and exist in only a vertical direction
C. It can be present at any level and can exit in both a horizontal and vertical direction.

Answer **(C)** is correct.
DISCUSSION: Wind shear occurs because of changes in wind direction and wind velocity, horizontal and vertical. it may be present at any flight level.

214. Low-level wind shear may occur when

A. Surface winds are light and variable
B. There is a low-level temperature inversion with strong winds above the inversion.
C. Surface winds are above 15 knots and there is no change in wind direction and wind speed with height

Answer (B) is correct.
DISCUSSION: A low-level temperature inversion forms on a clear night with clam or light surface winds. When the wind just a above the inversion is relatively strong, a wind shear zone develops between the clam and the stronger winds above.

215. hazardous wind shear is commonly encountered

A. Near warm or stationary frontal activity.
B. When the wind velocity is stronger than 35 knots.
C. In areas of temperature inversion and near thunderstorms.

Answer **(C)** is correct.
DISCUSSION : Hazardous wind shear is found near thunderstorms and also near strong temperature inversions.

216. If a temperature inversion is encountered immediately after take-off or during an approach to a landing a potential hazard exist due to

A. Wind shear
B. Strong surface winds.
C. Strong convective currents.

Answer **(A)** is correct.
DISCUSSION: a wind shear develops in a zone between cold , clam air covered by warm air with a strong wind.

217. winds at 3,000 feet AGL . . . . . 30 kts surface winds . . . . . .clam while on approach approach for landing under clear skies with convective turbulence a few hours after sunrise one should.

A. Increase approach airspeed slightly above normal to avoid stalling.
B. Keep the approach airspeed at or slightly below normal to compensate for floating.
C. Not alter the approach airspeed, these conditions are nearly ideal.

Answer **(A)** is correct.
DISCUSSION: When landing in calm wind under clear skies within a few hours after sunrise, you should be prepared for a temperature inversion near the ground.

218. The low level wind shear alert system (LLWAS) provides wind data and software process to detect the presence of a

A. Rotating column of air extending from a cumulonimbus cloud.
B. Change in wind direction and/or speed within a very short distance above the airport.
C. Downward motion of the air associated with continuous winds blowing with an easterly component due to the rotation of the Earth.

Answer **(B)** is correct.
DISCUSSION: The LLWAS provides wind data and software process to detect the presence of hazardous wind shear and microbursts in the vicinity of the airport .wind sensors mounted on poles as high as 150 ft. are located 2,000 to 3,500 ft from the runway centreline wind shear is defined as a change in wind speed and/or direction in a short distance and and can exist in either, or both horizontal or vertical direction.

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CHAPTER 5

INTERPRETING WEATHER DATA

- **Printed Reports and Forecasts**
- **Graphic Weather Products**
- **Source of Weather Information.**

1. ICAO defines ceiling as the height above the ground or water of the:

A. lowest layer of clouds that is reported as scattered, broken,
B. lowest reported obscuring phenomena and the highest layer of clouds reported as broken or overcast.
C. base of the lowest layer of cloud below 6000 meters (2000 feet) covering more than half the sky.

Answer **(C)** is correct.
DISCUSSION: ICAO defines ceiling as the height above the ground or water of the base of the lowest layer of cloud below 6000 meters (20,000 feet) covering more than half the sky.

2. (Refer to figure 30)What are the reported winds at Schiphol, Amesterdam (EHAM)?

A. Wind is from 200 true at 7 knots, gusts to 28 knots.
B. Wind is from 020 true at 17 knots, gusts to 28 knots.
C. Wind is from 020 magnetic at 17 knots, gusts to 28 knots.
D. Wind is from 200 true at 17 knots, gusts from 020 at 7 knots.

Answer **(B)** is correct.
DISCUSSION: The wind group at EHAM is coded as 02017G28KT. The first three digits represent the direction from which the wind is blowing (020), in reference to true north. The next two digits show the speed in knots (17). If the wing is gusty, it is reported with a G after the speed and followed by the highest gust (28).

3. (Refer to figure 30) What is the height of the base of the Lowest ceiling at London, Heathrow (EGLL)?

A. 800 feet.
B. 1400 feet.
C. 4000 feet.
D. 400 feet.

Answer **(A)** is correct.
DISCUSSION: Ceiling is defined as the height above the ground or water of the base of the lowest layer of cloud below 6000 meters (2000 feet) covering more than half the sky. Broken clouds cover 5/8 to 7/8 of the sky and are designated by BKN in the METAR. To determine the cloud bases, add two zeros to the number given in the report. In this example, a broken layer begins at 800feet AGL.

4. (Refer to figure 30) What is the wind direction and velocity at Mehrabad International (OIII)?

A. Wind is from 260 magnetic at 10 knots.
B. Wind is from 010 magnetic at 26 knots.
C. Wind is from 260 true at 10 knots.
D. Wind is from 010 true at 26 knots.

Answer **(C)** is correct.
DISCUSSION: The wind at OIII is coded as 26010KT. The first three digits represent the direction from which the wind is blowing (260), in reference to true north. The next two digits show the speed in knots (10).

5. (Refer to figure 30) What are the current conditions depicted for Detroit Metropolitan Airport (KDTW)?

A. Visibility 3 statute miles, snow, broken clouds, scattered clouds at 250 feet AGL, overcast skies at 450 feet AGL.
B. Visibility 3 statute miles, snow, mist, scattered clouds at 2500 feet AGL, overcast skies at 4500 feet AGL.
C. Visibility 3 statute miles, light snow, mist, scattered clouds at 2500 feet AGL, overcast skies at 4500 feet AGL.
D. Visibility 3 statute miles, light snow, mist, scattered clouds at 2500 feet MSL, overcast skies at 4500 feet MSL.

Answer **(C)** is correct.
DISCUSSION: Visibility 3 statute miles, light snow, mist, scattered clouds at 2500 feet AGL, overcast skies at 4500 feet AGL.

6. (Refer to figure 30) What is the actual temperature and dew point at Detroit Metropolitan Airport (KDTW)?

A. The actual temperature is -7 ºC and the dew point is -12 ºC.
B. The actual temperature is -6.7 ºC and the dew point is -11.7 ºC.
C. The actual temperature is 10.7 ºC and the dew point is 11.2 ºC.
D. The actual temperature is 6.7 ºC and the dew point is 11.7 ºC.

Answer **(B)** is correct.
DISCUSSION: Since the first digit after T is 1, it indicates that the temperature is negative; the dew point is also negative since the fifth digit is 1. Therefore, the actual temperature is -6.7 ºC and the dew-points is -11.7 ºC.

7. (Refer to figure 30) In the METAR for LEBL, what does the code **9999 FEW035** indicate?

A. Visibility is 10 kilometers or more, few clouds at 350 feet.
B. Visibility is more than 9 kilometers, few clouds at 3500 feet.
C. Visibility is 10 kilometers or more, few clouds at 3500 feet.
D. Visibility is 9 kilometers or more, few clouds at 3500 feet

Answer **(C)** is correct.
DISCUSSION: If the prevailing visibility is 10 kilometres or more, it is coded as 9999.
FEW is used when cloud coverage is greater than zero to 2/8 of the sky. To find the cloud bases, you must add 2 zeros to the number given in the report (few 3500).

8. (Refer to figure 30) What are the wind conditions at London Heathrow (EGLL)?

A. Wind is from 210º true at 15 knots with gusts to 26 knots, and the wind direction is varying from 180 º true to 250º true.
B. Wind is from 210 º magnetic at 15 knots with gusts to 26 knots, and the wind direction is varying from 180º magnetic to 250º magnetic.
C. Wind is from 150 º true at 21 knots with gusts to 26 knots, and the wind direction is varying from 250º true to 180º true.
D. Wind from 015 magnetic at 21 knots with gusts to 26 knots, and the wind direction is varying from 180 º to 250º.

Answer **(A)** is correct.
DISCUSSION: 21015G26KT indicates: The first three digits represent the direction from which the wind is blowing (210 º), in reference to true north. The next two digits show the speed in knots (15). If the wind is gusty, it is reported with a G after the speed and followed by the highest gust (26).
180V250 indicates: indicates that wind is varying from 180º true to 250º true.

9. (Refer to figure 30) What is the reported runway visual range (RVR) along runway 25 at Fiumicino (LIRF)?

A. RVR along runway 25 is 900 meters and vertical visibility is 1200 meters.
B. RVR along runway 25 is varying between 900 and 1200 meters.
C. RVR along runway 25 is 900 meters and is expected to increase to approximately more 1200 meters in one hour.
D. RVR along runway 25 is varying between 900 and 1200 meters and is increasing.

Answer **(D)** is correct.
DISCUSSION: The RVR along runway 25 is coded as R25/0900V1200U. RVR is designated with R followed by the runway number, a slant, and visual range in meters. IF the RVR is varying, the lowest and highest visual range values will be separated by a V. In addition, the letters U, D, and N are sometimes used to denote respectively increasing (Up), decreasing (Down) and unchanged (No change) visual range values since last report.

10. (Refer to figure 30) What is the reported intensity of the snow at Mehrabad airport (OIII)?

Answer **(B)** is correct.
DISCUSSION: The intensity of precipitation is indicated immediately before the descriptor and the weather

A. Light.
B. Moderate.
C. Heavy.

phenomena code. Intensity levels are indicated as light (-),moderate (no sign), and Heavy (+). In this example, the intensity of the snow is reported as moderate because there is no sign before the precipitation code (+ or – sign).

11. (Refer to figure 30) Which of the following airports have VFR weather? **EDDM – LEBL – ESSA - OIFM**

A. EDDM, LEBL, and ESSA.
B. OIFM, EDDM, and ESSA.
C. EDDM, and OIFM.
D. EDDM, and LEBL.

Answer **(D)** is correct.
DISCUSSION: Both EDDM and LEBL are reporting Meteorological conditions that meet the minimum requirements for VFR flight (1000 ft. ceiling and or 3 SM visibility).

12. (Refer to figure 30)In the METAR for Mehrabad airport (OIII), decode the following:

-SN FEW035CB SCT040 OVC090

A. Light snow, few clouds at 3500 feet AGL, scattered clouds at 4000 feet AGL, Overcast skies at 9000 feet AGL.
B. Light snow, few clouds at 3500 feet MSL, scattered clouds at 4000 feet MSL, Overcast skies at 9000 feet MSL.
C. Moderate snow, few clouds at 3500 feet AGL made up of cumulonimbus clouds, scattered clouds at 4000 feet AGL, Overcast skies at 9000 feet AGL.
D. Light snow, few clouds at 3500 feet AGL made up of cumulonimbus clouds, scattered clouds at 4000 feet AGL, Overcast skies at 9000 feet AGL.

Answer **(D)** is correct.
DISCUSSION: The intensity of precipitation is indicated immediately before the descriptor and the weather phenomena code. In this example, the intensity of the snow is reported as light (-).
A cloud type may be included in the report if towering cumulus clouds (TCU) or cumulonimbus (CB) are present.
FEW is used when cloud coverage is greater than zero to 2/8 of the sky. Broken clouds, which cover between 5/8 to 7/8 of the sky, are designated by BKN. Overcast skies (8/8 covered) are designated as OVC. To find the cloud bases, you must add 2 zeros to the number given in the report (few clouds at 1500 ft. AGL, scattered clouds at 4000 ft. AGL, and overcast skies at 9000 feet AGL).

13. (Refer to figure 30) In the METAR for EDDM, what does the code **CAVOK** indicate?

A. Visibility is 10 statute miles or more, with no cloud below 5000 feet, no cumulonimbus clouds at any level, and there is no significant weather.
B. Visibility is 5 kilometers or more, with no cloud below 2500 feet, no cumulonimbus clouds at any level, and there is no significant weather.
C. Visibility is10 kilometers or more, with no cloud below 5000 feet, no cumulonimbus clouds at any level, and there is no significant weather.
D. Visibility 5 statute miles or more, with no cloud below 5000 feet, cumulonimbus clouds at any level, and there is no significant weather.

Answer **(C)** is correct.
DISCUSSION: The visibility and sky condition group of the METAR are replaced by CAVOK (**C**eiling **A**nd **V**isibility **OK**) if the following conditions exist:
There are no clouds below 5000 feet above aerodrome level or minimum sector altitude (whichever is higher) and no cumulonimbus, visibility is at least 10 and no cumulonimbus, visibility is at least 10 cumulonimbus, visibility is at least 10 such as precipitation, thunderstorms, shallow fog or low drifting snow.

14. (Refer to figure 30) In the METAR for Arlanda airport (ESSA), decode the following:

Answer **(C)** is correct.
DISCUSSION: If the prevailing visibility is 10 kilometers or more, it

9999 SN FEW005 BKN014 M06/M08

A. Visibility is 9 kilometers or more, Snow, few clouds at 500 feet AGL, Broken clouds at 1400 feet AGL, temperature -6 ºC, dew point -8 ºC.
B. Visibility is 10 kilometers or more, snow, few clouds at 500 feet MSL, Broken clouds at 1400 feet MSL, temperature -6 ºC, dew point -8 ºC.
C. Visibility is 10 kilometers or more, snow, few clouds at 500 feet AGL, Broken clouds at 1400 feet AGL, temperature -6 ºC, dew point -8 ºC.
D. Visibility is 9 kilometers or more, snow, few clouds at 50 feet AGL, broken clouds at 140 feet AGL, temperature -6 ºC, dew point -8 ºC.

is coded as 9999.
FEW is used when cloud coverage is greater than zero to 2/8 of the sky. Broken clouds, which cover between 5/8 to 7/8 of the sky, are designated by BKN. To find the cloud bases, you must add 2 zeros to the number given in the report (few clouds at 1500 ft. AGL, Broken clouds at 1400 ft. AGL).
Temperatures below 0 ºC are prefixed with an M. Hence, in this example, the temperature is -6 ºC and dew point is -8 ºC.

15. In a METAR, what does the code VCTS -SHRA indicate?

A. Thunderstorm in vicinity, moderate rain showers
B. Various clouds in connection with thunderstorm, light rain showers.
C. Severe thunderstorm, light snow showers.
D. Thunderstorm in vicinity, light rain showers.

Answer **(D)** is correct.
DISCUSSION: Weather obscuration's or other weather phenomena occurring between approximately 8 km and 16 km of the airport reference point are indicated by VC preceding the code. TS is a descriptor code which means thunderstorm.
Intensity of precipitation is shown immediately before the descriptor and the weather phenomena code. In this example, the intensity of the rain (coded as RA) is reported as light (-). SH is a descriptor code that means showers.
Therefore, the code VCTS –SHRA indicates: Thunderstorm in vicinity, light rain showers.

16. (Refer to figure 30) What is the reported runway visual range (RVR) along runway 16R at Fiumicino (LIRF)?

A. More than 1200 meters and increasing.
B. More than 1200 meters and not changing.
C. 1200 meters and increasing.

Answer **(A)** is correct.
DISCUSSION: The RVR along runway 16R is coded as R16R/P1200U. RVR is designated with an R, followed by the runway number, a slant, and visual range in meters. If the RVR is above the highest value that can be determined by the system, it must be reported using the abbreviation "P".
When the variation of the RVR values shows an upward tendency, it should be indicated by a U.

17. (Refer to figure 31) When was the TAF for EGLL issued?

A. On the 16th day of the month, at 1150Z.
B. At 16:11:02Z.
C. On the 2nd day of the month, at 1611Z.

Answer **(A)** is correct.
DISCUSSION: The first two digits represent the day of the month, and the next four represent the issuance time (hour and minute) in Zulu.

18. (Refer to figure 31) What is the valid period for the EGLL TAF?

A. Valid from 1612Z to 1718Z. on the 16th of the month.
B. Valid from 1200Z on the 16th day of the month until 1800Z on the 17th.
C. Valid from 1200Z to 2100Z on the 16th day of the month.

Answer **(B)** is correct.
DISCUSSION: The valid period for this TAF is 1612/171
The first two digits before the slant represent the beginning date of this forecast (16th in this example), and the last two digits immediately prior to the slant represent the beginning hour of the valid time in zulu (1200Z).
The first two digits immediately after the slant represent the ending date of the forecast (17th), and the last two digits represent the ending hour in zulu (1800Z)

19. (Refer to figure 31) Between 1200Z (on the 16th) and 2100Z (on the 16th) the wind at EGGL is forecast to be?

A. Wind from 220º true at 14 knots.
B. Wind is from 220º magnetic at 17 knots with gusts to 28 knots.
C. Wind is from 220º true at 17 knots with gusts to 28 knots.
D. Wind is from 170º magnetic at 22 knots with gusts to 28 knots.

Answer **(C)** is correct.
DISCUSSION: The forecast wind for EGGL from 1200Z until 2100Z is coded as 22017G28KT.
The first three digits represent the wind direction (220º) in reference to true north. The next two digits show the speed in knots (17). If the wind is gusty, it is reported with a G after the speed and followed by the highest gust (28).

20. (Refer to figure 31) What weather conditions are forecast to exist from 1800Z until 2100Z at EGLL?

A. Refer to figure winds and temperature aloft forcast Becoming between 1800Z and 2100 Z, visibility 8000 meters, light rain, scattered clouds At 70 feet AGL, broken clouds at 120 feet AGL.
B. Becoming between 1800Z and 2100Z, visibility 8000 meters, rain, scattered clouds at 700 feet AGL, broken clouds at 1200 feet AGL.
C. Becoming between 1800Z and 2100Z, visibility 8000 meters, light rain, scattered clouds at 700 feet AGL, broken clouds at 1200 feet AGL.

Answer **(C)** is correct.
DISCUSSION: The forecast for EGLL from 1800Z until 2100Z is coded as BECMG 1618/1621 8000 –RA SCT007 BKN012.
It indicates a gradual change in weather conditions is expected to occur sometimes between 1800Z and 2100Z.
Becoming from 1800Z to 2100Z, visibility 8000 meters, light rain, scattered clouds at 700 feet AGL, broken clouds at 1200 feet AGL

21. (Refer to figure 31) What weather conditions are forecast to exist from 0700Z until 1900Z at EHAM?

A. A 30% Probability, temporary conditions between 0700Z and 1900Z, visibility is 4000 meters, rain, Drizzle, broken clouds at 400 feet AGL.
B. A 30% Probability, temporary conditions between 0700Z and 1900Z, visibility is 4000 feet, freezing rain, broken clouds at 400 feet AGL.
C. A 30% probability, becoming between 0700Z and 1900Z, visibility 4000 meters, rain, drizzle, broken clouds at 400 feet MSL.

Answer **(A)** is correct.
DISCUSSION: The forecast for EHAM between 0700Z and 1900Z is coded as PROB30 TEMPO 1707/1719 4000 RADZ BKN004.
A probability group (PROB) is used when the probability of occurrence is between 30% and 49% (in this example the probability is 30%).
TEMPO indicates a temporary forecast when wind, visibility, weather, or sky conditions are expected to last less than 60 minutes.
Therefore, the temporary group predicts that between 0700Z and 1900Z, visibility is expected to be 4000 meters in rain and drizzle, and broken clouds at 400 feet AGL.

22. (Refer to figure 31) In the TAF for EHAM, what does the code MIFG indicate?

A. Mist and Fog.
B. Patches of fog.
C. Shallow fog.
D. Partial fog.

Answer **(C)** is correct.
DISCUSSION: MI is a descriptor code that means shallow. FG is an obscuration to visibility which means fog. Therefore, MIFG indicates shallow fog.

23. (Refer to figure 31) What is the forecast wind for EHAM between 1800Z and 2100Z on the 18th of the month?

A. Variable in speed from 030º.
B. Variable in direction at 3 knots.
C. Variable in direction at 4 knots.
D. From 190 º true at 7 knots.

Answer **(B)** is correct.
DISCUSSION: The forecast wind for EHAM between 1800Z and 2100Z is coded as **VRB03KT**.
If the direction from which the wind is blowing is variable, the letters VRB are used. In the example, the forecast wind is variable in direction at 3 knots between 1800Z and 2100Z.

24. A squall (SQ) is defined as:

A. a sudden increase in the wind speed of at least 14 knots to a sustained speed of 32 knots or more for at least 10 minute.
B. a drastic change in wind speed and/or direction that may occur at any altitude and in all directions.
C. a sudden increase in the wind speed of at least 16 knots to a sustained speed of 22 knots or more for at least 1 minute.

Answer **(C)** is correct.
DISCUSSION: A squall is defined as a sudden increase in the wind speed of at least 16 knots to a sustained speed of 22 knots or more for at least one minute.

25. (Refer to figure 31) In the TAF for VIAR, what does the following statement indicate?

TEMPO 1808/1815 2000 TSRA FEW030CB

A. Temporary conditions between 0800Z and 1500Z, visibility 2000 meters, light rain and turbulence, few clouds at 3000 feet, ceiling below VFR minimums.
B. Temporary conditions between 0800Z and 1500Z, visibility 2000 meters, moderate rain associated with thunderstorm, few clouds at 300 feet, made up of cumulonimbus.
C. Temporary conditions between 0800Z and 1500Z, visibility 2000 meters, moderate rain associated with thunderstorm, few clouds at 3000 feet, made up of cumulonimbus.
D. Temporary between 18:08Z and 18:15Z, visibility 2000 meters, moderate rain associated with thunderstorm, few clouds at 3000 feet, made up of cumulonimbus.

Answer **(C)** is correct.
DISCUSSION: Wind, visibility, weather, or sky conditions that are expected to last less than 60 minutes are described in the temporary (coded as TEMPO) group, followed by the beginning and end time. In this example, the temporary group predicts that between 800Z and 1500Z, the visibility is 2000 meters, moderate rain associated with thunderstorm, few clouds at 3000 feet, made up of cumulonimbus.
TSRA: The intensity of rain is moderate because there is no qualifier (+ or -) prior to this group. Therefore, this code (TSRA) means moderate rain associated with thunderstorm.

26. (Refer to figure 31) The only cloud type forecast in TAF is:

A. Altocumulus.
B. Cumulonimbus.
C. Stratocumulus.
D. Nimbostratus.

Answer **(B)** is correct.
DISCUSSION: Only cumulonimbus (CB) clouds are forecast in the TAF.

27. (Refer to figure 31) What weather conditions are forecast to exist from 1900Z until 2000Z at VIAR?

A. Becoming between 1900Z and 2000Z, visibility 1500 meters, mist.
B. Becoming between 1900Z and 2000Z, visibility 1500 meters, broken clouds.
C. Becoming between 1900Z and 2000Z, visibility 1500 feet, blowing rain.

Answer **(A)** is correct.
DISCUSSION: The forecast for VIAR between 1900Z and 2000Z is coded as BECMG 1719/1720 1500 BR
If a more gradual change in weather, taking about two hours, is expected, the code BECMG (becoming) is used. This code is followed by the beginning and ending times of change period.
BECMG 1719/1720 1500 BR: this indicates that a gradual change in condition is expected to occur between 1900Z and 2000Z. Sometimes during this period, the visibility will be 1500 meters in mist**.**

28. (Refer to figure 31) In the TAF for EHAM, between 0100Z and 0400Z the height of the base of the lowest ceiling is expected to be:

A. 400 feet AGL.
B. 700 feet AGL.

Answer **(C)** is correct.
DISCUSSION: The forecast between 0100Z and 01400Z is:
BECMG 1701/1704 19007KT SCT007 BKN012 BKN 01
Ceiling is defined as the height above the ground or water of the base of the lowest layer of cloud below 6000 meters

C. 1200 feet AGL.
D. 1800 feet AGL.

(2000 feet) covering more than half the sky. Broken clouds cover 5/8 to 7/8 of the sky and are designated by BKN in the METAR. To determine the cloud bases, add two zeros to the number given in the report. In this example, the base of the first broken layer begins at 1200 feet AGL.

29. (Refer to figure 31) In the TAF for EHAM, what does the code **20012KT CAVOK** indicate?

A. Wind is from 200 º true at 12 knots, visibility is 5 kilometers or more, with no cloud below 10000 feet, no cumulonimbus clouds at any level, and there is no significant weather.
B. Wind is from 200 º true at 12 knots, visibility is 10 kilometers or more, with no cloud below 5000 feet, no cumulonimbus clouds at any level, and there is no significant weather.
C. Wind is from 200 º magnetic at 12 knots, visibility is 10 statute miles or more, with no cloud below 5000 feet, no cumulonimbus clouds at any level, and there is no significant weather.
D. Wind is from 200 º true at 12 knots, visibility is 10 statute miles or more, with no cloud below 5000 feet, no cumulonimbus clouds at any level, and there is no significant weather.

Answer **(B)** is correct.
DISCUSSION: The forecast wind is depicted by a five digit group. The first three digits represent the wind direction (200 º) in reference to true north, and the last two digits show the wind speed (12 knots).
The visibility and sky condition group are replaced by CAVOK if the following conditions exist:
There are no clouds below 5000 feet above aerodrome level or minimum sector altitude (whichever is higher) and no cumulonimbus, visibility is at least 10 kilometers, no current or forecast significant weather low drifting snow.

30. In a winds and Temperatures aloft forecast, winds are given in ……. and speed is shown in …….

A. True direction and kilometers per hour.
B. True direction and knots.
C. Magnetic direction and miles per hour
D. Magnetic direction and knots.

Answer **(B)** is correct.
DISCUSSION: In winds aloft forecast, winds are given in true direction and speed is in knots.

31. (Refer to figure 32) What wind is forecast for SAN at 12000 feet?

A. 330º magnetic at 17 knot
B. 330º true at 17 knots.
C. 330º true at 17 miles per hour.
D. 033º true at 17 knots.

Answer **(B)** is correct.
DISCUSSION: The wind forecast for SAN at 12000 feet is coded as 3317. The first two digits (33) represent the true direction (in tens of degrees) from which the wind is s blowing from. The next two digits (17) show the speed in knots.

32. (Refer to figure 32) What wind is forecast for MIA at 30000 feet?

A. 250º true at 112 knots.
B. 075º at 12 knots.
C. 250 magnetic at 112 knots.
D. 075 magnetic at 12 knots.

Answer **(A)** is correct.
DISCUSSION: To decode a forecast of winds between 100 and 199 knots, subtract 50 from the two-digit wind direction code (75) and multiply it by 10. Then, add 100 to the two-digit wind speed code (12). Therefore, the forecast wind for MIA at 30000 ft. is 250 º true at 112 knots.

33. (Refer to figure 32) Determine the wind and temperature aloft forecast for BOS at 9000 feet.

A. Wind is from 26 º true at 24 knots and the temperature is -16 ºC.
B. Wind is from 260 º magnetic at 24 knots and the temperature is -16 ºC.
C. Wind is from 260 º true at 24 miles per hour and the temperature is -16 ºF.
D. Wind is from 260 º true at 24 knots and the temperature

Answer **(D)** is correct.
DISCUSSION: The wind and temperature forecast for BOS at 9000 feet is coded as 2624-16. The first two digits (26) represent the true direction (in tens of degrees) from which the wind is blowing from. The next two digits (24) show the speed in knots. The last two digits (-16) represent the temperature in degrees Celsius.

is -16 ºC.

34. (Refer to figure 32) Determine the wind and temperature aloft forecast for MIA at 34000 feet.

752341

A. Wind is from 75 º true at 123 knots and the temperature is -41 ºC.
B. Wind is from 75 true at 23 knots and the temperature is -41 ºC.
C. Wind is from 250 true at 123 knots and the temperature is -41 ºC.
D. Wind id from 250 magnetic at 123 knots and the temperature is -41 ºC.

Answer **(C)** is correct.
DISCUSSION: To decode a forecast of winds between 100 and 199 knots, subtract 50 from the two-digit wind direction code (75) and multiply it by 10. Then, add 100 to the two-digit wind speed code (23). Therefore, the forecast wind for MIA at 34000 ft. is 250 º true at 123 knots.
The last two digits (41) indicate the temperature in degrees Celsius. Since all the temperatures above 24000 ft. are negative, the forecast temperature is -41 ºC.

35. When the term light and variable is used in reference to a winds aloft forecast, the coded group and wind speed is?

A. 9900 and less than 7 knots.
B. 0000 and less than 3 knots.
C. 9900 and less than 5 knots.
D. 0000 and less than 7 knots.

Answer **(C)** is correct.
DISCUSSION: A code of 9900 indicates light and variable winds (less than 5 knots).

36. (Refer to figure 32) You plan to fly over ONT at 12000 on a true heading of 340 º and a true speed of 135 knots. What groundspeed do you expect? What will be the outside air temperature?

A. Groundspeed of 119 knots and an outside air temperature of -1 ºC.
B. Groundspeed of 129 knots and an outside air temperature of -1 ºC.
C. Groundspeed of 151 knots and an outside air temperature of -1 ºC.
D. Groundspeed of 141 knots and an outside air temperature of -1 ºC.

Answer **(A)** is correct.
DISCUSSION: The wind and temperature forecast for ONT at 9000 feet is coded as 3416-01. This forecast is decoded as wind from 340 º true at 16 knots and a temperature of -1 ºC. Since the angle between wind direction (from 340 º true) and the true heading (340 º) is 180 º, you will have 16 knots of headwind. Therefore, you should expect to have a ground speed of 119 knots (135-16).

37. (Refer to figure 32) You plan to fly over SFO at 6000 on at true heading of 220 º and a true speed of 110 knots. What groundspeed do you expect? What will be the outside air temperature?

A. Groundspeed of 90 knots and an outside air temperature of 6 ºC.
B. Groundspeed of 129 knots and an outside air temperature of -1 ºC.
C. Groundspeed of 130 knots and an outside air temperature of 11 ºC.
D. Groundspeed of 90 knots and an outside air temperature of 11 ºC.

Answer **(C)** is correct.
DISCUSSION: The wind and temperature forecast for ONT at 9000 feet is coded as 3416-01. This means the wind is from 040 º true at 20 knots and the temperature is 11 ºC. Since the angular difference between wind direction (040 º true) and the true heading (220 º) is zero, you will have 20 knots of tailwind. Therefore, you should expect to have a groundspeed of 130 knots (110+20).

38. (Refer to figure 32) You plan to fly over SEA at 7500 feet. Determine the forecast wind.

A. 315º true at 15 knots.

Answer **(A)** is correct.
DISCUSSION: Since wind and temperature are not forecast for 7500 feet, you must interpolate between 6000 feet and 9000 feet. Your planned flight altitude is halfway between

B. 320º true at 17 knots.
C. 310º magnetic at 16 knots.
D. 310º true at 14 knots.

6000 and 9000 feet.
The forecast wind at 6000 feet is: 330º at 09 knots.
The forecast wind at 9000 feet is: 300º at 21 knots.
Therefore, a good estimate of the wind at 7500 feet
Therefore, a good estimate of the wind at 7500 feet
over SEA is 315º true at 15 knots.

39. (Refer to figure 32) You plan to fly over ONT at 10500 feet. Determine the forecast wind.

A. 015º true at 14 knots.
B. 360º true at 10 knots.
C. 340º true at 16 knots.
D. 355º true at 12 knots.

Answer **(D)** is correct.
DISCUSSION: Since wind and temperature are not forecast for 10500 feet, you must interpolate between 9000 feet and 12000 feet. Your planned flight altitude is midway between 9000 and 12000 feet.
The forecast wind at 9000 feet is: 010º at 08 knots.
The forecast wind at 12000 feet is: 340º at 16 knots.
Therefore, a good estimate of the wind at 7500 feet
over SEA is 355º true at 12 knots.

40. AIRMETs are advisories of significant weather phenomena but of lower intensities than SIGMETs and are intended for dissemination to:

A. Only VFR pilots.
B. Only IFR pilot.
C. All pilots.

Answer **(C)** is correct.
DISCUSSION: AIRMETS are advisories of significant weather phenomena that describe conditions at intensities lower than those which require the issuance of SIGMETS. They are intended for dissemination to all pilots.

41. What information is contained in an AIRMET?

A. Severe icing, severe turbulence, and embedded thunderstorms
B. Severe mountain wave, sandstorms, duststorms, and volcanic ash.
C. Sustained winds of 30 knots or more at the surface, mountain obscuration, widespread areas of broken or overcast cloud with height of base less than 1000 feet.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 3, Appendix 6, 2.1.4

42. What is the validity period of an AIRMET?

A. Not more than 2 hours.
B. Not more than 4 hours.
C. Not more than 6 hours.
D. Not more than 8 hours.

Answer **(B)** is correct.
DISCUSSION: The period of validity of an AIRMET can't be more than 4 hours.

43. AIRMETs contain weather conditions which are potentially hazardous to:

A. Small aircraft.
B. Large aircraft.
C. All aircraft.

Answer **(A)** is correct.
DISCUSSION: AIRMETs contain weather conditions which are potentially hazardous to small aircraft.

44. SIGMETs are issued for hazardous weather which is considered significant to:

A. Large aircraft only.
B. Small aircraft only.
C. All aircraft.

Answer **(C)** is correct.
DISCUSSION: SIGMETs warn of hazardous weather conditions which concern all aircraft.

45. What is the validity period of a SIGMET other than those for volcanic ash clouds and tropical cyclones?

A. Not more than 2 hours.
B. Not more than 3 hours.
C. Not more than 4 hours.
D. Not more than 6 hours.

Answer (C) is correct.
DISCUSSION: The validity period of a SIGMET shall be not more than 4 hours. In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, the period of validity shall be extended up to 6 hours.

46. What information is contained in a SIGMET?

A. Embedded thunderstorms, severe turbulence, severe icing, duststorms, sandstorms, and volcanic ash.
B. Sustained winds of 30 knots or more at the surface, and mountain obscuration.
C. Broken or overcast clouds with height of base less than 1000 feet AGL, and visibility less than 5000 meters affecting widespread areas.
D. Moderate icing, and moderate turbulence, and moderate mountain wave.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 3, appendix 6, and 1.1.4.

47. In a SIGMET, what does “EMBD TSGR” stand for?

A. Embedded thunderstorm with snow pellets.
B. Embedded thunderstorm with heavy rain.
C. Embedded thunderstorm with hail.
D. Embedded squall with hail.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 3, appendix 6, and 1.1.4.

48. An area of thunderstorms should be considered isolated if :

A. If it is embedded within cloud layers and can’t be readily recognized.
B. If it consists of individual features that affect an area with a maximum spatial coverage less than 50% of the area concerned
C. If it consists of well-separated features which affect an area with a maximum spatial coverage between 50% and 75% of the area concerned.
D. If it is obscured by haze or smoke.

Answer **(B)** is correct.
DISCUSSION: An area of thunderstorm should be considered isolated if it consists of individual features which affect an area with a maximum spatial coverage less than 50% of the area concerned.

49. (Refer to figure 33) The area enclosed in the scalloped line over southeastern Caspian sea is forecast to have:

A. Severe turbulence between 12000 ft. and 20000ft. and severe icing between 12000 ft. and 20000 ft.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 3, SHEET OF NOTATION USED IN FLIGHT DOCUMENTATION, and use the following sections:
1. Symbols for significant weather.
3. Abbreviations used to describe clouds (3.3 Heights).

B. Moderate turbulence between 12000 ft. and 20000 ft. and moderate icing between 12000 ft. and 20000. ft.
C. Moderate turbulence between 12000 ft. and 20000 ft. and isolated cumulonimbus with tops at 20000 ft.

4. Depicting of lines and systems on specific charts.

50. (Refer to figure 33) The area enclosed in the scalloped line over northern, central, and southern Turkey indicates:

A. Isolated embedded cumulonimbus with tops at 32000 ft. and bases below 10000 ft.
B. Isolated embedded stratocumulus with bases at 32000 ft. and tops above 45000 ft.
C. Isolated embedded cumulonimbus with bases at 32000 ft. and topes above 45000 ft.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 3, SHEET OF NOTATION USED IN FLIGHT DOCUMENTATION, and use the following
4. Depicting of lines and systems on specific charts.

51. (Refer to figure 33) What is the height and speed of the jet stream over southern Iran flowing from west to east?

A. 39000 ft. MSL at 260 knots.
B. 39000 ft. MSL at 130 knots.
C. 39000 feet AGL at 150 knots.
D. 39000 feet AGL at 130 knots.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 3, SHEET OF NOTATION USED IN FLIGHT DOCUMENTATION, and use the following section
4. Depicting of lines and systems on specific charts (4.1 and 4.3).

52. (Refer to figure 33) What does the following symbol over northeastern Iran indicate?

A. Moderate icing at 35000 ft.
B. Clear air turbulence at 35000 ft.
C. Tropopasue maximum height of 35000 ft.
D. Tropopasue height of 35000 ft.

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 3, SHEET OF NOTATION USED IN FLIGHT DOCUMENTATION, and use the following section:
4. Depicting of lines and systems on specific charts.

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CHAPTER 6

BASIC NAVIGATION

- **Aeronautical Charts**
- **Flight computers**
- **Pilotage and Dead Reckoning**
- **Sources of Flight Information**

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CHAPTER 7

RADIO NAVIGATION SYSTEMS

- **VHF Omnidirectional Range**
- **Automatic Direction Finder**
- **Advanced Navigation**

1. Pilots should notify controllers on initial contact that They have received that ATIS broadcast by

A. Stating “Have Numbers.”
B. Stating “Have Weather.”
C. Repeating the alphabetical code word appended to the to the broadcast.

Answer **(C)** is correct.
DISCUSSION: Pilots should notify controllers on initial contact that they have received the ATIS broadcast by repeating the alphabetical code word appended to the broadcast.

2. During a LORAN approach the receiver must detect a Lost signal, a signal blink within :

A. 5 seconds of the occurrence and warm the pilot of the even.
B. 10 seconds of the occurrence and warm the pilot of the event.
C. 15 seconds of the occurrence and warm the pilot of the event.

Answer **(B)** is correct.
DISCUSSION: LORAN navigation for non-precision approaches requires accurate and reliable information. During an approach, the occurrence of a signal blink or a loss of signal must detected within 10 seconds, and the pilot must be notified.

3. Where does the DME indicator have the greatest error Between the ground distance and displayed distance To the VORTAC ?

A. High altitudes close to the VORTAC.
B. Low altitudes close to the VORTAC..
C. Low altitudes far from the VORTAC.

Answer **(A)** is correct.
DISCUSSION: The mileage readout on the DME is the direct distance from the airplane to the VORTAC and is commonly referred to as slant-Range distance. The difference between a measured distance on the surface and the DME slant-Range is known as slant-range error and is greatest at high altitudes close to the VORTAC.

4. What DME indication should a pilot observe when directly over a VORTAC site at 12,000 feet ?

A. 0 DME miles.
B. 2 DME miles.
C. 2.3 DME miles.

Answer **(B)** is correct.
DISCUSSION: When directly over a VORTAC site, the DME will display altitude in nautical miles (NM) above the site. One NM equals approximately 6,000 ft at 12,000 ft. directly above the VORTAC, the DME will indicate 2 DME.

5. What would be the identification when a VORTAC is undergoing routine maintenance and is considered unreliable ?

A. A test signal, “TESTING”, is sent every 30 seconds.
B. Identifier is preceded by “M” and an intermitted “OFF” flag would appear.
C. The identifier would be removed.

Answer **(C)** is correct.
DISCUSSION: The only positive method of identifying a VOR is by its Morse code identification or by the recorded automatic voice identification which is always indicated by the use of the word “V-O-R” following the range’s name. During periods of maintenance, the facility may radiate a T-E-S-T code, or the identification code would be removed.

6. Which indication may be received when a VOR is undergoing maintenance and is considered unreliable ?

A. Coded identification T-E-S-T.
B. Identifier is preceded by “M” and intermittent “OFF” flag might appear.

Answer **(A)** is correct.
DISCUSSION: The only positive method of identifying a VOR is by its Morse code identification or by the recorded automatic voice identification which is always indicated by the use of the word “V-O-R” following the range’s name. During periods of maintenance the facility may radiate a T-E-S-T code, or the

C. An automatic voice recording stating the VOR is out-of-service for maintenance.

identification code would be removed.

7. (Refer to Figure 34) Which RMI illustration indicates the aircraft to be flying outbound on the magnetic bearing of 235° FROM the station ? (wind 050°at 20 knots.)

A. 2
B. 3
C. 4

Answer **(B)** is correct.
DISCUSSION: A radio magnetic indicator (RMI) consist of a rotating compass card which rotates as the airplane turns. The magnetic heading of the airplane is always directly under the index at the top of the instrument. The bearing pointer displays magnetic bearings to the selected station. The tail of the indicator tells you which radial you are on or the magnetic bearing from the station. Thus, a magnetic bearing of 235°from the station is indicated when the tail of the needle as in RMI 3 is on 235°. The 20-kt wind from 050° is a direct tailwind which does not require wind correction.

8. (Refer to figure 34) What is the magnetic bearing TO the station as indicated by illustration 4 ?

A. 285°
B. 055°
C. 235°

Answer **(B)** is correct.
DISCUSSION: The magnetic heading of the airplane is always directly under the index at the top of the instrument. The bearing pointer displays the magnetic bearing to the selected station. In RMI 4, the needle is pointing to 055°, which is the magnetic bearing to the station.

9. (Refer to Figure 34) Which RMI illustration indicates the indicates the aircraft is southwest of the station and proceeding TO the station ?

A. 1
B. 2
C. 3

Answer **(A)** is correct.
DISCUSSION: If the airplane is to the southwest of the station and moving toward it, the heading and the needle should both be indicating northeast, which is shown in RMI 1. It indicates a magnetic bearing to the station of 055°. The heading is also 055°, which means the airplane is flying to the station.

10. (Refer to figure 34) Which RMI illustration indicates the aircraft is located on the 55° radials of the station and heading away from the station ?

A. 1
B. 2
C. 3

Answer **(B)** is correct.
DISCUSSION: The magnetic heading of the airplane is always directly under the index at the top of the instrument. The bearing pointer display magnetic bearings to the selected station. The tail of the indicator tells you which radial you are on or the magnetic bearing from the station. Thus, a magnetic bearing of 055°from the station is indicated when the tail of the needle is on 055°, as in 2. The heading is also 055°, which means you are flying northeast ,which is away from the station ,and you are on the 055°radial.

11. (Refer to figure 35) What is the lateral displacement of the aircraft in nautical miles from the radial selected on the No. 1 NAV ?

A. 5.0 NM.
B. 7.5 NM.

Answer **(A)** is correct.
DISCUSSION: On VORs, the displacement from course is approximately 200 ft. per dot per NM. At 30 NM from the station. one dot deflection indicates approximately 1 NM displacement of the airplane from the course centerline . At 60 NM it would be 2 NM for every dot

C. 10.0 NM.

of displacement. Since here, displacement is 2 1/2 dots, the airplane would be 5 NM from the centerline.

12. (Refer to figure 35) On which radial is the aircraft as indicated by the NO. 1 NAV?

A. R-175 .
B. R-165.
C. R-345

Answer **(C)** is correct.
DISCUSSION: The course selector in figure 35 is set on 350°with a FROM reading, indicating that, if the course deflection bar were centered, the airplane would be on R-350 Since a total deflection is approximately 10°to 12° one-half, so it is about 5° to 6°. Here, deflection is less than one-half, so it is about 5°. The course deflection bar indicates that this airplane is to the left of R-350, which would be R-345.

13. (Refer to figure 35) What is the lateral displacement in degrees from the desired radial on the No.2 NAV ?

A. 1°.
B. 2°.
C. 4°.

Answer **(C)** is correct.
DISCUSSION: Since on a standard 5-dot VOR indicator, a full deflection on 5 dots is about 10°, 2 dots means a 4° deflection.

14. (Refer to figure 35) Which OBS selection on the NO.1 NAV would center the CDI and change the ambiguity indication to a TO?

A. 175
B. 165
C. 345

Answer **(B)** is correct.
DISCUSSION: The course selector in figure 35 set to 350° with a FROM indication, which means the airplane would be on R-350, if the course deviation bar were centered. However, the deviation bar indicates that the airplane is 5°(2°per dot) to the left of R-350, or R-345. Thus, to center the CDI and change the ambiguity indicator TO, the OBS should be set on the reciprocal of 345°, which is 165° (345° - 180°)

15. (Refer to figure 35) which OBS selection on the NO. 2 NAV would center the CDI ?

A. 174
B. 166
C. 335

Answer **(A)** is correct.
DISCUSSION: The course selector in figure 35 is set to 170° (it is not an HIS; it is a VOR) and the TO-FROM indicator indicates FROM, which means the airplane would be on R-170 if the course deviation bar were centered. Since the bar indicates a left deflection (2° per dot), the airplane is to the right of the radial, or R-174.

16. (Refer to figure 35) Which OBS selection on the NO.2 NAV would center the CDI and change the ambiguity indication to a TO ?

A. 166
B. 346
C. 354

Answer **(C)** is correct.
DISCUSSION: The course selector in Figure 35 is set to 170° (it is not an HIS; it is a VOR) and the TO-FROM indicator indicates FROM, which means the airplane would be means the airplane would be on R-170 if the course deviation bar were centered. Since the bar indicates a left deflection (2°per dot), the airplane is to the right of the radial, or on the 174° radial. To obtain a TO indication, one would have to change the OBS selection by 180° from 174° to 354°.

17. (Refer to figure 36) To which aircraft position does HIS presentation “A” correspond ?

A. 1
B. 8
C. 11

Answer **(A)** is correct.
DISCUSSION: HIS “A” has a VOR course selection of 090°, with a TO indication, meaning the airplane is to the left of the 360/180 radials. It has a right deflection, which means it is north of the 270/090 radials. The airplane heading is 205°, which means airplane

1 is described.

18. (Refer to figure 36) To which aircraft position does HIS presentation “B” correspond ?

A. 9
B. 13
C. 19

Answer **(C)** is correct
DISCUSSION: HIS “B” has a VOR course selection of 270° with a FROM indication, meaning that the airplane is to the left of the 360/180 radials. Since it has a right deflection, the airplane is south of R-270. Given a heading of 135°, airplane 19 is described.

19. (Refer to figure 36) To which aircraft position does HIS presentation “C” correspond ?

A. 6
B. 7
C. 12

Answer **(C)** is correct.
DISCUSSION: HIS “C” has a VOR course selection of 360° with a TO indication, meaning the airplane is south of the 270/090 radials. Since the course deflection bar is to the left, the airplane 12 is to the east of the 180° radial. Given a 310° heading, airplane 12 is described.

20. (Refer to figure 36) To which aircraft position does HIS presentation “D” correspond ?

A. 4
B. 15
C. 17

Answer **(C)** is correct.
DISCUSSION: HIS “D” has a VOR course selection (OBS) of 180° . It's FROM indication means the airplane is south of R-270/090. Since the course deflection bar is to the left, the airplane is west of R-180. Given the heading of 180°, the position describes airplane 17.

21. (Refer to figure 36) To which aircraft position does HIS presentation “E” correspond ?

A. 5
B. 6
C. 15

Answer **(B)** is correct.
DISCUSSION: HIS “E” has a VOR course selection of 360°. It's FROM indication means the airplane is north of R-270/090. Given the course Given the course deflection bar to the left, the airplane is to the east of the 360° radial. Given the 360° heading the position describes airplane 6.

22. (Refer to figure 36) To which aircraft position does HIS presentation “F” correspond ?

A. 10
B. 14
C. 16

Answer **(C)** is correct.
DISCUSSION: HIS “F” has VOR course selection of 180° with a FROM indication, meaning that the airplane is south of the 270/090 radials. Since the course deflection bar is centered, the airplane is on R-180. Given a heading of 045° (at the top of HIS), airplane 16 is described.

23. Which is true about homing when using ADF during crosswind conditions? Homing

A. To a radio station results in a curved path that leads to the station.
B. Is a practical navigation method for flying both to and from a radio station.

Answer **(A)** is correct.
DISCUSSION: Homing to a station accomplished by keeping the needle centered on the top index of your inbound course and fly a curved path to the station.

C. To a radio station requires that the ADF have an automatically or manually rotatable azimuth.

24. Which is true regarding tracking on a desired bearing when using ADF during crosswind conditions ?

A. To track outbound, heading corrections should be made away from the ADF pointer.
B. When on the desired track outbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the tail position.
C. When on the desired track inbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the nose position.

Answer **(B)** is correct.
DISCUSSION: When tracking outbound from an NDB station, the nose of the aircraft will be crabbed into the wind. As a result of this crab and flying away from the station, the ADF needle will be deflected towards the windward side (the side the wind is coming from)

25. The magnetic heading is 315°and the ADF shows a relative bearing of 140°. The magnetic bearing FROM the radio beacon would be

A. 095°
B. 175°
C. 275°

Answer **(C)** is correct.
DISCUSSION: To compute the magnetic bearing to an NDB, you use the formula below MH is given as 315°and RB is given 140°

MH + RB = MB(TO)
315°+ 140°= MB(TO) 455°- 360°= 095°
you adjust by 180°to get MB (FROM)
95°+ 180°= 275°

26. The magnetic heading is 350° and the relative bearing to a radio beacon is 240°. what would be the magnetic bearing TO that radio beacon ?

A. 050°
B. 230°
C. 295°

Answer **(B)** is correct.
DISCUSSION: To compute the magnetic bearing to an NDB, you use the formula below. The MH is given as 350° and the RB is given as 240°.

MH + RB = MB(TO)
350°+ 240°= MB(TO)
MB(TO) = 590°– 360°= 23

27. The ADF is tuned to a radio beacon. If the magnetic heading is 040°and the relative bearing is 290, the magnetic bearing TO that radio beacon would be

A. 150°
B. 285°
C. 330°

Answer **(B)** is correct
DISCUSSION: To compute the magnetic bearing to an NDB, you use the formula below. The MH is given as 040°and the RB is given as 290°.

MH + RB = MB(TO)
040°+ 290°= 330°

28. If the relative bearing to a non-directional radio beacon is 045°and the magnetic heading is 355°, the magnetic bearing TO that radio beacon would be

A. 040°
B. 065°
C. 220°

Answer **(A)** is correct.
DISCUSSION: To compute the magnetic bearing to an NDB, you use the formula below. The MH is given as 355°and the RB is given as 045°.

MH + RB = MB(TO)
355°+ 045°= MB(TO)

MB(TO) = 400°– 360°= 040°

29. An aircraft is maintaining a magnetic heading of 265°and the ADF shows a relative bearing of 065°. This indicates that the aircraft is crossing the

A. 065° magnetic bearing FROM the radio-beacon.
B. 150° magnetic bearing FROM the radio-beacon.
C. 330° magnetic bearing FROM the radio-beacon.

Answer **(B)** is correct.
DISCUSSION: To compute the magnetic bearing to an NDB, you use the formula below. The MH is given as 265°and the RB is given as 065°.

MH + RB = MB(TO)
265°+ 065°= 330°
you adjust by 180°to get MB (FROM)
330°– 180°= 150°

30. (Refer to Figure 37) To intercept a magnetic bearing of 240°FROM at a 030°angle (while outbound), the airplane should be turned

A. left 065°
B. left 125°
C. right 270°

Answer **(B)** is correct.
DISCUSSION: Draw a diagram as illustrate . Read the illustration from right to left. You are on a 35° MH. Your RB is 310°. That identifies where the NDB is. Finally you want to draw the 240°MB at a 30°angle, you need a left turn from 35°to 270°which is 125°

MH + RB = MB
035°+ 310°= MB(TO) = 345°

31. (Refer to Figure 37) If the airplane continues to fly on the heading as shown, what magnetic bearing FROM the station would be intercepted at a 35°angle outbound ?

A. 035°
B. 070°
C. 215

Answer **(B)** is correct.
DISCUSSION: You are currently on the 165° MB(FROM) With a 35°MH, you will cross the 70° MB(FROM) at a 35° intersection angle (70°- 35°= 35°). Note that the 70°MB(FROM) is in front of us when you are northeast bound currently crossing the 165° MB(FROM)

32. (Refer to Figure 38) If the airplane continues to fly on the magnetic heading as illustrated, what magnetic bearing FROM the station would be intercepted at a 35° angle ?

A. 090°
B. 270°
C. 305°

Answer **(C)** is correct.
DISCUSSION: Draw a diagram as illustrate. Being by determining your present MB.

MH + RB = MB(TO)
ADD 180°for MB(FROM)
340°+ 110°+ 180°= MB(FROM) = 630°– 360°= 270°
you are now on the 270° MB(FROM). When you cross the 305°MB(FROM) of the NDB, you will have a 35° interception angle (340° - 305° = 35°

33. (Refer to Figure 38) If the airplane continues to fly on the magnetic heading as illustrated, what magnetic bearing FROM the station would be intercepted at a 30◦

Answer **(C)** is correct.
DISCUSSION: Refer to figure 38,
Being by determining your present MB.

angle ?

A. 090°
B. 270
C. 310°

MH + RB = MB (TO)
add 180°for MB (FROM)
340°+ 110°+ 180= MB (FROM) = 360° – 360°= 270°
when you cross the 310°MB(FROM) of the NDB, you will have a 30° interception angle (340°-310°= 30°)

34. When checking the course sensitivity of a VOR receiver, how many degrees should be OBS be rotated to move the CDI from the centre to the last dot on either side ?

A. 5° to 10°
B. 10°to 12°
C. 18°to 20°

Answer **(B)** is correct.
DISCUSSION: Course sensitivity may be checked on a VOR by noting the number of degrees of change in the course selected as you rotate the OBS to move the CDI from centre to the last dot on either side. This should be between 10° and 12°.

35. When using a VOT to mage a VOR receiver check, the CDI should be centred and the OBS should indicate that the aircraft is on the

A. 090°radial.
B. 180°radial.
C. 360°radial.

Answer **(C)** is correct.
DISCUSSION: To use a VOT, tune in the published VOT frequency on your VOR receiver. With the course deviation indicator (CDI) centred, the Omni-bearing selector (OBS) should read 0°with the TO-FORM indicator showing FROM or the OBS should read 180°with the TO-FORM indicator showing TO. This indicates you are on the 360°radial.

36. How should the pilot make a VOR receiver check when the aircraft is located on the designated checkpoint on the airport surface ?

A. Set the OBS on 180°plus or minus 4°; the CDI should centre with a FROM indication.
B. Set the OBS on the designated radial. The CDI must centre within plus or minus 4°of that radial with a FROM indication,
C. With the aircraft headed directly toward the VOR and the OBS set to 000°, the CDI should centre with a TO indication.

Answer **(B)** is correct.
DISCUSSION: On ground checkpoints, you must have the aircraft on the location of the checkpoint and have the designated radial set on the OBS. The CDI must centre within ±4°of the designated radial.

37. An aircraft 60 miles from a VOR station has a CDI indication of one-fifth deflection, this represents a course centreline deviation of approximately.

A. 6 miles.
B. 2 miles.
C. 1 miles.

Answer **(B)** is correct.
DISCUSSION: Assuming a receiver with normal course sensitivity and full-scale deflection at 5 dots, aircraft displacement from course is approximately 200 ft. per dot per NM. Since one-fifth deflection equals 1dot, the aircraft is 12,000 ft. or 2 NM off course (200 ft./NM x 60 NM = 12,000 ft.)

38. When the CDI needle is centred during an airborne VOR check, the Omni-bearing selector and the TO/FROM indicator should read

A. Within 4°of the selected radial.
B. Within 6°of the selected radial.
C. 0° TO , only if you are due south of the VOR.

Answer **(B)** is correct.
DISCUSSION: For an airborne VOR receiver check, the maximum permissible bearing error of a VOR is ±6°.

39. Which situation would result in reverse sensing of a VOR receiver ?

A. Flying a heading that is reciprocal to the bearing selected on the OBS.
B. Setting the OBS to a bearing that is 90° from the bearing on which the aircraft is located.
C. Failing to change the OBS from the selected inbound course to the outbound course after passing the station.

Answer **(C)** is correct.
DISCUSSION: By flying heading that is a reciprocal of the course set in the OBS, you will have two situations : you will be flying to the station with a FROM indication or you will fly from the station with a TO indication. either will result in reverse sensing.

40. To track outbound on the 180 radial of a VOR station, the recommended procedure is to set the OBS to

A. 360°and make heading corrections toward the CDI needle.
B. 180°and make heading corrections away from the CDI needle.
C. 180°and make heading corrections toward the CDI needle.

Answer **(C)** is correct.
DISCUSSION: The recommended procedure is to set 180°on the OBS (your outbound course) . This will give you a FROM indication while flying away from the station. This is normal sensing and you correct towards the needle.

41. To track inbound on the 215 radial of a VOR station, the recommended procedure is to set the OBS to

A. 215°and make heading corrections toward the CDI needle.
B. 215°and make heading corrections away from the CDI needle.
C. 035°and make heading corrections toward the CDI needle.

Answer **(C)** is correct.
DISCUSSION: Since radials emanate outward from the VOR, tracking inbound on R-215 means you are flying the reciprocal course of 035°. Thus you should set 035° on the OBS, and make heading corrections toward the needle.

42. What would be the identification when a VORTAC is undergoing routine maintenance and is considered unreliable ?

A. A test signal, "TESTING," is sent every 30 seconds.
B. Identifier is preceded by "M" and an intermittent "OFF" flag would appear.
C. The identifier would be removed.

Answer **(C)** is correct.
DISCUSSION: During periods of routine or emergency maintenance, coded identification (or code and voice , where applicable) is removed from certain ICAO NAV-AIDs. During periods of maintenance, VHF ranges may radiate a T-E-S-T code.

43. Which indication may be received when a VOR is undergoing maintenance and is considered unreliable ?

A. Coded identification T-E-S-T
B. Identifier is preceded by "M" and an intermittent "OFF" flag might appear.
C. An automatic voice recording stating the VOR is out-of-service for maintenance.

Answer **(A)** is correct.
DISCUSSION: During periods of routine or *emergency* maintenance, coded identification (or code and voice where applicable) is removed from certain ICAO NAV-AIDs. During periods of maintenance, VHF ranges may radiate a T-E-S-T code.

44. During a VOT check of the VOR equipment, the course deviation indicator centers on 356° with the TO/FROM reading FROM. This VOR equipment may

A. Be used if 4° is entered on a correction card and subtracted from all VOR courses.
B. Be used during VFR flights, since the error is within limits.

Answer **(B)** is correct.
DISCUSSION: With the course deviation indicator (CDI) centered, the Omni-bearing selector should read 0° (±4°) with the TO/FROM indicator showing FROM or 180° (±4°) with the TO/FROM indicator showing TO.

C. Not be used during VFR flights, since the TO/FROM should read TO.

45. If an airborne checkpoint is used to check the VOR system for VFR operations, the maximum bearing error permissible is

A. Plus or minus 6°.
B. Plus 6°or minus 4°.
C. Plus or minus 4°.

Answer **(A)** is correct.
DISCUSSION: If neither a VOT nor a designated ground checkpoint is available, a pilot may use a designated air-borne checkpoint for the VOR check. The Maximum permissible bearing error is ± 6°

46. Which entry shall be recorded by the person performing a VOR operational check ?

A. Frequency, radial and facility used, and bearing error.
B. Flight hours and number of days since last check, and bearing error.
C. Date, place, bearing error, and signature.

Answer **(C)** is correct.
DISCUSSION: Each person making the VOR operational check required by regulations shall the date, place, bearing error and sign the aircraft log or other record .

47. What DME indications should a pilot observe when directly over a VORTAC site at 12,000 feet ?

A. 0 DME miles.
B. 2 DME miles.
C. 2.3 DME miles.

Answer **(B)** is correct.
DISCUSSION: Distance information displayed on DME equipment is slant range from the station in nautical miles. 12,000 feet directly over a VORTAC is almost exactly 2NM.

48. Where Does the DME indicator have the greatest error between the ground distance and displayed distance to the VORTAC ?

A. High altitudes close to the VORTAC.
B. Low altitudes close to the VORTAC.
C. Low altitudes far from the VORTAC.

Answer **(A)** is correct.
DISCUSSION: Distance information displayed on DME *eq*uipment is slant range from the station in nautical miles. The greatest difference between displayed distance and ground distance will occur at high altitude close to the VORTAC

49. (Refer to Figure 36) To which aircraft position does HIS presentation “D” correspond ?

A. 4.
B. 15.
C. 17

Answer **(C)** is correct.
DISCUSSION: HIS indicator “D” has a course selection of of 180°, and the TO/FROM indicator is pointing to the tail of the course arrow. So the aircraft is flying away FROM the station, and is south of R-270 and R-090. The CDI bar is deflected left, which means the aircraft is west of R-180. The aircraft heading is 180°, which describes position 17.

50. (Refer to Figure 36) To which aircraft position does HIS presentation “E” correspond ?

A. 5.
B. 6.
C. 15.

Answer **(B)** is correct.
DISCUSSION: HIS indicator “E” has a course selection of 360°, and the TO/FROM indicator is pointing to of the course arrow. So the aircraft is flying away FROM the station, and is north of R-270 and R-090. The CDI bar is deflected left, which means the aircraft is east of R-180. The aircraft heading is 360°, which describes

position 6.

51. (Refer to Figure 36) To which aircraft position does HIS presentation "A" correspond ?

A. 1.
B. 8.
C. 11.

Answer **(A)** is correct.
DISCUSSION: HIS indicator "A" has a course selection of 090°, and the TO/FROM indicator is pointing to the head of the course arrow. So the aircraft is flying TO the station, and is west of R-180 and R-000 The CDI bar is deflected right, which means the aircraft heading is 205°, which describes position 1.

52. (Refer to Figure 36) To which aircraft position does HIS presentation "B" correspond ?

A. 9.
B. 13.
C. 19.

Answer **(C)** is correct.
DISCUSSION: HIS indicator "B" has a course selection of 270°, and the TO/FROM indicator pointing to the tail of the course arrow. So the aircraft is flying away FROM the station, and is west of R-180 and R-000 The CDI bar is deflected right, which means the aircraft is south of R-270. The aircraft heading is 135°, which describes position 19.

53. (Refer to Figure 36) To which aircraft position does HIS presentation "C" correspond ?

A. 6
B. 7
C. 12.

Answer **(C)** is correct.
DISCUSSION: HIS Indicator "C" has a course selection of 360°, and the TO/FROM indicator is pointing to head of the course arrow. So the aircraft is flying TO the station and is which means the aircraft is east of R-180.The aircraft aircraft heading is 310°, which describes position 12.

54. (Refer to Figure 40) What is the approximate position of the aircraft if the VOR receivers indicate the 320° radial of savannah VORTAC (Area 3) and the 184° radial of Allendale VOR (Area 1) ?

A. Town of Guyton.
B. Town of Springfield.
C. 3 miles east of Marlow.

Answer **(B)** is correct.
DISCUSSION: 1. Pilot the 320° radial (magnetic course FROM) of the Savannah VORTAC.
2. Plot the 184° radial of the Allendale VOR.
3. Note the intersection of the two plotted radials over the town of Springfield.

55. (Refer to Figure 41) What is the approximate position of the aircraft if the VOR receivers indicate that 245 radial of Sulphur Springs VORD-DME (area5) and the 140° radial of Bonham VORTAC (area3) ?

A. Meadowview Airport.
B. Glenmar Airport.
C. Majors Airport.

Answer **(B)** is correct.
DISCUSSION: 1. Pilot the 320° radial (magnetic course FROM) of the Sulphur Springs VOR-DME.
2. Plot the 140°radial (magnetic course FROM) of the Bonham VORTAC.
3. Note the intersection of the two plotted radials over the Glenmar Airport (PVT).

56. (Refer to Figure 42, area 5) The VOR is tuned to the Dallas/Fort Worth VORTAC. The Omni-bearing selector (OBS) is set on 253°, with TO indication, and a right course deviation indicator (CDI) deflection. What is the aircraft's position from the VORTAC ?

A. East-northeast
B. North-northeast.
C.. West-southwest.

Answer **(A)** is correct.
DISCUSSION: The course selected is 253° and the TO/FROM indicator has a TO flag, which means the aircraft is south of the course but north of the VOR. The CDI needle is deflected to the right, which means the aircraft is left (or east) of the course. Therefore, the aircraft must be to the east northeast of the station to satisfy the VOR indications.

57. (Refer to Figure 43-1) The VOR receiver has the indications shown What is the aircraft's position relative to the station ?

A. North
B. East.
C. South.

Answer **(C)** is correct.
DISCUSSION: The course selected is 030° and the TO/ FROM indicator is showing TO, which means the aircraft is south of the course. The CDI needle is deflected to the left, which means the aircraft is right of the course.

58. (Refer to Figure 43-3) The VOR receiver has the indications shown. What is the aircraft's position relative to the station ?

A. East.
B. Southeast.
C. West.

Answer **(B)** is correct.
DISCUSSION: Observe from illustration 3 of Figure 43, that there is no TO/FROM indication and the CDI is deflected left with an OBS set on 030°. The aircraft is somewhere along the perpendicular line (120/300°). The CDI left means the 030° radial is to the left, or west, of the aircraft position. Answer B is the only one placing the aircraft on the 120° radial, or southeast of the station.`

59. (Refer to Figure 43-8) The VOR receiver has the indication has the indications shown. What radial is the aircraft crossing ?

A. 030°
B. 210°
C. 300°

Answer **(A)** is correct.
DISCUSSION: The CDI is centered with the OBS set to 210° with a TO indication . Therefore, the aircraft is located on the 030° radial

60. (Refer to Figure 40) On what course should the VOR receiver (OBS) be set to navigates direct from Hampton Varnville Airport (area1) to Savannah VORTAC (area3) ?

A. 003°
B. 183°
C. 200

Answer **(B)** is correct.
DISCUSSION: 1. Plot the course direct from Hampton Varnville Airport to the Savannah VORTAC.
2. Note radial (magnetic course from Savannah) on which the plotted course lies (003°)
Determine the course To the VORTAC by finding the reciprocal :

TO = FROM + 180°
TO = 003°+ 180°
TO = 183°

61. (Refer to Figure 41) On what course should the VOR receiver (OBS) be set in order to navigate direct from Majors Airport (area1) to Quitman VORTAC (area2) ?

A. 101°.
B. 108°.
C. 281°

Answer **(A)** is correct.
DISCUSSION: Use the following steps :
1. Plot the course direct from Majors Airport to Quitman VORTAC.
2. Note the radial (magnetic course FROM) of Quitman VORTAC on which the plotted course lies (281°)
3. Determine the course TO the VORTAC by finding the reciprocal :

TO = FROM + 180°
TO = 281°+ 180°
TO = 461°-360°= 101°

62. (Refer to Figure 44) The VOR is tuned to Elizabeth City VOR, and the aircraft is positioned over Shawboro. Which VOR indication is correct ?

Answer **(A)** is correct.
DISCUSSION: 1. Locate the Shawboro Airport and the Elizabeth City VOR in FAA Figure . Draw the radial (magnetic course FROM) of the Elizabeth City VOR

A. 2.
B. 5.
C. 9.

on which Shawboro lies (030°)

2. When over Shawboro on the 030 radial, the CDI should be centered with a 030 FROm indication or a 210 TO indication (the reciprocal). Dials 2 and 8 satisfy these conditions. Only dial 2 is listed as an answer choice.

63. (Refer To Figure 41 and 43) The VOR is tuned to Bonham VORTAC (area3), and the aircraft is positioned over the town of OF Sulphur Springs (area5). Which VOR indication is correct ?

A. 1.
B. 7.
C. 8.

Answer **(B)** is correct.
DISCUSSION: 1. Locate and draw the magnetic course from Bonham VORTAC to Sulphur Springs (120°)

2. Notice that the OBS selections of all the dials in Figure. . . . .are 030°or 210°, both of which are at 90° with respect to the 120°radial. Therefore, When over Sulphur Springs, the flag should indicate neither TO nor FROM and the course needle should have a full deflection either side.

64. (Refer to Figure 45 AND 43) The VOR is tuned to Jamestown VOR, and the aircraft is positioned over Cooperstown airport. which VOR indication is correct ?

A. 1
B. 6
C. 4

Answer **(B)** is correct.
DISCUSSION: Use the following steps :
1. Locate the Cooperstown Airport and the Jamestown VOR in Figure . . . . . Draw the radial (magnetic course FROM) of the Jamestown VOR on which Cooperstown Airport lies.
2. When over Cooperstown Airport on the 30 radial, The CDI should have a 030 FROM indication or a 210 TO indication (The reciprocal). Dial 6 satisfies these conditions.

65. (Refer to Figure 46) What course should be selected on the Omni-bearing selector (OBS) to make a direct flight from Mercer county Regional Airport (area3) to the Minot VORTAC (area1) with TO indication ?

A. 001°
B. 359°
C. 179°

Answer **(B)** is correct.
DISCUSSION: Use following steps :
1. plot a direct course from Mercer Airport to the Minot Airport VORTAC.

2. Note the radial (magnetic course FROM Minot VORTAC) on which the plotted course lies (179°)
3. Determine the course TO Minot VORTAC by finding the reciprocal:

TO = FROM + 180°
TO = 179°+ 180°
TO = 359°

66. (Refer to Figure 44) What is your approximate position on low altitude airway Victor 1, southwest of Norfolk (area1), if the VOR receiver indicates you are on the 340° radial of Elizabeth City VOR (area3) ?

A. 15 nautical miles from Norfolk VORTAC.
B. 18 nautical miles from Norfolk VORTAC.
C. 23 nautical miles from Norfolk VORTAC.

Answer **(B)** is correct.
DISCUSSION: Use the following steps :
1. Plot the 340° radial from the Elizabeth City VOR to the point of intersection with V1. **Caution**: the numerals ”330” just inside the Elizabeth City compass rose (just to the left of the course line), refer to an obstruction high , not a VOR radial.
2. Measure the distance from Norfolk to the plotted intersection using the sectional scale of a plotter. the distance is 18 NM.

67. When the course deviation indicator (CDI) needle is centered during an receiver check using a VOR test signal (VOT), the Omni-bearing selector (OBS) and the TO/FROM indicator should read

A. 180° FROM, only if the pilot is due north of the VOT.
B. 0° TO or 180° FROM, regardless of the pilot's position from the VOT.
C. 0° FROM or 180° TO, regardless of the pilot's position from the VOT.

Answer **(C)** is correct.
DISCUSSION: To use the VOT service, tune in the VOT frequency on the VOR receiver. With the CDI centered, the OBS should read 0° with the TO/FROM indication showing "FROM" or the OBS should read 180° with the TO/FROM indication showing "TO".

68. (Refer to Figure 47-1) Determine the magnetic bearing TO the station

A. 030°
B. 180°
C. 210°

Answer **(C)** is correct.
DISCUSSION: The head of the needle indicates the magnetic bearing TO the station, which is 210°

69. (Refer to Figure 47-2) What magnetic bearing TO the station

A. 010°
B. 145°
C. 190°

Answer **(C)** is correct.
DISCUSSION: The nose of the needle indicates the magnetic bearing TO the station which is 190°.

70. (Refer to Figure 47-2) Determine the approximate heading to intercept the 180 bearing TO the station.

A. 040°
B. 160°
C. 220°

Answer **(C)** is correct.
DISCUSSION: To determine the intercept angle, turn to the inbound bearing and note degrees the needle is from the nose. Double this figure to get the intercept angle of 20°
180°+ 20° = 200
The only possible answer is 220° since the other true headings would not intercept the180° bearing to the station.

71. (Refer to Figure 47-3) What is the magnetic bearing from the station?

A. 025°
B. 115°
C. 295°

Answer **(B)** is correct.
DISCUSSION: The tail of the needle indicates the magnetic bearing FROM the station which is 115°

72. (Refer to Figure 47) which ADF indication represents the aircraft tracking TO the station with a right crosswind ?

A. 1
B. 2
C. 4

Answer **(C)** is correct.
DISCUSSION: Figure 47depicts ADF indications combined with aircraft heading information. In this case, the magnetic bearing To can be read under the nose of the needle and the bearing FROM can be read directly under the tail of the needle. Use the following steps :
1. Note which dials,#3 and #4, of Figure 47, show an aircraft proceeding toward the station.
2. A right crosswind (wind FROM the right) requires that the aircraft heading be to the right of the course to

compensate for drift to the left. With the nose of the aircraft to the right of the course, the station appears to be left on the nose, as shown on dial #4.

73. (Refer to Figure 47-1) What outbound bearing is the aircraft crossing ?

A. 030°
B. 150°
C. 180°

Answer **(A)** is correct.
DISCUSSION: The tail of the needle indicates the magnetic bearing FROM the station, which 030°

74. (Refer to Figure 48-1)The relative bearing TO the station is

A. 045°
B. 180°
C. 315

Answer **(C)** is correct.
DISCUSSION: On a fixed-scale (fixed-card) ADF, the nose of the aircraft is marked as 0°. The ADF indication is relative to aircraft heading, thus relative bearing may be read directly under the head of the needle, which is 315°.

75. (Refer to Figure 48-2) The relative bearing TO the station is

A. 090°
B. 180°
C. 270°

Answer **(A)** is correct.
DISCUSSION: On a fixed-scale (fixed-card) ADF, the nose of the aircraft is marked as 0°. The ADF indication is re-relative to aircraft heading, thus relative bearing may be read directly under the head of the needle, which is 090°.

76. (Refer to Figure 48-2) The relative bearing TO the station

A. 090°
B. 180°
C. 270°

Answer **(B)** is correct.
DISCUSSION: On a fixed-scale (fixed-card) ADF, the nose of the aircraft is marked as 0°. The ADF indication is relative to aircraft heading, thus relative bearing may be read directly under the head of the needle, which is 180°.

77. How many satellites make up the Global positioning System (GPS)?

A. 25.
B. 22.
C. 24.

Answer **(C)** is correct.
DISCUSSION: The GPS constellation of 24 satellites is designed so that a minimum of five are always observable by a user anywhere on earth.

78. What is the minimum number of global positioning system (GPS) satellites that are observable by a user anywhere on earth ?

A. 6.
B. 5.
C. 4.

Answer **(B)** is correct.
DISCUSSION: The GPS constellation of 24 satellites is designed so that a minimum of five are always observable by a user anywhere on earth.

79. How many global Positioning system (GPS) satellites are required to yield a three dimensional position (latitude, longitude, and altitude) and time solution ?

A. 5
B. 6
C. 6

Answer **(C)** is correct.
DISCUSSION: The GPS receiver uses data from a minimum of four satellites to yield a three-dimensional position (latitude, longitude and altitude) and time solution.

80. (Refer to Figure 47-1) What is the relative bearing TO the station ?

A. 030°
B. 210°
C. 240°

Answer **(C)** is correct.
DISCUSSION: Figure 47-1 depicts ADF indications combined with aircraft heading information, In this case, the magnetic bearing TO can be read under the nose of the needle and the bearing FROM can be read directly under the tail of the needle. Use the following steps:
1. The aircraft magnetic heading is 330°
2. The magnetic bearing TO the station is 210°
3. Calculate the relative bearing (RB):
   MB = MH + RB
   RB = 210° – 330°+ 360°
   RB = 240°

81. (Refer to Figure 47-2) what is the relative bearing TO The station ?

A. 190°
B. 235°
C. 315°

Answer **(B)** is correct
DISCUSSION: Figure 47-2 depicts ADF indications combined with aircraft heading information, In this case, the magnetic bearing TO can be read under the nose of the needle and the bearing FROM can be read directly under the tail of the needle . Use the following steps:
1. The aircraft magnetic heading is 315°.
2. The magnetic bearing TO the station is 190°.
3. Calculate the relative bearing (RB):
   MB = MH + RB
   RB = 190°– 315°+360°
   RB = 235°

82. (Refer to Figure 47-4) what is the relative bearing TO The station ?

A. 020°
B. 060°
C. 340°

Answer **(C)** is correct.
DISCUSSION: Figure 47-4depicts ADF indications combined with aircraft heading information, In this case, the magnetic bearing TO can be read under the nose of the needle and the bearing FROM can be read directly under the tail of the needle. Use the following steps:
1. The aircraft magnetic heading is 220
2. The magnetic bearing TO the station is 200°
3. Calculate the relative bearing (RB):
   MB = MH + RB
   RB = 200°– 220° + 360°
   RB = 340°

83. (Refer to Figure 48-4) On a magnetic heading of 320, The magnetic bearing TO the station is

Answer **(B)** is correct.
DISCUSSION: Use the following steps :

A. 005°
B. 185°
C. 225°

1. On a fixed-scale ADF, the aircraft heading is marked as 0°. The ADF indication is relative to the aircraft. heading, thus relative bearing (RB) may be read directly under the head of the needle (255°).
2. Calculate the magnetic bearing to the station at a magnetic heading of 320°.
MB = RB + MH
MB = 225°+ 320°= 545 - 360°
MB = 185°

84. (Refer to Figure 48-5) On a magnetic heading of 320, The magnetic bearing TO the station is

A. 035°
B. 180°
C. 215°

Answer **(A)** is correct.
DISCUSSION: Use the following steps :
1. On a fixed-scale ADF, the aircraft heading is marked as 0°. The ADF indication is relative to the aircraft. heading, thus relative bearing (RB) may be read directly under the head of the needle (000°).
2. Calculate the magnetic bearing to the station at a magnetic heading of 035°.
MB = RB + MH
MB = 0° + 035
MB = 035°

86. (Refer to Figure 48-6) On a magnetic heading of 120◦, The magnetic bearing TO the station is

A. 045°
B. 165°
C. 270°

Answer **(B)** is correct.
DISCUSSION: Use the following steps :
1. On a fixed-scale ADF, the aircraft heading is marked as 0° . The ADF indication is relative to the aircraft. heading, thus relative bearing (RB) may be read directly under the head of the needle (045°) .
2. Calculate the magnetic bearing to the station at a magnetic heading of 120°.
MB = RB + MH
MB = 045° + 120°
MB = 165°

85. (Refer to Figure 48-6) If the magnetic bearing TO the station is 240◦, the magnetic heading is

A. 045°
B. 105
C. 195°

Answer **(C)** is correct.
DISCUSSION: Use the following steps :
1. On a fixed-scale ADF, the aircraft heading is marked as 0°. The ADF indication is relative to the aircraft. heading, thus relative bearing (RB) may be read directly under the head of the needle (045°).
2. note that the magnetic bearing TO the station is 240°. Calculate the magnetic heading using :
MB = RB + MH
240°= 045°+ MH
MH = 240°- 045°= 195°

86. (Refer to Figure 48-7) If the magnetic bearing TO the station is 030◦, the magnetic heading is

A. 060°
B. 120°

Answer **(B)** is correct.
DISCUSSION: Use the following steps :
1. On a fixed-scale ADF, the aircraft heading is marked as 0°. The ADF indication is relative to the aircraft. heading, thus relative bearing (RB) may be read directly

C. 270°

under the head of the needle (270°).
2. note that the magnetic bearing TO the station is 030. Calculate the magnetic heading using :
MB = RB + MH
030= 270 + MH
MH = 030°- 270°+ 360°
MH = 120°

87. (Refer to Figure 48-8) If the magnetic bearing TO the station is 135, the magnetic heading is

A. 135°
B. 270°
C. 360°

Answer **(C)** is correct.
DISCUSSION: Use the following steps :
1. On a fixed-scale ADF, the aircraft heading is marked as 0°. The ADF indication is relative to the aircraft. heading, thus relative bearing (RB) may be read directly under the head of the needle (135°).
2. note that the magnetic bearing TO the station is 135°. Calculate the magnetic heading using :
MB = RB + MH
135= 135°+ MH
MH = 0°or 360°

88. The major components of a VOR indicator are the

A. HSI, CDI, and course selector.
B. HIS, CDI, and TO-FROM indicator.
C. CDI, DME, and TO-FROM indicator.
D. CDI, TO-FROM indicator, and course selector.

Answer **(D)** is correct
DISCUSSION: The VOR indicator has three different components which give you related navigation information . the components are the course deviation indicator (CDI), the TO-FROM indicator , and the course selector .

89. ……. The heading of the airplane has a direct Relationship to the radial selected on the VOR Indicator.

A. True
B. False

Answer **(B)** is correct
DISCUSSION: It is important to remember that the radial travel outward from the VOR station . The heading of the airplane has not a direct relationship to the radial selected on the VOR indicator .

90. If the CDI is deflected four dots to the right and your course Indicator and heading indicator are in general agreement, Your desired course is

A. 2° to the right.
B. 4° to the left.
C. 4° to the right.
D. 8° to the right.

Answer **(D)** is correct
DISCUSSION: When you are off course , the CDI points toward the desired course . The scale underneath the needle shows how far you are off course , with each dot on the scale representing course deviation off two degree.

91. When correcting toward the CDI in a reverse sensing Situation, you will

A. Parallel the radial.
B. Fly closer to the radial.
C. Fly further away from the radial.
D. Stay the same distance from the radial.

Answer **(C)** is correct
DISCUSSION: If you mistakenly set your course selector to the reciprocal of the desired course, your CDI will be deflected away from the course you want to follow . this situation is known as reverse sensing .

92. When you are conducting a VOR check with a VOT And the CDI centers, the course selector and TO-FROM indicator should read

A. 0° TO.
B. 180° FROM.
C. 0° TO or 180° FROM , depending on your position from The VOT.
D. 0° FROM or 180° TO, regardless of your position from the VOT.

Answer **(D)** is correct
DISCUSSION: A VOT check using a course of 180° should center the CDI and give you a TO indication. Using 0° should center the CDI and give you a FRO indication.

93. A VORTAC facility provides you with

A. Course guidance only.
B. Distance information only.
C. Nautical mile distance information only.
D. Course guidance and distance information.

Answer **(D)** is correct
DISCUSSION: The VORTAC facility provides you with course guidance and distance information.

94. The most accurate DME groundspeed readings occur when Traveling

A. Directly to the station only.
B. Directly from the station only.
C. Directly to or from the station.
D. At a 90° angle to the station.

Answer **(C)** is correct
DISCUSSION: The ground speed reading is accurate only when you are travelling directly to or from the station. Flight in any other direction will give you an unreliable reading.

95. DME measures

A. Magnetic course.
B. Vertical distance.
C. Horizontal distance.
D. Slant range distance.

Answer **(D)** is correct
DISCUSSION: DME measures slant range distance , not horizontal distance . slant range distance is the results of two components , the horizontal distance and vertical distance.

96. When you are tuning a VOR/DME or VORTAC facility The absence of the single-coded identification every 30 second indicates.

A. The DME is not operational.
B. The VOR is not operational.
C. The system is working correctly.
D. Your receiver is not operational.

Answer **(A)** is correct
DISCUSSION: The absence of the single-coded identification signal every 30 seconds means the DME is not operational.

97. ADF equipment is capable of receiving signals from

A. Any FM radio station.
B. Only AM radio station.
C. Specially equipped VOR or VORTAC station.
D. NDBs and commercial broadcast stations.

Answer **(D)** is correct
DISCUSSION: ADF equipment allows you to navigate using NDBs and commercial broadcast stations .

98. ……. The ADF receiver will give an OFF indication if the station signal is unreliable.

A. True
B. False

Answer **(B)** is correct
DISCUSSION: Always use the test function to verify that the bearing pointer is responding to a reliable signal . The ADF receiver will not give an OFF indication if the station signal is unreliable.

99. VORTAC-based RNAV systems allow you more lateral freedom because

A. The data base identifies surrounding airports
B. The signals radiate from satellites in space.
C. You do not have to tune and identify the station.
D. You do not have to track directly to or from navigations facilities.

Answer **(D)** is correct
DISCUSSION: Area navigation (RNAV) allows you more lateral freedom in navigation , because it does not require you to track directly to or from navigation facilities.

100. The main component for VORTAC-based RNAV is the

A. TACAN receiver.
B. LORAN receiver.
C. Course line computer.
D. Flight management computer.

Answer **(C)** is correct
DISCUSSION: VOTRAC- based RNAV uses a course-line Computer (CLC) which permits you to create ""phantom Station " for use in navigation.

101. When you are using a VORTAC-based RNAV system The needle deflections on the VOR indicator show course deviation in terms of

A. Degrees.
B. Radials.
C. Statute miles.
D. Nautical miles.

Answer **(D)** is correct
DISCUSSION: Another desirable RNAV feature is that you navigate using the VOR indicator . With RNAV , the needle deflections still indicate course displacement , but the deviation scale is in nautical miles and not dot degrees.

102. ……. The sky waves formed by the low frequency LORAN transmitters are not considered as reliable for navigation as the ground waves.

A. True.
B. False.

Answer **(A)** is correct
DISCUSSION: Sky waves are formed by LORAN signals but are not considered as reliable for navigation as ground waves .

103. A LORAN chain is composed of stations designated as

A. AM and FM.
B. High and low.
C. Main and auxiliaries.
D. Master and Secondary's.

Answer **(D)** is correct
DISCUSSION: In a typical LORAN chain , one transmitter is the master and two or more other are called secondary's.

104. The global positioning system (GPS) provides horizontal accuracy for civil user of approximately

A. 100 feet.
B. 328 feet.
C. 300 meters.
D. 328 meters.

Answer **(B)** is correct
DISCUSSION: System accuracy for civil users is approximately 328 feet (100 meters) horizontally.

105. …….. One disadvantage of the GPS is that it is adversely affected by electrical disturbances such as thunderstorms and precipitation static.

A. True.
B. False.

Answer **(B)** is correct
DISCUSSION: One advantage of the GPS is that it is free from any affected by electrical disturbances such as thunderstorms and precipitation static.

106. The radio magnetic indicator, or RMI, is usually composed of a single-bar needle, double-bar needle.

A. And a fixed compass card.
B. And a slaved compass card.
C. Ambiguity indicator , and a fixed compass card.
D. A TO-FORM indicator , and a slaved compass card.

Answer **(B)** is correct
DISCUSSION: The radio magnetic indicator combines the heading indicator with two bearing pointers.

107. The RMI is oriented toward.

A. True north.
B. Magnetic north.
C. Relative north.
D. The nose of the aircraft.

Answer **(B)** is correct
DISCUSSION: The RMI is oriented toward magnetic north. The number under the tail of each needle indicates the magnetic bearing from the appropriate station.

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CHAPTER 8

AVIATION PHTSIOLOGY

- **Vision in Flight**
- **Spatial Disorientation**
- **Respiration and Altitude**
- **Alcohol, Drugs, and Performance**

1. In Bright light, the best vision is obtained by looking

A. Directly at the object.
B. Off center of the object.
C. With quick scanning motions.
D. With your peripheral vision.

Answer **(A)** is correct.
DISCUSSION: The best vision in day light is obtained by looking directly at the object.

2. To see an object most clearly at night, you should look.
A. directly at the object.
B. 5◦ to 10 ◦ away from the object.
C. 45◦ away from the object.
D. In quick scanning movements.

Answer **(B)** is correct.
DISCUSSION: To see an object clearly at night, you must expose the rods to the image. This is accomplished by looking 5° to 10° off center of the object you want to see.

3. What part of the retina is most active during periods of darkness ?

A. The entire retina.
B. Fovea.
C. Roads.
D. Cones.

Answer **(C)** is correct.
DISCUSSION: The rods are our dim light and night receptors and are concentrated outside the fovea area.

4. If you look directly at an object at night, you will see it ?

A. Less clearly because there are no as many cones as rods.
B. Less clearly because the fovea is a night blind-spot.
C. More clearly because it is focused in the fovea.
D. More clearly because rods see better in the dark.

Answer **(B)** is correct.
DISCUSSION: Since the cones do not see well in the dark, you may not be able to see an object if you look directly at it. The concentration of cones in the fovea can make a nigh blind-spot At the center of your vision.

5. Before a night fight, you should avoid bright lights for at least _____ minutes.

A. 15
B. 30
C. 45
D. 60

Answer **(B)** is correct.
DISCUSSION: Bright lights should be avoided for at least 30 minutes before a night flight.

6. The cockpit light color that best preserves your dark adaptation is _____ light .

A. Green.
B. Yellow.
C. Red.
D. Blue.

Answer **(C)** is correct.
DISCUSSION: Red cockpit lighting enhances dark adaptation, while regular white light, such as that from a flash light, impairs your night adaptation.

7. _____ , Aeronautical charts are easier to read under red cockpit lighting.

A. True
B. False

Answer **(B)** is correct.
DISCUSSION: Red light severely distorts some colors, especially those found on aeronautical charts.

8. During a night flight, you see a steady red light and a flashing red light ahead, the other aircraft is

A. Crossing from right to left.
B. Crossing from left to right.
C. Approaching head on.
D. Headed away from you.

Answer **(A)** is correct.
DISCUSSION: When you see a steady red light and a flashing red light ahead, the other aircraft is crossing from right to left.

9. During a night flight, you see a steady white light, a steady green light, and a flashing red light. the other aircraft is

A. Approaching head on.
B. Approaching, but will pass from right to left.
C. Flying away from you and will cross from left to right.
D. Flying away from you and will cross from right to left.

Answer **(C)** is correct.
DISCUSSION: When you see a steady white light, a steady green light, and a flashing red light, the other aircraft is Flying away from you and will cross from left to right.

10. The three primary senses used in maintaining balance are the _____, _____, and _____.

A. Visual.
B. Vestibular.
C. Kinesthetic.
D. All

Answer **(D)** is correct.
DISCUSSION: your awareness of your body's position is a result of input from three main senses : visual, vestibular, and kinesthetic.

11. The sense that we rely on most for orientation is _____ sense.

A. Vestibular.
B. Kinesthetic.
C. Visual.
D. Saccule.

Answer **(C)** is correct.
DISCUSSION: you need to rely heavily on your visual sense to interpret flight environment.

12. The two sensory organs in the inner ear responsible for vestibular sense are the _____and the_____.

A. Utricle.
B. Saccule.
C. Vestibule.
D. Semicircular canals, vestibule (static organ)

Answer **(D)** is correct.
DISCUSSION: The semicircular canals and the vestibule referred to as the static organ), located in your inner (sometimes ear, are primarily responsible for your vestibular sense.

13. _____ The utricle and the saccule organs differentiate between G-loads and gravity.

A. True.

Answer **(B)** is correct.
DISCUSSION: The utricle and saccule organs within the vestibule are responsible for the perception of linear acceleration, which is movement forward and back, side to side, and up and down.

B. False.

one of the major problems with this sensory organ is its inability to tell the difference between gravity caused by the earth and G-loads caused by centrifugal force.

14. Spatial disorientation may be defined as

A. A physiological illness of the inner ear.
B. An incorrect mental image of where you are on the map.
C. An incorrect mental image of you r position, altitude or movement in space.
D. An incorrect mental image caused exclusively by fatigue and anxiety.

Answer **(C)** is correct.
DISCUSSION: Spatial disorientation is an incorrect mental image of your position, attitude, or movement in relation to what is actually happening to your airplane.

15.Spatial disorientation will most likely occur if a pilot

A. Ignores the kinesthetic sense.
B. Uses body signals to interpret flight altitude.
C. Ignores the sensations of muscles and inner ear.
D. Cross checks the instrument panel with eye movement.

Answer **(B)** is correct.
DISCUSSION: spatial disorientation is an incorrect mental image of your position, attitude, or movement in relation to what is actually happening to your airplane.

16. Spatial disorientation most commonly occurs during

A. Daylight hour.
B. Periods of low visibility
C. Flight at high altitude and is related to hypoxia.
D. Rapid acceleration or deceleration , regardless of the weather conditions.

Answer **(B)** is correct.
DISCUSSION: spatial disorientation is most common at night and during times of restricted visibility.

17. If you become spatially disoriented, you should

A. Reduce power and slow the aircraft.
B. Concentrate on the flight instruments.
C. Concentrate on visual cues outside the aircraft.
D. Control the airplane by relying on your kinesthetic sense.

Answer **(B)** is correct.
DISCUSSION: relay on the instruments and believing what they tell you, regardless of how it feels, are the keys to maintaining spatial orientation.

18. During acceleration, if you experience the overwhelming sensation that you are in a nose-high attitude, even though you are in straight-and-level-flight, you are experiencing the

A. Coriolis illusion.
B. Somatogravic illusion.
C. Inversion sensation.
D. False horizon illusion.

Answer **(B)** is correct.
DISCUSSION: a rapid acceleration or deceleration can cause a somatogravic illusion. An acceleration can produce the illusion that you are in a nose-high attitude, even though You are still in straight -and-level flight.

19. Vertigo caused by sunlight shining through a rotating propeller is called _____.

Answer **(D)** is correct.
DISCUSSION: Flicker vertigo can happen when the sun is behind is behind you, reflecting off the propeller.

A. Inversion Illusion.
B. Leans.
C. Coriolis illusion.
D. Flicker vertigo.

20. Inhaled oxygen is carried to the cells of your body by attaching to _____ in your bloodstream.

A. Hemoglobin.
B. Lungs
C. Vessels.

Answer **(A)** is correct.
DISCUSSION: Inhaled oxygen is diffused through the lungs into the bloodstream, where it attaches to hemoglobin.

21. A condition where there is a lack of oxygen in your body because there is not enough oxygen in the air is referred to as

A. Anemic hypoxia.
B. Hypoxic hypoxia.
C. Hyperventilation.
D. Carbon monoxide poisoning.

Answer **(B)** is correct.
DISCUSSION: Hypoxia is a state of oxygen deficiency in the body.

22. One of the early symptoms of hypoxia is

A. Unconsciousness.
B. Impaired judgment.
C. A feeling of euphoria.
D. Blue-colored fingernails.

Answer **(B)** is correct.
DISCUSSION: Impaired judgment is an early symptom of hypoxia. It can occur at lower altitudes as well as at higher altitudes. Do not wait for the symptoms; anticipate them and use supplemental oxygen.

23. The part of the body that is unusually the first affected by oxygen deprivation is the _____.

A. Pupil.
B. Cones
C. Rods.
D. Retina.

Answer **(D)** is correct.
DISCUSSION: The part of the body that is first affected by oxygen deprivation is the retina of the eye.

24. The time you have to make a rational and lifesaving decision following a lack of oxygen at a given altitude is known as the time of _____ _____.

A. Useful consciousness.
B. useful unconsciousness.
C. Euphoria.
D. Impaired judgment.

Answer **(A)** is correct.
DISCUSSION: The time of useful consciousness is the maximum time you have to make a rational, life-saving decision And carry it out following a lack of oxygen at given altitude.

25. _____, Carbon monoxide poisoning produces a state of anemic hypoxia in the body.

Answer **(A)** is correct.
DISCUSSION: Carbon monoxide poising produces a state of anemic hypoxia in the body.

A. True
B. False.

26. Breathing large amounts of carbon monoxide can result in

A. A warm sensation.
B. Loss of muscle power.
C. An increased sense of well-being.
D. Tightness across the forehead and neck.

Answer **(B)** is correct.
DISCUSSION: Carbon monoxide robs the body of oxygen by attaching to the hemoglobin and reducing the oxygen carrying capacity of the blood. Large accumulations of CO result in a loss of muscular power.

27. Susceptibility to carbon monoxide poisoning increases as

A. Altitude decreases.
B. Altitude increases.
C. Temperature increases.
D. Air pressure increases.

Answer **(B)** is correct.
DISCUSSION: Susceptibility to carbon monoxide poisoning increases as altitude increases.

28. In order to avoid hypoxia, you should

A. Breathe slowly and deeply.
B. Avoid hyperventilating by breathing into a paper bag.
C. Rely on knowing your own personal symptoms to serve as a warning.
D. Not fly above 10,000 feet MSL for extended periods of time without using supplemental.

Answer **(D)** is correct.
DISCUSSION: To avoid the effects of hypoxia, do not fly for prolonged periods above 10,000 feet MSL, during the day or 5,000 feet MSL at night without breathing supplemental oxygen.

29.When flying at night, you may experience symptoms of hypoxia as low as

A. 5,000 feet MSL.
B. 10,000 feet MSL.
C. 12,000 feet MSL.
D. 14,000 feet MSL.

Answer **(A)** is correct.
DISCUSSION: To avoid the effects of hypoxia, do not fly for prolonged periods above 10,000 feet MSL, during the day or 5,000 feet MSL at night without breathing supplemental oxygen.

30. whenever you are replenishing an aircraft's oxygen system, always use _____ oxygen.

A. Environmental.
B. Medical breathing.
C. Aviator's breathing.

Answer **(C)** is correct.
DISCUSSION: Use only aviator's breathing oxygen to fill aircraft oxygen cylinders.

31.Rapid and deep breathing , even when you are using supplemental oxygen, can cause a condition known as

A. The "bends."
B. Anemic hypoxia.
C. Hypoxic hypoxia.
D. Hyperventilation.

Answer **(D)** is correct.
DISCUSSION: rapid or extra deep breathing can cause hyperventilation. It can occur even while breathing supplemental oxygen.

32. Which condition would most likely result in hyperventilation ?

A. Excessive consumption of alcohol.
B. Emotional tension, anxiety, or fear.

Answer **(B)** is correct.
DISCUSSION: Some of the symptoms of hyperventilation include:
1. Dizziness.
2. Tingling of the fingers and toes.

C. An extreme case of relation or sense of well-being.
D. A very slow rate of breathing with insufficient oxygen intake.

3. Muscle spasms.
4. Coolness.
5. Drowsiness.
6.Weakness or numbness.
7. Rapid heart rate.
8. Apprehension and mental confusion.
9. Finally, loss of consciousness.

33. To overcome the symptoms of hyperventilation, you can

A. Breathe more oxygen.
B. Monitor your flight instruments.
C. Use over-the-counter medications.
D. Slow your breathing rate, breathe into a bag, or talk out loud.

Answer **(D)** is correct.
DISCUSSION: The treatment for hyperventilation involves restoring the proper carbon dioxide level in the body. Breathing normally is both the beast prevention and the best cure for hyperventilation. In addition to slowing the breathing rate, you also can breathe into a paper bag or talk aloud to to overcame hyperventilation.

34. _____, As you descend, the pressure in your ear canal and throat becomes lower than the pressure in your middle ear.

A. True
B. False

Answer **(B)** is correct.
DISCUSSION: As you descend, the pressure in your ear canal and throat becomes lower than the pressure in your middle ear.

35. The method of relieving pressure on the eardrum by holding your nose and mouth closed and forcing air into the middle ear is referred to as the _____ technique.

A. Yawning.
B. Swallowing.
C. Valsalva.
D. Chewing.

Answer **(C)** is correct.
DISCUSSION: Air can also be forced into the middle ear by holding your nose and mouth shut and attempting to blow air gently into your nostrils.

36. After a dive requiring a decompression stop, scuba divers should wait at least _____ hour before flying.

A. 12.
B. 48.
C. 24.
D. 8.

Answer **(C)** is correct.
DISCUSSION: After a dive requiring a decompression stop. Scuba divers should wait at least 24 hour before flying.

37. The main effect of depressant drugs is to

A. Erode self-confidence.
B. Stimulate bodily functions.
C. Slow down bodily functions
D. Cause carbon monoxide poisoning at lower altitude.

Answer **(C)** is correct.
DISCUSSION: Depressants slow your motor responses and mental processes.

38. The most widely and commonly used depressant drug is _____.

A. Alcohol.
B. Caffeine.

Answer **(A)** is correct.
DISCUSSION: Ethyl alcohol is the most widely used and abused drag. although some alcohol is used for medicinal purposes, The majority of it is consumed as a beverage.

C. Nicotine.

39. The amount of oxygen absorbed into your bloodstream is reduced by _____.

A. Caffeine.
B. Alcohol.
C. Non-alcohol beverage.
D. Asprine.

Answer **(B)** is correct.
DISCUSSION: Alcohol reduces the amount of oxygen absorbed into your blood stream.

40. With reference to alcohol consumption and flying, ICAOs require that

A. 12 hours pass between drinking and flying.
B. 12 hours pass between drinking and flying , and your blood alcohol level be .04% or less.
C. either 8 hours pass between drinking and flying, or your blood alcohol be less than .04%.
D. 8 hour pass between drinking and flying, and your blood alcohol level be less than .04%.

Answer **(D)** is correct.
DISCUSSION: ICAO regulations require that your blood alcohol level be below .4% and that at least eight hours pass between bottle and throttle.

41. When you consume alcohol, your "physiological altitude" _____ .

A. Increases.
B. Decreases.

Answer **(A)** is correct.
DISCUSSION: When you drink, your physiological altitude is much higher than your actual altitude.

42. Motion sickness medications should not be used when you are pilot in an aircraft, because they often contain

A. Alcohol.
B. Sedatives.
C. Stimulants.
D. Anticholinergics.

Answer **(B)** is correct.
DISCUSSION: these type of drugs often contain sedatives that can cause drowsiness and decreased alertness.

43. Antihistamines and decongestants are sometimes dangerous to use while flying because they cause _____.

A. Restlessness.
B. Anxiety.
C. Panic.
D. Drowsiness.

Answer **(D)** is correct.
DISCUSSION: These drugs often cause drowsiness and slowed motor response and can be very hazardous to use when flying.

44. Two commonly used stimulant drugs that are not prohibited by ICAOs are _____ and _____.

A. Alcohol , Drags.
B. Nicotine, Caffeine.

Answer **(B)** is correct.
DISCUSSION: Although caffeine and nicotine use are not prohibited by the regulation, you should use they in moderation to avoid the side effects.

C. Amphetamines, Caffeine.
D. Drags. Nicotine.

45. Due to the increased level of carbon monoxide in their blood-streams, smokers are much more susceptible to the effects of _____.

A. Hypoxia.
B. Paranoia.
C. Hyperventilation.
D. Halluninations.

Answer **(A)** is correct.
DISCUSSION: Smoker increases the level of carbon monoxide In your bloodstream and increases the chance of hypoxia.

46. The physiological altitude of a smoker is raised from sea level to about

A. 5,000 feet.
B. 7,000 feet.
C. 10,000 feet.
D. 12,000 feet.

Answer **(B)** is correct.
DISCUSSION: If you are a regular smoker, you carry a carbon monoxide level of about 5% in your blood stream. This raises your physiological altitude from sea level to about 7,000 feet.

47. What general statement is applicable for flying after you have had dental treatment ?

A. Flying within 48 hour of a minor dental procedure is not recommended.
B. You should not fly after undergoing dental treatment without authorization from an aviation medical examiner.
C. Because of the depressant effect of local anesthetics, you should not fly within 24 hours of a dental treatment.
D. Most local anesthetics wear of shortly after treatment, but the dental procedure itself and the subsequent pain may preclude flight operations.

Answer **(D)** is correct.
DISCUSSION: Most local anesthetics wear of shortly after treatment, but the dental procedure itself and the subsequent pain may preclude flight operations.

48. A person may not act as a crewmember of a civil aircraft if alcoholic beverages have been consumed by that person within the preceding.

A. 8 hours.
B. 12 hours.
C. 24 hours.

Answer **(A)** is correct.
DISCUSSION: No person may act or attempt to act as a crewmember of a civil aircraft within 8 hours after the consumption of any alcoholic beverage.

49. In the dark , a stationary light will appear to move when stared at for a period of time. This illusion is known as

A. Somatogravic illusion.
B. Ground lighting illusion.
C. Auto-kinesis.

Answer **(C)** is correct.
DISCUSSION: In the dark, a stationary light will appear to move about when started at for many seconds. then illusion is known as auto-kinesis.

50. What is the effect of alcohol consumption on functions of the body ?

A. Alcohol has an adverse effect , especially as altitude

Answer **(A)** is correct.
DISCUSSION: The adverse effect of alcohol is greatly multiplied when a person is exposed to altitude. Two drinks on the ground are

increases.
B. Small amount of alcohol in the human system increases judgment and decision-making abilities.
C. Alcohol has little effect if followed by equal quantities of black coffee.

equivalent to three or four at altitude.

51. When making an approach to a narrower-than usual runway , without VASI assistance , the pilot should be aware that the approach .

A. Altitude may be higher than it appears.
B. Altitude may be lower than it appears.
C. May result in leveling off too high and landing hard.

Answer **(B)** is correct.
DISCUSSION: An approach to a narrower-than usual runway can create the illusion that the aircraft is higher than it actually is.

52. When making a landing over darkened of featureless terrain such as water or snow, a pilot should be aware of the possibility illusion. The approach may appear to be too

A. High.
B. Low.
C. Shallow.

Answer **(A)** is correct.
DISCUSSION: An absence of ground features, when landing over water , darkened areas and terrain made featureless by snow, can create the illusion that the aircraft is at a higher altitude than it actually is.

53. The illusion of being in a nose up altitude which may occur during rapid acceleration take off is known as

A. Inversion illusion.
B. Auto-kinesis.
C. Somatogravic illusion.

Answer **(C)** is correct.
DISCUSSION: A rapid acceleration during takeoff can create the illusion of being in a nose-up altitude. This is known as a Somatogravic illusion

54. What is the most effective way to use the eyes during night flight ?

A. Look only at far away ,dim lights.
B. Scan slowly to permit off center viewing.
C. Concentrate directly on each object for a few second.

Answer **(B)** is correct.
DISCUSSION: One should scan slowly at night to permit off-center viewing of dim objects.

55. Which observed target aircraft would be of most concern with respect to collision avoidance ?

A. One which appears to be ahead and moving from left to right at high speed.
B. One which appears to be ahead and moving from right to left at slow speed.
C. One which appears to be ahead with no lateral or vertical movement and is increasing in size.

Answer **(C)** is correct.
DISCUSSION: Any aircraft that appears to have no relative motion and stay in one scan quadrant is likely to be on a collision course. If a target shows no lateral or vertical motion, but increases in size, take evasive action.

56. Scanning procedures for effective collision avoidance should constitute.

Answer **(A)** is correct.
DISCUSSION: Studies show that the time a pilot spends on visual tasks inside the cabin should re-

A. Looking outside for 15 seconds, then inside for 5 seconds, then repeat.
B. 1 minute inside scanning , then 1 minute outside scanning, then , repeat.
C. Looking outside every 30 second except in radar contact when outside scanning is unnecessary.

present no more than 1/4 to 1/3 of the scan time outside, or no more that 4 to 5 seconds on the instrument panel for every 16 seconds outside.

57. When using the Earth's horizon as a reference point to determine the relative position of other aircraft, most concern would be for aircraft.

A. Above the horizon and increasing in size.
B. On the horizon with little relative movement.
C. On the horizon and increasing in size.

Answer **(C)** is correct.
DISCUSSION: Any aircraft that appears to have no relative motion and stays in one scan quadrant likely to be on a collision course. If a target shows no lateral or vertical motion, but increases in size take evasive action.

58. A pilot is more subject to spatial disorientation when

A. Ignoring or overcoming the sensation of muscles and inner ear.
B. Eyes are moved often in the process of cross checking the flight instruments.
C. Body sensations are used to interpret flight altitudes.

Answer **(C)** is correct.
DISCUSSION: When seated on an unstable moving platform at altitude, with your vision cut off from the earth, horizon or other fixed reference, you are susceptible to misinterpreting certain body sensations caused by angular accelerations.

59. Which procedure recommended to prevent or overcome spatial disorientation ?

A. Reduce head and eye movement to the greatest possible extent.
B. Rely on the kinesthetic sense.
C. Rely entirely on the indications of the flight instruments.

Answer **(C)** is correct.
DISCUSSION: The best method to prevent or overcome spatial disorientation is rely entirely on the indications of the flight instruments.

60. While making prolonged constant rate turns under IFR conditions, an abrupt head movement can create the illusion of rotation on an entirely different axis. This is known as

A. Autoi-kinesis.
B. Coriolis illusion.
C. The leans.

Answer **(B)** is correct.
DISCUSSION: An abrupt head movement making a prolonged constant rate turn, can produce a strong sensation of rotation movement in an entirely different axis. the phenomenon is known as Coriolis illusion.

61. Haze can give the illusion that the aircraft is

A. Closer to the runway than it actually is.
B. Farther from the runway than it actually is.
C. The same distance from the runway as when there is no restriction to visibility.

Answer **(B)** is correct.
DISCUSSION: Atmospheric haze can create an illusion of being at a greater distance from the runway than you actually are.

62. Sudden penetration of fog can create the illusion of

A. Pitching up.
B. Pitching down
C. Leveling off.

Answer **(A)** is correct.
DISCUSSION: Penetration of fog can create an illusion of pitching up.

63. What illusion , if any, can rain on the windscreen create ?

A. Does not cause illusion .
B. Lower than actual.
C. Higher than actual.

Answer **(C)** is correct.
DISCUSSION: Rain on the windscreen can create an illusion of being at a higher altitude than you are.

64. what is the symptom of carbon monoxide poisoning ?

A. Rapid, shallow breathing.
B. Pain and cramping of the hands and feet.
C. Dizziness.

Answer **(C)** is correct.
DISCUSSION: Carbon monoxide poisoning produces the same symptoms as hypoxia, which included dizziness.

65. Which would most likely result in hyperventilation ?

A. A stressful situation causing anxiety.
B. The excessive consumption of alcohol
C. An extremely slow rate of breathing and insufficient Oxygen

Answer **(A)** is correct.
DISCUSSION: You are most likely to hyperventilation when under stress or a high altitude.

66. What causes hypoxia ?

A. Excessive carbon dioxide in the atmosphere.
B. An increase in nitrogen content of the air at high altitudes.
C. A decrease of oxygen partial pressure.

Answer **(C)** is correct.
DISCUSSION: Low partial pressure of oxygen causes hypoxia.

67. Which is a common symptom of hyperventilation ?

A. Tingling of the hands, leg, and feet.
B. Increased vision keenness.
C. Decreased breathing rate.

Answer **(A)** is correct.
DISCUSSION: Symptoms of hyperventilation include dizziness tingling of the extremities, sensation of body heat, rapid heart rate, blurring of vision, muscle spasm and , finally unconsciousness.

68. Loss of cabin pressure may result in hypoxia because as cabin altitude increases

A. The percentage of nitrogen in the air is increased.
B. The percentage of oxygen in the air is decreased.
C. Oxygen partial pressure is decreased.

Answer **(C)** is correct.
DISCUSSION: Low partial pressure of oxygen causes hypoxia.

69. Hypoxia is the result of which of these conditions ?

A. Insufficient oxygen reaching the brain .
B. Excessive carbon dioxide in the bloodstream.
C. Limited oxygen reaching the heart muscles.

Answer **(A)** is correct.
DISCUSSION: Hypoxia is a result of too little oxygen reaching the brain.

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CHAPTER 9

FLIGHT PLANNING AND DECISION MAKING

- **Planning and Organizing Flights**
- **Factors Affecting Decision Making**

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CHAPTER 10

REGULATIONS

- **Annex II**
- **Annex III**
- **Annex VI**
- **Annex X**
- **Annex XI**
- **AIP**

1. Aerodrome traffic includes all the traffic:

A. On the movement area.
B. On the maneuvering area of an aerodrome.
C. Flying in the vicinity of an aerodrome.
D. Both B and C are correct.

Answer **(D)** is correct.
DISCUUSION: Refer to Annex 2; Chapter 1-Definitions.

2. Air traffic advisory service is provided within advisory airspace to ensure separation between:

A. Aircraft which are operating on IFR flight plans.
B. Aircraft which are operating on special VFR and VFR flight plans.
C. Aircraft which are operating on VFR and IFR flight plans.

Answer **(A)** is correct
DISCUSSION: Refer to Annex 2; Chapter 1-Definitions.

3. …… is provided to notify appropriate organizations regarding aircraft in need of search and rescue air.

A. Advisory service.
B. Alerting service.
C. Area control service.
D. Surveillance service.

Answer **(B)** is correct.
DSCUSSION: Refer to Annex 2; Chapter 1-Definitions.

4. A controlled airspace extending upwards from a specified limit above the earth is called a:

A. Control zone.
B. Control area.
C. Control center.
D. Terminal control area.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 1-Definitions.

5. A controlled airspace extending upwards from the surface of the earth to a specified upper limit is called a:

A. Terminal control area.
B. Control area
C. Control zone.
D. Control center.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 1-Definitions.

6. The estimated time required from take-off to arrive over the destination aerodrome is called:

A. The total estimated elapsed time.
B. The estimated flight time.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 1-Definitions.

C. The estimated off-block time.
D. The estimated en-route time.

7. …… is responsible for the operation of the aircraft in accordance with the rules of the air.

A. The air traffic control unit.
B. The pilot-in-command.
C. The operation manager.
D. The person manipulating the controls

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 2 -2.3.1

8. Who has the final authority as to the disposition of the aircraft while in command.

A. The chief pilot.
B. The flight operations department.
C. The air traffic controller.
D. The pilot-in-command.

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 2 -2.4

9. What separation shall be maintained from the flight leader by each aircraft in a formation flight?

A. A distance not exceeding 500 meters laterally and longitudinally and 30 meters vertically.
B. A distance not exceeding 1000 meters laterally and longitudinally and 100 meters vertically.
C. A distance not exceeding 0.5 NM laterally and longitudinally and 100 feet vertically.
D. A distance of 1 km laterally and longitudinally and 30 feet vertically.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.1.8

10. When two aircraft are approaching head-on or nearly so and category are converging at approximately the same level?

A. Both aircraft must alter their headings to the right.
B. The faster aircraft shall give way.
C. The aircraft that has the other on is right shall give way.
D. The aircraft that has the other on its left shall give way.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.2.2.2

11. Which aircraft has the right-of-way over the aircraft listed below?

A. airplane.
B. Balloon.
C. Glider.
D. Airship.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 3.2.2.3

12. Which converging aircraft has the right-of-way over the other aircraft listed below?

A. Aircraft towing another aircraft.
B. Airship.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.2.2.3

C. Rotorcraft.
D. Airplane.

13. An airplane and a glider are converging. The glider has the airplane on its right. Which aircraft has the right of way?

A. Both should alter their headings to the right.
B. The glider.
C. The airplane.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.2.2.3

14. Which of the following statements, concerning the right-of-way is correct when two or more heavier-than-air aircraft are approaching an aerodrome for the purpose of landing?

A. Aircraft at the lower level shall give way to the aircraft at the higher level.
B. Aircraft at the higher level shall give way to the aircraft at the lower level.
C. An aircraft on final approach shall give way to on aircraft on downwind leg.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.2.2.5.2

15. Which lights must be displayed by all aircraft in flight between sunset and sunrise

A. Navigation lights and anti-collision lights.
B. Anti-collision lights and landing lights
C. Navigation lights and landing lights.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.2.3.1

16. Unless otherwise prescribed by the appropriate ATS authority, a flight plan for a flight to be provided with air traffic control service or air traffic advisory service shall be submitted:

A. At least 15 minutes before departure.
B. At least 30 minutes before departure.
C. At least 60 minutes before departure.
D. At least 90 minutes before departure.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.3.1.4

17. You shall notify the appropriate air traffic services unit if the average true airspeed at cruising level between reporting points varies or is expected to be varies by:

A. Plus or minus 10 %.
B. Plus or minus 15 %.
C. 5 knots.
D. Plus or minus 5%.

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 – 3.6.2.2.b

18. When operating under visual flight rules in class D airspace at altitudes above 10000 feet AMSL, you must maintain a vertical distance of at least ……. from clouds.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.9 – table 3-1

A. 1500 feet.
B. 300 feet.
C. 1000 feet.
D. 1000 meters.

19. When flying under visual flight rules in class C airspace at altitudes below 10000 feet AMSL and above 3000 feet AMSL, or 1000 feet above terrain, whichever is the higher, you must maintain a horizontal distance of at least …… from clouds.

A. 5 kilometers.
B. 1500 meters.
C. 1000 feet.
D. 2000 feet.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2 – chapter 3 – 3.9 – table 3-1

20. To fly under VFR in class D airspace at or below 3000 feet AMSL, or 1000 feet above terrain, whichever is the higher, the flight visibility must be at least:

A. 5 kilometers.
B. 5 nautical miles.
C. 8000 meters.
D. 1500 meters.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.9 – table 3-1

21. To fly under VFR in class G airspace at and below 3000 feet AMSL or 1000 feet above terrain, whichever is the higher, you must:

A. Maintain a horizontal distance of at least 1500 meters from clouds.
B. Maintain a vertical distance of at least 1500 meters from the clouds.
C. Maintain a horizontal distance of at least 1500 feet from clouds.
D. Remain clear of clouds and insight of the surface.

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.9 – table 3-1

22. To fly under VFR in class C airspace at and above 10000 feet AMSL, the flight visibility must be at least:

A. 5000 meters.
B. 8000 meters.
C. 1500 meters.
D. 3000 meters.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.9 – table 3-1

23. What is the required minimum distance from clouds for VFR flights in class G airspace at and above 10000 feet MSL?

A. 1500 meters horizontally, and 300 feet vertically

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 -3.9- table 3-1.

from clouds.
B. 1500 feet vertically, and 1000 feet horizontally from clouds.
C. Remain clear of clouds and insight of the surface.
D. 1500 meters horizontally, and 1000 feet vertically from the clouds.

24. Except when a clearance is obtained from an air traffic control unit no VFR flight may take-off or land at an aerodrome within a control zone, or enter the aerodrome traffic zone or traffic pattern when:

A. The ceiling is less than 1000 ft, and the ground visibility is less than 3 km.
B. The ceiling is less than 1500 ft, and the ground visibility is less than 5 statute miles.
C. The ceiling is less than 1500 ft, and the ground visibility is less than 5 km.
D. The ceiling is less than 450 ft, and the ground visibility is less than 5 km.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2 – chapter 4 – 4.2

25. Unless authorized by the appropriate ATS authority, VFR flights shall not be operated:

A. Above FL 200, at transonic and supersonic speeds.
B. Above FL 200, at subsonic and transonic speeds.
C. Above FL 180, at transonic and supersonic speeds.
D. Above FL 290, at transonic and supersonic speeds.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2 – chapter 4 – 4.4

26. You may not fly over any congested area of a city, town, or settlement at a height from which it would be impossible to land without undue hazard to persons or property on the surface in the event of an emergency arising ,except:

A. When necessary for take-off or landing.
B. When trying to remain clear of clouds and in sight of surface.
C. When you receive a logbook endorsement from your instructor.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2; Chapter 3 – 3.1.2

27. Except when taking off or landing, or except by permission from the appropriate authority, an aircraft may not fly over the congested areas of cities, towns, or settlements or over an open-air assembly of persons at a height less than ……. above the highest obstacle.

A. 300 feet.
B. 1500 feet.
C. 500 feet.
D. 1000 feet.

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 2 – chapter 4 – 4.6 a

28. When an A/C has been intercepted ,what action(s) shall take place by intercepted immediately?

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 2 – appendix 2 – 2.

A. Follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals.
B. Attempt to establish radio-communication with the intercepting aircraft by making a general call on 121.5 MHz.
C. Squawk 7700.
D. All of the above.

29. What does it mean when the intercepting aircraft rocks its wings and, after acknowledgement, initiates a slow level turn, normally to the left on the desired heading?

A. You may proceed.
B. You have been intercepted. Follow me.
C. You must leave the prohibited area.
D. You should land at this aerodrome.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2 – Appendix 1 – 2.1

30. If an intercepted A/C instructed to intercepting A/C to follow me what signal shall be used by intercepted A/C that I understood and will comply ?

A. Rocking aircraft wings, flashing navigation lights at irregular intervals, and follow the intercepting aircraft.
B. Lowering the landing gear (if fitted), and show steady landing lights.
C. Switch the anti-collision lights on and off at regular intervals for 15 seconds.
D. Switch all available lights on and off at regular intervals in such a manner as to be distinct from flashing lights.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2 – Appendix 1 – 2.1

31. The intercepting aircraft performs an abrupt break-away maneuver from the intercepted aircraft consisting of a climbing turn of 90 degrees or more. What does this mean?

A. You have been intercepted. Follow me.
B. Land at this aerodrome.
C. You may proceed.
D. Understood, follow me.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2 – Appendix 1 – 2.1

32. what shall be the intercepted aircraft signal that the designated aerodrome is inadequate?

A. Switching on and off of all available lights but in a such manner as to be distinct from flashing lights.
B. Irregular flashing of all available lights.
C. Rocking the aircraft's wings, and flashing the navigation lights at irregular intervals while passing over runway in use.
D. Raising landing gear, and flashing landing lights while passing over runway in use.

Answer **(D)** is correct.
DISCUSSION: Refer to Annex 2 – Appendix 1 – 2.2

33. How should the pilot of the intercepted aircraft signal that he or she cannot comply?

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2 – Appendix 1 – 2.2

A. Raising landing gear, and flashing landing lights.
B. Rocking the aircraft's wing, and flashing navigation lights at irregular intervals.
C. Switching all available lights on and off at regular intervals.
D. Irregular flashing of all available lights

34. Flight under SVFR is only permitted within:

A. A Terminal Control Area.
B. A Control Zone.
C. An Aerodrome Traffic Zone.
D. An ATS route.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2 – Chapter 1 – Definitions.

35. A Control Area (CTA) normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes is known as:

A. An Aerodrome traffic zone.
B. A Control Zone.
C. A Terminal Control Area.
D. An airway.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2 – Chapter 1 – Definitions.

36. When QNH is set on the altimeter, the vertical position of the aircraft is expressed in terms of:

A. Altitude.
B. Height.
C. Flight level.
D. Elevation.

Answer **(A)** is correct.
DISCUSSION: Refer to Annex 2 – Chapter 1 – Definitions.

37. The vertical position of the aircraft during climb is expressed in terms of ……. until reaching the transition altitude.

A. Height.
B. Altitude.
C. Flight level.
D. Elevation.

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2 – Chapter 1 – Definitions.

38. When climbing through the transition altitude, the reference for the vertical position of the aircraft should be changed from …… to ……

A. Flight levels – altitudes.
B. Altitudes – height.
C. Altitudes – flight levels.
D. Transition layer – altitudes.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2

39. During the approach to land, you initiate your descent below transition level with the altimeter subscale set to:

Answer **(B)** is correct.
DISCUSSION: Refer to Annex 2

A. 1013.2 hPa.
B. The QNH.
C. The QFE.
D. 29.82 in. Hg.

40. The vertical positioning of aircraft during approach shall be controlled by reference to …… until reaching the transition level below which vertical positioning is controlled by reference to ……

A. Flight levels – height.
B. Altitudes – flight levels.
C. Flight levels – altitudes.
D. Flight level – 1013.2 hPa.

Answer **(C)** is correct.
DISCUSSION: Refer to Annex 2

41. To which type of operations, the advisory service shall be provided?

A. VFR
B. IFR
C. Controlled flights
D. SVFR

Answer **(B)** is correct.
DISCUSSION: Refer to annex 11.

42. Within which airspace, the advisory service may be provided?

A. Controlled airspace
B. Uncontrolled airspace
C. FIR
D. Advisory airspace

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

43. Who is responsible to issue an AIP?

A. ATS authority
B. AIS
C. State
D. Operators

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

44. Based on which aircraft system, the ACAS is operating?

A. SSR
B. PSR
C. Transponder
D. Pressure altitude

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

45. What will be the maximum ground speed to reduced ground effect during air-taxing of VTOL aircraft?

A. 20 Kts
B. 25 Kts
C. 15 kts.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

D. 10 kts.

46. What is the minimum height requires by a helicopter for Air-taxing to reduce ground effect turbulence?

A. 45 ft
B. 35 ft
C. 25 ft
D. 15 ft

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

47. What is the minimum height AGL requires for air-taxing of a helicopter to provide clearance for cargo sling loads?

A. 15 ft
B. 25 ft
C. 35 ft
D. 45 ft.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

48. Aerodrome traffic means?

A. All aircraft on the manoeuvring area.
B. All aircraft in the vicinity of an aerodrome.
C. All traffic on the manoeuvring area.
D. Items B and C are correct.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

49. How many class of ATS airspace are specified for the operation of aircraft?

A. 5
B. 2
C. 3
D. 7

Answer **(D)** is correct.
DISCUSSION: Refer to annex 11.

50. How many class of controlled airspace are specified for the operations of aircraft?

A. 3
B. 5
C. 2
D. 4

Answer **(B)** is correct.
DISCUSSION: Refer to annex 11.

51. How many class of uncontrolled airspace are specified for the operations of aircraft?

A. 3
B. 5
C. 2
D. 4

Answer **(C)** is correct.
DISCUSSION: Refer to annex 11.

52. Which controlled airspace with the specified limitation, is in the form of corridor?

A. Control area.
B. Airway.
C. CTR

Answer **(B)** is correct.
DISCUSSION: Refer to annex 11.

D. ATZ.

53. Which of the following controlled airspace, specified as control area?

A. TMA.
B. CTR
C. Airway
D. A and C.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 11.

54. Which of the following type of airplane is required to determine ETOPs alternate?

A. B747-400
B. C130.
C. A300-600.
D. All of them.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

55.What is the vertical position of an aircraft when set to a QNH?

A. Flight level.
B. Elevation
C. Altitude.
D. Height.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

56. What is the vertical position of an aircraft when set to a QFE?

A. Height.
B. Flight level.
C. Altitude.
D. Level.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

57. What is the vertical position of an aircraft when set to a QNE?

A. Height.
B. Altitude.
C. Flight level.
D. Level.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

58. What is the vertical position of an aircraft when set to 1013.2 hpa?

A. Altitude.
B. Flight level.
C. Height.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

59. What is the vertical position of an aircraft at transition altitude?

A. Level.
B. Flight level.
C. Altitude.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

D. Height.

60. What is the vertical position of an aircraft at transition level?

A. Flight level.
B. Altitude.
C. Height.
D. None.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

61. Who is the appropriate authority, regarding flight over the high seas?

A. State of the operator.
B. State having sovereignty.
C. State of registry.
D. All

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

62. Who is the appropriate authority, regarding the flight over the areas, other than high seas?

A. State of registry.
B. State of the operator.
C. State having sovereignty.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

63. What is the maximum height of ceiling?

A. 1500 ft
B. 2000 ft
C. 15000ft
D. 20000ft

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

64. What is the minimum amount of ceiling?

A. Half the sky.
B. More than half the sky.
C. Less than half sky.
D. All above are correct.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

65. based on which navigational facility, the change-over point may be established?

A. VOR
B. NDB
C. VOR/DME.
D. NDB/DME.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

66. What is the class of the CTRs, within Tehran FIR?

A. ''D''
B. ''C''
C. ''D'' and ''A'' above FL 200.
D. ''C'' and ''A'' above FL 200.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

67. What is the class of ATZ, within Tehran FIR, if specified as controlled aerodrome?

A. ''C''
B. ''D''
C. ''G''
D. ''A''

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

68. What is the nationality letters, indicating a danger area within Tehran FIR?

A. EP
B. DR
C. OI
D. IR

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

69. Based on what clearance, an airplane may leave the holding point, for the purpose of landing?

A. Approach clearance.
B. Descend clearance.
C. Landing clearance.
D. EAT clearance.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

70. Who is responsible to file a flight plane with an ATS unit?

A. Pilot
B. Operator.
C. Designated representative.
D. Items B is incorrect.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

71. Who is responsible to file repetitive flight plan?

A. Pilot.
B. Operator.
C. Co-pilot
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

72. Based in which ICAO document, the flight crew member licences shall be issued?

A. Flight crew licensing
B. Document 9685
C. Annex 1
D. Annex 2

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

73. Under what atmospheric pressure, the flight level may be specified?

A. QNH.
B. QNE.
C. QFE.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

D. QFF.

74. Within which controlled airspace, the SVFR may be permitted?

A. CTR.
B. CTA.
C. ATZ.
D. TMA.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

75. Who may provide traffic avoidance advice?

A. Pilot.
B. ATS unit.
C. Co-pilot.
D. Radar unit.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

76. What is the vertical position of an airplane under cruise within transition layer?

A. Flight level.
B. Altitude.
C. Height
D. None.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

77. The general rules of annex 2 are stated to:

A. IFR.
B. VFR.
C. Both.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

78. Who is responsible for the operations of an airplane in accordance with the rules of the air?

A. Pilot in command.
B. ATC
C. Flight attendant.
D. Pilot.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

79. When an arrival report shall be made, if the arrival aerodrome has no communication facility?.

A. Prior to landing.
B. After landing.
C. Ant time.
D. None.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

80. The familiarity with all available information, for the purpose of departure is the responsibility of:

A. Operator.
B. Dispatcher.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

C. Pilot-in-command.
D. All.

81. Who has the final authority as disposition of an aircraft?

A. ATC unit.
B. Pilot-in-command.
C. Operator.
D. Maintenance.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

82. Which authority may prescribe the condition, to drop or spray some objects from an aircraft?

A. ATS authority.
B. Operator.
C. ATC unit.
D. Appropriate authority.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

83. Which authority may prescribe the conditions under which, the formation flight may take place within a controlled airspace?

A. Appropriate authority.
B. Appropriate ATS authority.
C. Flight leader.
D. Military commander.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

84. Who is responsible for the separation between all aircraft practicing in formation flight?

A. Flight leader.
B. All pilot in command.
C. ATS unit.
D. All.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

85. What is the maximum lateral separation of each formation flight from the leader?

A. 2 NM
B. 1.5NM
C. 1 NM
D. 0.5NM

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

86. what is the maximum vertical separation of each formation flight from the leader?

A. 50 ft
B. 100 ft
C. 150 ft
D. 200 ft

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

87. For the purpose of the formation flight, pre-arrangement shall take place between?

A. Pilots in command
B. Flight leader and ATS unit.
C. Flight leader and operator.
D. All together.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

88. restricted or prohibited areas, may not be established in?

A. FIR.
B. TMA.
C. CTR.
D. High seas.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 11.

89. When an aircraft has the right of way, shall maintain its?

A. Speed.
B. Heading.
C. ‘’A’’ and ‘’’B’’
D. ‘’A’’ or ‘’B’’

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

90. What action should be taken by two aircraft, when approaching head on, at same level?

A. Change their level.
B. Change their heading
C. Change their speed.
D. Change their cruise.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

91. When a helicopter is converging with an airplane, which of them has the right of way?

A. Right side aircraft.
B. Left side aircraft.
C. Helicopter.
D. Airplane.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

92. An airplane is towing some object, converging with helicopter, which of them has the right of way?

A. Left side aircraft.
B. Right side aircraft.
C. Helicopter.
D. Towing aircraft.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

93. Where a glider and a balloon are converging, which of them has the right of way?

A. Glider.
B. Balloon.
C. Right side aircraft.
D. Left side aircraft.

Answer B**()** is correct.
DISCUSSION: Refer to annex 2

94. Which navigation light may be seen by overtaking aircraft?

A. Rear light
B. Starboard light.
C. Port light.
D. Anti-collision light.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

95. What action shall be taken by an overtaking aircraft?

A. Alter its heading.
B. Alter its heading to the left.
C. Alter its heading to the right.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

96. What action shall be taken by an overtaken aircraft?

A. Alter its heading.
B. Alter its speed.
C. Alter its level.
D. Continue its flight as planned.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

97. When two aircraft are in the final stage of landing, which of them has the right of way?

A. Faster.
B. Slower.
C. Higher.
D. Lower.

Answer **(D** is correct.
DISCUSSION: Refer to annex 2

98. Which of the following aircraft has the right of way, when they are approaching on an aerodrome for landing?

A. Glider.
B. Airship.
C. Balloon
D. Airplane.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

99. When two aircraft are approaching head-on on the surface of an aerodrome, what shall they do?

A. Alter its heading.
B. Alter its course.
C. Alter its track.
D. Alter its direction.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

100. Which lights may be used to indicate aeroplane structure, on the movement area, if adequate illumination is not provided?

A. Anti-collision lights
B. Red anti-collision light.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

C. Navigation lights.
D. Landing lights.

101. Which light may be used, when an aircraft running its engine on the movement area of an aerodrome?

A. Anti-collision lights.
B. Red anti-collision lights.
C. Navigation lights
D. Flashing lights.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

102. Which lights may be switched off the authority of pilot?

A. Landing lights.
B. Anti-collision lights.
C. Navigation lights.
D. Any flashing lights.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

103. Which direction may be turned by an airplane, after taking off?

A. Left
B. Right
C. Left at 10,000 ft
D. Right at 10,000 ft.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

104. How long before departure, a controlled flight shall file a flight plan?

A. 90 minutes.
B. 60 minutes.
C. At least 90 minutes.
D. At least 60 minutes.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

105. How long before departure, an uncontrolled VFR in Iran, shall file a flight plan?

A. 90 minutes.
B. 60 minutes.
C. At least 60 minutes.
D. At least 90 minutes.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

106. How long before departure, an IFR flight subject to advisory service, shall file a flight plan?

A. 60 minutes.
B. At least 60 minutes.
C. 90 minutes.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

D. At least 90 minutes.

107. How long before crossing any airway within Tehran FIR, an aircraft shall file a flight plane?

A. 10 minutes.
B. 60 minutes.
C. 90 minutes.
D. Not applicant in Iran.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

108. What information includes significant change shall be reported to ATS unit, before departure if it is incorrect than the information file in the flight plane?

A. fuel.
B. Number of persons.
C. Level.
D. Both A and B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

109. When an arrival report shall be made, if the arrival aerodrome has no ATS unit?

A. Before landing.
B. After landing.
C. Any time.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

110. Which time shall be used to comply rules of the air?

A. GMT.
B. Local time.
C. UTC.
D. Standard.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

111. When the time check shall be obtained by any controlled flight?

A. Before start up.
B. Before filling flight plan.
C. Before take-off.
D. Before departure.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

112. What shall be the accuracy of time when utilized in data link communication?

A. One second.
B. Within one second.
C. Two second.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

D. Within two second.

113. When an ATC clearance shall be obtained?

A. Prior to operating controlled flight.
B. Prior to take off.
C. Prior to entering CTR.
D. Prior to ensuring FIR.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

114. How shall an aircraft make taxi in the manoeuvring area of a controlled aerodrome?

A. By pre-arrangement.
B. By ATC clearance.
C. Operator clearance.
D. All above.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

115. Under what circumstances, may depart from rules of the air?

A. Night.
B. Interest of safety.
C. Engine failure.
D. With ATC clearance.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

116. According which flight plan, the pilot shall adhere himself?

A. Filed flight plan.
B. Operational flight plan.
C. Current flight plan.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

117. How much of true airspeed at cruising level if vary than the speed filed in the flight plan shall be reported to ATS unit?

A. +5%
B. -5%
C. ±5%
D. ±5 NM

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

118. how long of the time estimate constitute inadvertent change and must be reported to ATS unit?

A. 3 minutes.
B. Less than 3 minutes.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

C. In excess of 3 minutes.
D. ±3 minutes.

119. When an VFR aircraft operating within Tabriz CTR as a local flight, visibility is deteriorating below VMC, the pilot shall:

A. Request SVFR.
B. Request IFR.
C. Request any amendment clearance.
D. One of A, B or C.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

120. Which of the following guidance shall be used for precision approach?

A. Precision lateral and vertical guidance.
B. Lateral and vertical guidance.
C. Lateral and distance guidance.
D. Vertical and distance guidance.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

120. Which category of precision approach has no decision height?

A. CAT III
B. CAT IIIc
C. CAT II
D. CAT I

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

121. Who is responsible for the safety of passengers of an aircraft after the aircraft door is closed?

A. Safety person.
B. Cabin crew.
C. Pilot-in-command.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

122. To whom, the pilot shall submit a report of its violation from regulation has been made for the interest of safety?

A. State of event.
B. State of registry.
C. State of the operator.
D. A and B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

123. TO whom, the pilot in command shall report an accident which cause a serious injury of some passenger?

A. Operator.
B. Appropriate authority.
C. Nearest appropriate authority.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

D. All.

124. Lateral and vertical guidance to carry out an instrument approach procedure may be provided by?

A. Computer generated navigation data.
B. Ground based navigation aid.
C. A and B.
D. A or B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

125. Which category of precision approach requires visibility or RVR as a part of aerodrome operating minima?

A. CAT III.
B. CAT II.
C. CAT I.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

126. To whom, the pilot in command shall notify any violation of local procedure has been done for interest of safety?

A. Local authority.
B. Operator.
C. State of registry.
D. State of the operator.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

127. Which of ICAO annexes has been provision of carriage of dangerous good?

A. 16
B. 15
C. 18
D. 17

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

128. What shall be the minimum cloud base of destination as an operating minima when destination alternate is not required?

A. 1000 M above minima.
B. 1000 Ft above minima.
C. 500 M above minima.
D. 500 Ft above minima.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

129. Who is responsible to be ensure that all passenger on board an aeroplane are aware regarding the location of emergency equipment for collective use?

A. Cabin crew.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

B. Pilot in command.
C. Operator.
D. State.

130. Which RVR is controlling RVR?

A. Touchdown.
B. Stop-end.
C. Mid-point.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

131. what is the responsibility of a pilot in command when the capacity of a flight crew reduced due to lack of oxygen?

A. Do not commence the flight.
B. Land at the nearest aerodrome.
C. Land at the nearest suitable aerodrome.
D. Continue to the alternate.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

132. Who is responsible to promulgate the instrument approach procedure?

A. Operator.
B. State.
C. State of registry.
D. ATC.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

133. Who is authorize to prescribe operating limitation for visual presentation by placards?

A. Maintenance.
B. Operator.
C. Certification authority.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

135. How long before and after ETA, the current visibility shall be either 5.5 km or 4 km more than minimum, when destination alternate is not required?

A. At least 2 hours.
B. Minimum 2 hours.
C. 2 hours.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

136. When an instrument approach procedure shall be continued beyond outer marker fix?

A. VIS is above minima.
B. RVR is above minima.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

C. Controlling RVR is above minima.
D. B is incorrect.

137. How long fuel required an aeroplane which is operating IFR, after destination alternate?

A. 45 minutes.
B. 45 GAL.
C. 45 litter
D. 45 US GAL.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

138. What is a responsibility of a pilot in command when any flight crew is incapacitated due to drugs?

A. Do not continue the flight.
B. Land at the nearest aerodrome.
C. Do not commence the flight.
D. Return to departure point.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

139. Who is responsible to pay attention to the aircraft refuelling when passengers are embarking?

A. Pilot in command.
B. Qualified personal.
C. A and B.
D. A or B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

140. The standards of annex 6 relates to all aeroplane with the MAX certificated take-off mass of over?

A. 5,700 kg
B. 7,000 kg
C. 27,000kg
D. 15,000 kg

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

141. When the multi-engine aeroplane shall has equipment for making a pyrotechnic signal?

A. Operating over water 50 NM.
B. Operating over water 100 NM.
C. Operating over water 200 NM.
D. Operating over water 210 NM.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

142. When the single engine aeroplane shall has an ELT?

A. When operating over water beyond 50 NM.
B. When operating over water beyond 100 NM.
C. When operating over water beyond 100 Km.
D. When operating over water beyond 50 Km.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

143. What is the minimum number of passengers to be considered for the purpose of carrying oxygen when flying at altitude with 676 hpa pressure?

A. All.
B. 50%.
C. 30%.
D. 10%.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

144. Which of the annex has provision attesting noise certification?

A. 18.
B. 16.
C. 14.
D. 12.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

145. When the flight recorder shall be off?

A. En-route.
B. Taxi.
C. Landing.
D. None.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

146. Foe which level, ICAO recommended that throat microphone to be used?

A. Below flight level 150.
B. Below flight level 200.
C. Below transition level.
D. Below 10,000 ft.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

147. What shall be the color of the making of break-in points?

A. Yellow.
B. Red.
C. A or B in white outline.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

148. When a single-engine aeroplane on extended flight over water shall has sufficient life-saving rafts?

A. Operating 100 NM.
B. Operating 30 minutes.
C. Operating 150 NM.
D. Operating 45 minutes.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

149. How many ELT shall has a multi-engine aeroplane when operating 280 NM over water?

A. One.
B. Two.
C. At least one.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

150. What is the minimum period of oxygen for passengers compartment, when aeroplane cannot descend safely within 4 minutes to reach at a level with 620 hpa pressure?

A. 30 minutes.
B. 45 minutes.
C. 10 minutes.
D. 15 minutes.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

151. How many landing light shall have an aeroplane when flying at night?

A. One.
B. Two.
C. Minimum one.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

152. For which mass, an aeroplane shall be equipped with GPWS?

A. Landing.
B. Take-off.
C. Maximum certificated take-off.
D. Maximum certificated landing.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

153. Which of the following certificated take-off mass required F.D.R type 1A?

A. 5,800 kg.
B. 15,000 kg.
C. 27,100 kg.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

154. Who is responsible to determine the age of person to take a seat in an aeroplane?

A. State of the operator.
B. ICAO.
C. State.
D. State of registry.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

155. How many ELT shall have an aeroplane when operating search and rescue on the designated area is difficult?

A. One.
B. Two.
C. Minimum one.
D. Minimum two.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

156. How many pressure altimeter shall have an aeroplane when operating IFR?

A. Two.
B. One.
C. At least one.
D. At least two.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

157. An aeroplane has authorize to carry……passengers when it has been equipped with GPWS?

A. 9+2 crew.
B. 10+2 crew.
C. 9+3 crew.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6

158. How long shall be the duration of retraining the information by FDR 1A?

A. 25 hours.
B. 30 minutes.
C. At least 25 hours.
D. At least 30 minutes.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

159. How many independent radio equipment shall be provided for an aeroplane operating IFR or at night?

A. More than one.
B. More than two.
C. Two.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

160. When an en-route VFR is authorized by appropriate authority, the minimum distance of land mark for navigation is?

A. 100 NM.
B. 110 NM.
C. 60 NM.
D. 50 NM.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

161. Who is responsible to authorize an aeroplane to operate within an area applying VSM of 1000 ft above FL 290?

A. State.
B. State of the operator.
C. State of the registry.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6

162. Which document specifies the number and composition of flight crew?

A. Flight manual.
B. Operation manual.
C. Annex 6.
D. Pilot hand book manual.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6

163. What shall be the threshold alert of the equipment of an aeroplane when operating within RVSM area?

A. Minimum +/- 300 ft.
B. Not exceed +/- 200 ft.
C. More than +/- 300 ft.
D. Not exceed +/- 300 ft.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

164. Who may authorize an aeroplane to operate within defined airspace of MNPS?

A. Operator.
B. State of registry.
C. Contracting state.
D. State of the operating.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6

165. Where can find the difference between ICAO standards and Iran regulation and procedure?

A. GEN 2.5.
B. ENR 3.
C. GEN 1.7
D. ENR1.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

166. Which part of AIP contain conversion table?

A. GEN 1.
B. GEN 2.
C. ENR 1.
D. AD 1.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

167. Which part of AIP contain measuring system?

A. GEN 2.
B. ENR 1.
C. ENR 2.
D. AD 1.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

168. Which one of the following statement is correct EP-TSC is?

A. EP-TSC is a registration mark.
B. EP is a registration mark.
C. EP is a nationality mark.
D. A and C are correct.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

169. The location indicator OICK is for?

A. Boroujerd.
B. Khoramabad.
C. Sanandaj.
D. Ilam.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

170. Where can we find the abbreviations used in AIS publication?

A. GEN 2.
B. GEN 3.
C. ENR 1.
D. ENR 3.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

171. Which part of AIP contain the list of radio navigation aids?

A. ENR 1.
B. ENR 4.
C. GEN 2.5.
D. GEN 3.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

172. What is the accuracy of the location of navigation aids which are measured by GPS in Iran?

A. ±10 meters.
B. ± 5 m
C. Within 5 meters.
D. A and C.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

173. The Aghajari NDB may be used as a facility for the purpose of ?

A. Aerodrome.
B. En-route.
C. Off route navigation aids.
D. A and B.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

174. What is the purpose of using Ilam DVOR/DME?

A. Aerodrome facility.
B. En-route facility.
C. Off route navigation aid.
D. A and B.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

175. What is the accuracy of time for sunrise and sunset table published in AIP?

A. Less than 3 minutes.
B. Less than 2 minutes.
C. 2 minutes.
D. 3 minutes.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

176. What is the color of regular AIP amendment cover sheet paper?

A. Blue.
B. Pink.
C. Red.
D. Yellow.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

177. What is the color of AIRAC amendment cover sheet paper?

A. Blue.
B. Pink.
C. Red.
D. Yellow.

Answer **(B** is correct.
DISCUSSION: Refer to AIP.

178. The AIP supplement cover sheet paper is ……

A. Blue.
B. Pink.
C. Red.
D. Yellow.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

179. Which temporary changes may be included in AIP supplement?

A. 2 months.
B. 3 month and longer.
C. 1 month.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

180. Which section of AIP contain the information of NOTAM?

A. GEN 2.
B. ENR 3.
C. GEN 3.
D. ENR 1.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

181. The series of international NOTAM is …….

A. A.
B. B.
C. C.
D. R.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

182. The series of non-international NOTAM is……..

A. A.
B. B.
C. C.
D. N.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

183. What is the series of domestic NOTAM?

A. A.
B. B.
C. C.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

184. NOTAM "A" contain the information regarding, the operation of ?

A. International.
B. Domestic.
C. IFR.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

185. NOTAM “B” contain the information about ……..operation.

A. International.
B. Domestic.
C. Snow.
D. All.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

186. What is the validity of SNOWTAM?

A. 12 hrs.
B. 30 min.
C. 24 hrs.
D. 60 min.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

187. The SNOWTAM contain information about……

A. Slush.
B. Snow.
C. Compacted snow.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

188. What is the meaning of NOTAM “C”?

A. Replace.
B. Cancel.
C. New.
D. Snow.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

189. What is the meaning of NOTAM “N”?

A. Snow.
B. New.
C. Cancel.
D. Replace.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

190. In which Iranian airspace VFR flight is authorized to operate?

A. B,C,D.
B. B,D.
C. D,E.
D. C,D.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

191. VFR flight shall not operate at night within Tehran FIR but may be authorized to operate in aerodrome traffic zone by coordination with ATS authority:

A. True.
B. False.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

192. What is the minimum height for IFR flight within Tehran FIR if minimum flight level has not been establish?

A. 1,000 ft.
B. 1,500 ft.
C. 2,000 ft.
D. 2,500 ft.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

193. which section of AIP contain information about "meteorological service" ?

A. GEN 3.
B. ENR 3.
C. GEN 3.5.
D. ENR 4.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

194. How many MET reporting station are specified in Iran?

A. 3.
B. 4.
C. 5.
D. 6.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

195. How many compulsory MET reporting station are specified in Iran?

A. 3.
B. 4.
C. 5.
D. 6.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

196. In which part of AIP we can find the "on request" MET reporting station?

A. ENR 3.
B. GEN 2.
C. GEN 3.5.
D. ENR 4.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

197. The compulsory MET reporting station are:

A. Zahedan, Esfahan, Uromiyeh.
B. Abadan, Birjand, Sabzevar.
C. Zahedan, Abadan, Esfahan.
D. Sabzevar, Abadan, Esfahan.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

198. METAR in Iran will be done every:

A. 1 hrs.
B. 30 minutes.
C. A or B.
D. None.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

199. Which part of AIP contain VFR/IFR rules?

A. ENR 3.
B. ENR 1.
C. AD 1.
D. GEN 4.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

200. Where can we find the information about flight plan?

A. ENR 1.
B. ENR 3.
C. GEN 3.
D. GEN 2.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

201. How many SAR (search and rescue station) are specified in Iran?

A. 6.
B. 8.
C. 9.
D. 10.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

202. Which part of AIP contain the information about interception procedures?

A. ENR 1.
B. ENR 3.
C. GEN 3.
D. GEN 2.5.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

203. Which part of AIP contain the information about "unlawful interference" ?

A. ENR 1.
B. ENR 3.
C. GEN 3.
D. GEN 1.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

204. Which part of AIP contain the information about "airspace classification" ?

A. ENR 3.
B. ENR 1.
C. GEN3.
D. GEN1.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

205. How many airspace are classified in Iran ?

A. 4.
B. 3.
C. 5.
D. 2.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

206. How many control airspace are classified in Iran?

A. 3.
B. 2.
C. 1.
D. 4.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

207. How many uncontrolled airspace are classified in Iran?

A. 1.
B. 2.
C. 3.
D. 4.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

208. Which class of airspace in Iran are control airspace?

A. B,C,D.
B. A,B,C,D.
C. A,C,D.
D. A,D.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

209. Which class of airspace in Iran are uncontrolled airspace?

A. F,G.
B. F.
C. G.
D. E,F,G.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

210. What is the class of airspace outside AIRWAY,TMA,CTR?

A. A.
B. C.
C. D.
D. G.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

211. What is the classification of Boushehr CTR?

A. A.
B. D.
C. A,D.
D. C.

Answer **(C)** is correct.
DISCUSSION: Refer to AIP.

212. What is the classification of TMA up to FL 200?

A. C.
B. A.
C. A,C.
D. D.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

213. What is the classification of Tabriz CTR above FL 200?

A. C.
B. A.
C. A,C.
D. D.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

214. Which part of AIP contain information about altimeter setting procedure?

A. ENR 1.
B. BNR 3.
C. GEN 3.
D. GEN 1.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

215. In which chart you can find transition altitude?

A. Instrument approach.
B. SID.
C. STAR.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to AIP.

216. The QNH value shall transit in ……..within Tehran FIR.

A. Hpa.
B. Mb.
C. Inch.hg.
D. Psi.

Answer **(A)** is correct.
DISCUSSION: Refer to AIP.

217. The reported QNH in Iran is valid up to…….

A. 25 km.
B. 25 nm.
C. 30 nm.
D. 30 km.

Answer **(B)** is correct.
DISCUSSION: Refer to AIP.

218. How long the test signal shall take place for the adjustment of a receiver?

A. 10 seconds.
B. Minimum 10 seconds.
C. Maximum 10 seconds.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

219. What shall be the composed of test signal?

A. Alphabet.
B. Numerals.
C. A or B.
D. Composed of A and B.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

220. How many category of messages may be handled by the aeronautical mobile service?

A. 6.
B. 5.
C. 4.
D. 3.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

221. Which message is constitute as an exceptional case and preclude of message category?

A. Flight safety.
B. Regulatory.
C. Direction finding.
D. Unlawful interference.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

222. Which category of messages shall be handled by inter-pilot air-to-air communication?

A. Safety.
B. Regulatory.
C. Urgency.
D. A and B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

223. Which ICAO language shall be used in addition to language used by ground station for the purpose of air-ground radio telephony communications?

A. English.
B. French.
C. Spanish.
D. Russian.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

224. Within which publication, each state shall publish the availability of ground station language?

A. Annex 1.
B. Annex 6.
C. AIP.
D. Annex 10.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

225. The altimeter setting of 1025 shall be transmitted as:

A. Ten – Twenty five.
B. Ten – Twenty fife.
C. One – Zero – Two –Five.
D. One – Zero – Two –Fife.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

226. The altitude of 10,500 ft shall be transmitted.as:

A. One – Zero –Five hundred.
B. Ten thousand – Fife hundred.
C. One – Zero – Five – Zero – Zero.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

227. What phrase shall be requested from a person for the purpose of accurate reception of number?

A. CONFIRM.
B. READ BACK.
C. CHECK.
D. VERIFY.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

228. How many words per minute shall be spoken for the purpose of to maintain an even rate of speech?

A. 100.
B. 60.
C. Maximum 100.
D. Maximum 60.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

229. What phrases need not to be transmitted on VHF?

A. OUT.
B. OVER.
C. GO-AHEAD.
D. Both A and B

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

230. The ROGER shall not to be used in reply of a question

A. AFFIRM.
B. NEGATIVE.
C. READ BACK.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

231. The UNABLE shall normally be followed by?

A. CLEARANCE.
B. REASON.
C. REQUEST.
D. CHECK.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

232. The BREAK shall be used for the purpose of?

A. Separation between portion of messages.
B. Separation between messages transmitted to different aircraft.
C. Separation between messages transmitted to different ground stations.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

233. The WILCO is abbreviated for…..

A. Will do.
B. Will comply.
C. Will co-ordinate.
D. Will contact.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

234. Why the WORDS TWICE may be used in radio telephony communication as:

A. An information.
B. A request.
C. Both A and/or B.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

235. The CORRECT means:

A. True.
B. Accurate.
C. O.K.
D. A or B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

236. The MONITOR means:

A. Listen out.
B. Establish contact.
C. Check.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

237. The DISREGARD means:

A. No.
B. Ignore.
C. Cancel.
D. Negative.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

238. What is the call sign suffix of approach control radar departure?

A. RADAR.
B. APPROACH.
C. DEPARTURE.
D. A or C.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

239. What is the call sign suffix of direction finding station?

A. D.F control.
B. HOMER.
C. RADIO.
D. INFORMATION.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

240. What is the call sign suffix of area control centre?

A. Control.
B. Centre.
C. Area.
D. Control centre.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

241. What is the call sign suffix of precision approach radar?

A. Radar.
B. Precision.
C. Approach.
D. Control.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

242. The full call sign of an aircraft shall be:

A. Characters of registration mark.
B. Telephony designator + A.
C. Telephony designator + last 4 characters of registration mark.
D. A or B are correct.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

243. To which of the following call sign, the aircraft model or manufacture may be added as prefix:

A. Flight identification.
B. Aircraft operating agency.
C. Registration mark.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

244. Which one of the following call sign has no abbreviated form?

A. EPIRN.
B. Boeing PIRN.
C. Airbus MDNS.
D. BAW 328.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

245. Who may change the call sign of an aeroplane temporarily?

A. Operator.
B. ATC.
C. Pilot.
D. ADIZ.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

246. How shall reply, the general call as ALL STATION?

A. READ BACK.
B. ACKNOWLEDGE.
C. WILCO.
D. Not reply.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

247. What frequency specified for the purpose of inter pilot air-to air communication?

A. 123.45
B. 121.45
C. 132.45
D. 113.45

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

248. When abbreviated call sign shall be used?

A. After addressed by pilot.
B. After addressed by ATC.
C. By permission of operator.
D. By permission of state.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

249. Who shall always add call sign of the aircraft, when issuing ATC clearances and reading back such clearances?

A. Pilot.
B. Controllers.
C. Both A and B.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

250. Which digit of high frequency (Khz) should be use, when there is no confusion?

A. First two.
B. First three.
C. First and last.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

251. How many digit of VHF frequency by 8.33 khz spacing shall be transmitted?

A. 4.
B. 5.
C. 6.
D. As indicated by ATC.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

252. Which digit of frequency (119.000) by 25 khz spacing shall be set on aircraft radio management panel?

A. 119.0
B. 119.00
C. 119.000
D. None.

Answer **(B)** is correct.
DISCUSSION Refer to annex 10 (radio telephony)**:**

253. Which words should be used during test procedures for the purpose of readability scale?

A. How do you read.
B. Request test.
C. Radio test.
D. Radio check.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

254. The readability scale of 2 means:

A. Readable now and then.
B. Unreadable.
C. Readable with difficulty.
D. Readable.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

255. When the abbreviated procedures should be used?

A. Advised by aeronautical station.
B. After initial contact.
C. Advised by operator.
D. All the time.

Answer **(B)** is correct.
DISCUSSION Refer to annex 10 (radio telephony)**:**

256. What word shall be spoken, when an error has been made in transmission?

A. CONFIRM.
B. CORRECT.
C. CORRECTION.
D. REPORT.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

257. On which VHF frequency shall an aircraft be guard when required to be equipped with ELT?

A. 243.
B. 121.5
C. 123.45
D. 132.45

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

258. When every attempt by aircraft station for establishing contact is failed, how many time the message shall be transmitted by phrase TRANSMITTING BLIND ?

A. One.
B. At least one.
C. Two.
D. At least two.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

259. On which frequency, the SELCAL should be utilized?

A. VHF.
B. UHF.
C. HF.
D. Both A and C.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

260. How many pre-selected audio tones, consists, a SELCAL?

A. 5.
B. 4.
C. 3.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

261. Which station has the decoder on its receiver for the purpose of (SELCAL code)?

A. Aircraft.
B. Aeronautical.
C. Both A and C.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

262. Who is responsible to disseminate, at regular interval the list of SELCAL code?

A. Pilot.
B. Aircraft agency.
C. ATS authority.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

263. How should inform the appropriate ATS unit the SELCAL of an aircraft?

A. Submit in flight plan.
B. Submit in operational flight plan.
C. Forward a message.
D. Any of A, B, or C.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

264. How the pre-flight check should be made on the primary and secondary frequency of SELCAL?

A. First on primary.
B. First on secondary.
C. First on secondary then primary.
D. First on primary then secondary.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

265. How many call on the primary and the secondary frequency, if unanswered, the aeronautical station should revert to voice calling?

A. One.
B. Two.
C. Three.
D. Four.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

266. When the MAYDAY and PAN PAN signal shall be used

A. At the commencement of communication.
B. At the first contact.
C. At the commencement of the first distress and urgency communication.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

267. How many time, MAYDAY signal is required to be spoken?

A. One.
B. Two.
C. Three.
D. Preferably three.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

268. What phrases shall be used by a station in distress or station controlling distress traffic for the purpose of imposition of silence?

A. MAYDAY.
B. STOP TRANSMITTING.
C. B + A.
D. A + B.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

269. How the silence condition shall be terminated?

A. Normal condition.
B. Distress traffic ended.
C. No distress.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

270. What phrases shall be used by a medical transport aeroplane?

A. PANPAN MAYY-DEE-CAL.
B. PANPAN MEDICAL.
C. A three time.
D. B three time.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

271. What is the appropriate SSR mode and code for distress aircraft?

A. A 7500.
B. A 7600.
C. A 7700.
D. A 2000.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

272. What is the appropriate SSR mode and code for medical aircraft?

A. A 2000.
B. A 7400.
C. As pilot decision.
D. A specified by ATC.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 10 (radio telephony)

273. Which of ICAO annexes talks about the rules of the air?

A. Annex 8.
B. Annex 3.
C. Annex 2.
D. Annex 11.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

274. ADS stand for ……

A. Automatic deviation search.
B. Area development system.
C. Automatic independent system.
D. Automatic dependent surveillance.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

275. Advisory service will be provided in:

A. Uncontrolled airspace.
B. Air traffic control airspace.
C. Advisory airspace.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

276. Aerodrome traffic is:

A. All traffic flying in the vicinity of an aerodrome.
B. All traffic departing from an aerodrome.
C. All traffic arriving to an aerodrome.
D. All traffic on the manoeuvring area and in the vicinity of an aerodrome.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

277. Who is responsible for issuing AIP?

A. State.
B. Operator.
C. Air traffic control unit.
D. Flight standard.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

278. Airborne collision avoiding system is based on:

A. Primary surveillance radar.
B. Secondary surveillance radar.
C. Very high frequency.
D. Ultra high frequency.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

279. Air taxing of helicopter or VTOL aircraft should be:

A. 20 knots.
B. 37 knots.
C. Less than 20 knots.
D. More than 20 knots.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

280. Cargo sling loads by helicopters require air taxiing in order to reduce ground effect turbulence with a height of:

A. 25 ft.
B. Above 25 ft.
C. Less than 25 ft.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

281. Authorization for an aircraft to proceed under condition specified by air traffic control unit is:

A. Flight permission.
B. Authorized flight.
C. Controlled flight.
D. ATC clearance.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

282. Which one are the objectives of air traffic control service:

A. Prevent collision between aircraft.
B. Prevent collision between aircraft and obstruction.
C. Expediting and maintaining an orderly flow of air traffic.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

283. How many airspaces are classified by ICAO?

A. 7.
B. 4.
C. 6.
D. 5.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

284. How many of airspace classes are known as controlled airspace?

A. 5.
B. 2.
C. 4.
D. 3.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

285. What are the uncontrolled airspaces?

A. F.
B. G.
C. D,E.
D. G,F.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

286. How many airspaces are assigned for Iran FIR?

A. 7.
B. 3.
C. 5.
D. 4.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

287. Airway is a control area established in the form of:

A. Corridor.
B. Rectangle.
C. Circle.
D. Triangle.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

289. Altitude is the expression of vertical distance of an aircraft when using?

A. QNH.
B. QNE.
C. QFE.
D. Standard pressure.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

290. Who is the appropriate authority regarding the flight over the high seas?

A. State of territory being over flown.
B. State of registry.
C. State of operator.
D. State of manufacture.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

291. Change over point is point of transfer to next facility when the ATS route is defined by:

A. VOR's.
B. NDB's.
C. Any NAV aids.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

292. The estimated time at which the aircraft will commence movement associated with departure is:

A. EOBT.
B. EET.
C. TEET.
D. ETA.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

293. The vertical distance of an aircraft measured from mean sea level, as flight level, is on the basis of:

A. QNE.
B. 1013.2 hpa.
C. QNH.
D. A or B are correct.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

294. Flight visibility is forwarded from:

A. Cockpit of an aircraft on the ground.
B. Cockpit of an aircraft in flight.
C. RVR.
D. All correct.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

295. IMC is a meteorological condition……

A. Equal to VMC.
B. Less than minimum for VMC.
C. Mare than minimum for VMC.
D. B and C are correct.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

296. Who is safety sensitive personnel?

A. Crew member.
B. Aircraft maintenance.
C. Air traffic controller.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

297. special VFR flight operates in:

A. ATZ.
B. CTR.
C. TMA.
D. All airspaces.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

298. Runway holding position is a designed position intended to ……

A. Protect runway.
B. Protect an obstacle limitation surface.
C. Protect an ILS?MLS criteria/sensitive area.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

299. Taxing is a surface movement of an aircraft under its power…….

A. Including take-off.
B. Excluding take-off.
C. Excluding take-off and landing.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

300. Traffic avoiding advice will be provided by:

A. Operator.
B. Pilot in command.
C. ATS units.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

301. What is the intent of traffic avoidance advice?

A. To make large separation.
B. To sequence the traffic.
C. To apply priority.
D. To avoid a collision.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

302. Who has the final authority for disposition of aircraft?

A. In flight security.
B. Pilot.
C. Pilot in command.
D. Operator.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

303. The cruising level of an aircraft shall be in the term of flight level……..

A. At lowest usable flight level.
B. Above lowest usable flight level.
C. At or above lowest usable flight level.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

304. The cruising level of an aircraft shall be in the term of altitude:

A. At lowest usable flight level.
B. Below the lowest usable flight level.
C. At or below transition altitude.
D. B and C are correct.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

305. The vertical distance between the formation flights shall not exceed……from the leader.

A. 100 m.
B. 100 ft.
C. 30 ft.
D. 50 ft.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

306. The aircraft that has the right of way shall maintain:

A. Listening on watch.
B. The landing lights on.
C. Heading and speed.
D. It's transponder on.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

307. Which one is not correct?

A. Emergency aircraft shall have priority to other aircraft.
B. Aircraft landing shall have priority to departing aircraft.
C. The higher aircraft shall have priority to lower aircraft.
D. The urgency aircraft shall have priority to other aircraft.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

308. Anti-collision and navigation light shall be displayed on aircraft during…..

A. Sunset to sunrise.
B. Sunrise to sunset.
C. Any other time prescribed by appropriate ATS authority.
D. A and C are correct.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

309. What is the basis of expressing time in aeronautical operations?

A. UTC.
B. Local.
C. UTC and local.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

310. The accuracy of time in data link communication is expected to be within?

A. 1 second.
B. 5 second.
C. 30 second.
D. 10 second.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

311. The obtaining of time check shall be made?

A. Prior to operating a controlled flight.
B. The other times during flight as may be necessary.
C. A and B are correct.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

312. Which one is the emergency radar code?

A. 7700.
B. 7600.
C. 7500.
D. 2000.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

313. An aircraft which is being subjected to unlawful interference, shall:

A. Squawk 7600.
B. Squawk 7500.
C. Squawk 2000.
D. Squawk ATC assigned code.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

314. an aircraft experiencing radio communication failure, shall squawk its transponder to …..

A. 7700.
B. 7600.
C. 7500.
D. 7400.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

315. An intercepted aircraft shall set it's transponder to …..

A. 7700.
B. 2000.
C. 7600.
D. 7500.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

316. Intercepting aircraft shall set its transponder to:

A. 7600.
B. 2000.
C. 7500.
D. ATC assigned code.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2

317. Which one is distress signal?

A. MAYDAY.
B. PAN,PAN.
C. XXX in data link.
D. All are correct.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

318. What does the steady green light for aircraft in flight mean?

a. Cleared to land.
b. Return for landing.
c. Give way to other aircraft.
d. None.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

319. What does the red flash light for aircraft on the ground mean?

A. Give way to other aircraft.
B. Stop.
C. Taxi clear of landing area in use.
D. Return to starting point.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 2

320. How much of deviation from true airspeed must be reported to ATS units it is more than….

A. ±5%.
B. ±10%.
C. ±2%.
D. ±15%.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

321. Inadvertent changes consisting deviation of ……time estimate shall be reported to ATS units.

A. ±5 minutes.
B. In excess of 3 minutes.
C. ±2 minutes.
D. Less than 3 minutes.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

322. The time check for controlled flight must be done?

A. Before to operating.
B. At the commence of taxiing.
C. Before taking-off.
D. Any time.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 2

323. Which one is the urgency signal code?

A. SOS.
B. PAN,PAN.
C. MAYDAY.
D. Parachute flare red light.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 2

324. How many operations are defined in annex 6?

A. 1.
B. 2.
C. 3.
D. 4.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

325. The lowest height as an aerodrome operating minima for the approach with vertical guidance is:

A. OCH.
B. DH.
C. MDH.
D. VDH.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

326. What is the reference of lowest height for circle-to-land?

A. Aerodrome elevation.
B. Landing threshold.
C. Touchdown elevation.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

327. What is the reference of lowest height for precision approach?

A. Threshold elevation.
B. Airport elevation.
C. Touchdown elevation.
D. None.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

328. For which alternate, the departure aerodrome may be considered for planning?

A. Destination.
B. En-route.
C. Take-off.
D. Both A or B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

329. What alternates shall be determined, if departure aerodrome, under all situation is unable for landing?

A. Take-off.
B. En-route.
C. Destination.
D. A is wrong.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

330. Which facility can provide lateral and vertical guidance?

A. Ground based navigation AID.
B. Computer generated navigation data.
C. A and B.
D. A or B.

Answer **(D)** is correct.
DISCUSSION Refer to annex 6-part 2**:**

331. What is the difference between altitude indicated by the altimeter display and pressure altitude corresponding to undisturbed ambient pressure?

A. target level of safety.
B. Altimetry system error.
C. Total vertical error.
D. All.

Answer **(B)** is correct.
DISCUSSION Refer to annex 6-part 2**:**

332. Which category of precision approach may be use both visibility or RVR as aerodrome cooperating minima?

A. CAT I.
B. CAT II.
C. CAT III.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

333. If a DH is in the range of CAT IIIA but with RVR in range CAT III B, the approach procedure would be conducted in accordance with?

A. CAT IIIA.
B. CAT III B.
C. as indicated by ATC.
D. None.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

334. What is the minimum RVR for CAT II operation?

A. 550 m.
B. 800 m.
C. 350 m.
D. 200 m.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

335. What is the minimum height for CAT I operation?

A. 210 ft.
B. 70 m.
C. 200 m.
D. 200 ft.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

336. What is the minima height for CAT IIIC ?

A. 100 ft.
B. 50 ft.
C. 10 ft.
D. Zero.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

337. How many ELT are defined in ANNEX 6 part 2?

A. 4.
B. 3.
C. 2.
D. 1.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

338. According which ICAO annexes the flight crew member shall be licensed?

A. Annex 6.
B. Annex 2.
C. Annex 1.
D. Annex 7.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

339. Which aircraft manual is associated with certificate of airworthiness?

A. Aircraft operating manual.
B. Operating manual.
C. Flight manual.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

340. How many type of recorder shall be installed in the aircraft with maximum mass of 15,000 kg for the purpose of accident investigation?

A. 1.
B. 2.
C. A and B.
D. All.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

341. The total time from first moves of an aeroplane until the moment at the end of flight is called?

A. Flight time.
B. Flight duty period.
C. As specified by operator .
D. As specified by the pilot.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

342. The 95% of containment basis regarding navigation accuracy (based on ±…..NM) is

A. RCP.
B. RNP.
C. RNP type.
D. RCP type.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

343. What is the lowest height on an instrument approach procedure used in establishing compliance with appropriate obstacle clearance criteria?

A. DH.
B. MDH.
C. TCH.
D. OCH.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

344. The label that represents of the value of parameters of communication transaction time, continuity, available and integrity is named as:

A. RCP.
B. RCP type.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

C. RNP.
D. RNP type.

345. Which ICAO annexes are contained the standard and recommended practices for international general aviation operation of aeroplane?

A. annex 6-1.
B. Annex 6-2.
C. Annex 6-3.
D. All.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

346. Who shall comply with the laws, regulation and procedure of a state in which the aeroplane is operating?

A. ATC.
B. Operator.
C. Pilot in command.
D. Crew members.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

347. Who is responsible for the safety of the passengers and cargo, when the aeroplane doors are closed?

A. Pilot in command.
B. Cabin crew.
C. Operator.
D. Ground crew.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

348. Who is responsible for the operation and safety of an aeroplane during flight time?

A. Operator.
B. ATC.
C. Safety management.
D. Pilot in command.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

349. Which unit is the primary propulsion unit?

A. Push back.
B. Engine.
C. Aeroplane gears.
D. Tow car.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

350. When any violation from local procedure shall be notified to the local authority?

A. At the termination of flight.
B. As soon as practicable.
C. Without delay.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

351. To which authority, a copy of violation report shall also be submitted?

A. State of registry.
B. State of authority.
C. Contracting state.
D. State of territory.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

352. When the violation report shall be submitted to the appropriate authority of such state by the pilot in command?

A. At the termination of flight.
B. As soon as possible.
C. Within 10 days.
D. Without undue delay.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

354. What action should be taken by a pilot when an accident occur in an aeroplane with a result of death of two persons?

A. Notify appropriate authority.
B. Notify state of registry.
C. Notify ATS authority.
D. Notify nearest appropriate authority.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

355. Where should the essential search and rescue information be available?

A. Flight manual.
B. Annex 13.
C. On board the aeroplane.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

356. Which ICAO annex talks about provisions of carrying of dangerous goods?

A. 16.
B. 18.
C. 6.
D. 2.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

357. The required information published by aeronautical information service which may be used by aviation persons is

A. AIP.
B. NOTAM.
C. AIP supplement.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

358. Who is responsible to be ensure that all person on board are aware of the general manner of use of the emergency equipment's?

A. Crew member.
B. Pilot in command.
C. Cabin crew.
D. Operator.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

359. The pilot in command shall not operate……than aeroplane operating minima established by ……..?

A. Lower/operator.
B. Lower/state of registry.
C. Lower/state.
D. Lower/ ATS authority.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

360. How many destination alternate shall be selected for IFR flight.

A. One.
B. Two.
C. At least two.
D. At least one.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

361. How many destination alternate shall be selected for IFR flight if aerodrome of intended landing is possible?

A. One.
B. At least one.
C. One or two.
D. None.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

362. What shall be the minimum visibility of a destination when no destination alternate is required?

A. 5.5 km.
B. 4 km more than minima.
C. A or B.
D. A and B.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

363. How long before and after ETA, the minimum cloud base of a destination shall be 1000 ft if destination alternate is not required?

A. Two hours.
B. One hours.
C. 30 minutes.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

D. 90 minutes.

364. How shall be the weather minima at destination and destination alternate for an IFR flight?

A. Equal to aerodrome minima.
B. Equal or above minima.
C. Above minima.
D. All are correct.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

365. When an instrument approach shall be continued beyond outer marker fix?

A. RVR is at and above minima.
B. RVR is same as minima.
C. RVR is above minima.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

366. Which RVR is controlling RVR?

A. Touchdown.
B. Stop-end.
C. Mid-point.
D. All.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

367. When an aeroplane is authorized to operate in icing condition?

A. Certify to operate.
B. Equipped for operation.
C. A or B.
D. A and B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

368. What is minimum amount of fuel for an aeroplane with no destination alternate?

A. Departure to destination + 30 minutes.
B. Departure to destination + 45 minutes.
C. Departure to destination + 30 minutes + 15%.
D. Departure to destination + 45 minutes + 15%.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

369. An aeroplane operating at a level at which the atmosphere pressure is 650 hpa, the minimum amount of breathing oxygen for passengers shall be?

A. 10%.
B. 10 minutes.
C. 15%.
D. 15 minutes.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

370. If an aeroplane operating at a level at which the pressure is 361 hpa and is not able within 4 minutes to reach at a level with a pressure of 62o hpa, the minimum amount of oxygen for passengers shall be

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

A. 10%.
B. 10 minutes.
C. 15%.
D. 15 minutes.

371. When an aeroplane shall has quick donning type of mask for flight crew members duty station?

A. Pressure is 376 hpa.
B. Pressure is 620 hpa.
C. Pressure is less than 376 hpa.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

372. If a flight crew member capacity is reduced due to lack of oxygen, what is the responsibility of pilot in command.

A. Continue to destination.
B. Not continue beyond nearest suitable aerodrome.
C. Continue to en-route alternate.
D. Back to departure.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

373. Who is responsible to be ensure of the fitness of flight crew members?

A. Operator.
B. Owner.
C. ATC.
D. Pilot in command.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

374. When a flight crew may leave the duty station in connection with the aeroplane operation?

A. During take-off.
B. En-route.
C. During landing.
D. Go-around.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

375. Who is responsible to design instrument approach procedure?

A. State.
B. State of registry.
C. Operator.
D. Controller.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

376. An IFR flight shall comply with an instrument approach procedure approved by:

A. ATC.
B. Operator.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

C. Pilot in command.
D. State.

377. Who is responsible to publish instrument approach procedures?.

A. State of registry.
B. State.
C. ICAO.
D. IATA.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

378. How an aeroplane may be refuelled, when passengers are on board the aeroplane?

A. Attended by pilot in command.
B. Attended by qualified person on the ground.
C. A and B.
D. A or B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

379. The operating limitation shall be prescribed by the certificating authority of …….

A. State.
B. State of registry.
C. State of design.
D. State of manufacture.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

380. where the placards or listing containing the limitation shall be displayed in…..

A. Flight manual.
B. Aeroplane C of A.
C. Aeroplane.
D. Flight plan.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

381. Which ICAO annexes has the provisions of airworthiness of aeroplane over 5700 kg?

A. 8.
B. 6.
C. 7.
D. 9.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

382. Who is responsible to approve, the instrument and their installation in an aeroplane?

A. State.
B. State of manufacture.
C. State of registry.
D. Operator.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

383. Who is responsible to accept prescribed equipment and their installation on an aeroplane?

A. State of registry.
B. State of design.
C. State of manufacture.
D. None.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

384. How many first aids kit shall be carried by an aeroplane operating in accordance with annex 6 part 2?

A. Two.
B. At least two.
C. One.
D. At least one.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

385. How many portable fire extinguisher shall be located in the pilot's compartment?

A. At least one.
B. One.
C. At least two.
D. Two.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

386. Which of the following shall be carried on all flight?

A. Flight manual.
B. Suitable chart for route.
C. Interception information.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

387. Which of the following means should be on an aeroplane on all flights?

A. Ground-air signal code for SAR.
B. Safety for crew member seats.
C. Both A and B.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

389. What is the colour of break-in points markings?

A. Red.
B. Yellow.
C. Black.
D. A or B.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

390. How many sensitive pressure altimeter shall be equipped by an aeroplane operating as a VFR flight?

A. One.
B. Two.
C. At least one.
D. At least two.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

391. How many attitude indicator shall has a controlled VFR?

A. One.
B. Two.
C. At least one.
D. At least two.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

392. Which of the following aircraft shall be equipped with a device for making sound signal?

A. Land plane.
B. Sea plane.
C. Amphibian.
D. Both B and C.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

393. When a single engine aeroplane shall be equipped with the sufficient numbers of life-saving rafts?

A. Operating 100 NM from destination.
B. Operating 100 NM from departure point.
C. Operating more than 100 NM from suitable aerodrome.
D. None.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

394. What is the minimum distance of a flight over water, that requires to carry life jackets by a landplane?

A. 50 KM.
B. 50 NM.
C. 100 NM.
D. 100 NM.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

395. What is the minimum distance over water from the land suitable for emergency landing by multi-engine aeroplane that require to carry life-saving raft?

A. 100 NM.
B. 150 NM.
C. 200 NM.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

396. How many ELT shall has an aeroplane when operating extended range over water?

A. At least one.
B. At least two.
C. Two.
D. One.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

397. When an area designated by a state where SAR is difficult, how many ELT shall be carried by the aeroplane?

A. One.
B. Two.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

C. At least one.
D. At least two.

398. Which of the following atmospheric pressure requires a device for positive warning?

A. 376 hpa.
B. 367 hpa.
C. 637 hpa.
D. 620 hpa.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

399. How many landing lights an aeroplane requires when operating at night?

A. One.
B. Two.
C. At least one.
D. At least two.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

400. Within which document, an aeroplane shall carry noise certification?

A. Flight manual.
B. Annex 16.
C. Any document approved by the state of registry.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

401. What is the maximum certificated take-off mass of an aeroplane that requires GPWS?

A. 7500 KG.
B. 5000 KG.
C. 7000 KG.
D. 5700 KG.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

402. The authorization of how many passengers requires equipment GPWS?

A. 9.
B. 10.
C. 11.
D. B or C.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

403. The GPWS warnings are regarding to?

A. Excessive descent rate.
B. Unsafe terrain clearance.
C. A and B.
D. A or B.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

404. Which equipment is able to warn a pilot regarding to excessive altitude loss after take-off or go-around?

A. Radar altimeter.
B. GPWS.
C. Radio altimeter.
D. ADS.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

405. Which F.D.R shall record the configuration of lift and drag devices only?

A. Type IA.
B. Type IIA.
C. Type I.
D. Type II.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

406. How many system of recorder comprise the flight recorder?

A. One.
B. Two.
C. Three.
D. Four.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

407. What is the minimum capability of F.D.R type II for the recording of information?

A. 30 hours.
B. 30 minutes.
C. 25 hours.
D. 25 minutes.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

408. Which of the following aeroplane shall be equipped with both F.D.R and C.V.R when operating in accordance with annex 6 part 2?

A. Max. mass 2,700 kg.
B. Max. mass 7,000 kg.
C. Max. mass 12,700 kg.
D. None.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

409. When the flight recorder shall be switch-off.

A. Take-off.
B. En-route.
C. Landing.
D. None.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

410. When the inspection of F.D.R and C.V.R shall take place?.

A. Every day.
B. Prior to the first flight of the day.
C. Each calendar month.
D. All.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

411. which of the following turbine-engine aeroplane, shall be equipped with ACAS II?

A. Max. mass 15,000 kg.
B. Max. mass 5,700 kg.
C. Max. mass 7,000 kg.
D. Max. mass 18,000 kg.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

412. When an aeroplane authorized to carry more than ……passengers shall be equipped with ACAS II.

A. 31.
B. 30.
C. 19.
D. 9.

Answer **()A** is correct.
DISCUSSION: Refer to annex 6-part 2

413. When the flight crew should communication through boom or throat microphone?

A. Below MEA.
B. Below transition level.
C. Below FL.150.
D. Below FL. 200.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

414. Which of the following operation shall be able to establish two-way communication?

A. IFR.
B. Controlled VFR.
C. Night operation.
D. All.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 6-part 2

415. What should be the minimum distance of visual land mark for the operation under VFR?

A. 110 NM.
B. 60 NM.
C. 160 Km.
D. 100 NM.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

416. Who may authorize an operation to take place in MNPS airspace?

A. Operator.
B. State.
C. State of registry.
D. ATS authorized.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

417. What is the minimum deviation from selected flight level, the alert system shall be active in RVSM airspace?

A. 300 ft.
B. 200 ft.
C. 100 ft.
D. None.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 6-part 2

418. Who shall be ensure that each flight crew members has been trained to use ACAS II and avoidance collision?

A. Operator.
B. Pilot in command.
C. State.
D. All.

Answer **(B)** is correct.
DISCUSSION: Refer to annex 6-part 2

419. Which document specify the composition of flight crew?

A. Operation manual.
B. Aircraft operating manual.
C. Flight manual.
D. All.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 6-part 2

420. For what type of operation, the advisory service may be provided?

A. Controlled IFR.
B. SVFR.
C. CVFR.
D. IFR.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2.

421. What is the purpose of air traffic control service?

A. Prevent collision between aircraft.
B. Expedite flow of traffic.
C. A and B.
D. A or B.

Answer **(C)** is correct.
DISCUSSION: Refer to annex 11

422. How we can notify the pilot the limitation, or irregularity of navigation and aerodrome facility?

A. NOTAM.
B. Direct communication.
C. General call and broadcast.
D. All above.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2.

423. Manoeuvring area is not to be used for the purpose of:

A. Take-off.
B. Landing.
C. Taxing.
D. Loading passenger.

Answer **(D)** is correct.
DISCUSSION: Refer to annex 2.

424. The controlled area established at the confluence of ATS route is?

A. TMA.
B. CTR.
C. ATZ.
D. AWY.

Answer **(A)** is correct.
DISCUSSION: Refer to annex 11

INTENTIONALLY

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PILOT NOTES

PILOT NOTES

APPENDIX