PHY 1101: GENERAL PHYSICS I   **TIME: 2HRS**
ATTEMPT ALL QUESTIONS, CIRCLE THE CORRECT OPTION
REGISTRATION NUMBER:
NAME:
DEPARTMENT:

1. Which of the following units is derived? A. Kg B. M C. K D. N
2. Youngs Modulus can be written as Y = FL/Ae. Dimensionally, the unit of Y is A. Kg-$^{15-2}$ B. Kgm^{IS-1} C. Kgm^{S-2} D. Kgm$^{8-1}$
3. In which of the following groups are the entire quantities scalar A. Momentum, Acceleration, temperature B. Force, displacement, time C. Distance, temperature, speed D. Temperature, velocity, force.
4. The memory size in your cell phone is recorded as 20.4 Gigabytes. This means that the memory size is A.204000 Bytes B. 2000004 Bytes C. 204000000 Bytes D. 20400000000
5. One of these is not an application of dimensional analysis, A. They help to predict answer to questions B. They help to recapitulate formular C. They help to suggest relationships between fundamental constants. D. They help in checking units in physical quantities.
6. A body is projected with an initial velocity u at an angle θ to the horizontal. The time taken by it to react its maximum height is given by A. 2usin θ/g B. U^{2}sin^2 θ/2g C.U sin θ/g D. Using θ/2g
7. The slope of a straight line velocity time graph represents. A. Uniform acceleration B. Uniform speed C. Total distance travelled D. Work done.
8. A student walks 40m due East from the University gate, then turns and walks 30m due South to the lecture Hall, what is the magnitude of his displacement from the University gate. A. 10m B. 35m C. 50m D. 70m
9. A bullet fired vertically upwards reaches a height of 500m Neglecting ait resistance, calculate the magnitude of the initial velocity of the bullet of g = 10m^{S-2}. A. 500.0m $^{S-2}$ B. 100.0m $^{S-2}$ C. 70.0m $^{S-2}$ D. 50.0m $^{S-2}$
10. A body of mass 1000kg is released from a height of 10m above the ground. Determine its Kinetic Energy just before it strikes the round (g = 10m $^{S-2}$). A. 10J B. 10^{3}J C. 10^{4}J D. 10^{S}J
11. A uniform Bar AB 100cm long is balanced on a knife edge which is 60cm from B by a Mass of 22g. this hangs at a point which is 10cm from A. The mass of the Bar is. A. 133.2g B.66.0g C. 60.0g D. 22.0g.
12. A gun of mass 20kg fires a bullet of mass 10g with a muzzle velocity of 200m/s. the recoil velocity of the gun is A. 10.0ms^{-1} B. 10m^{-1} C. 0.1ms^{-1} D. 100.0ms^{-1}.
13. In the S.I Unit, the second is defined as the; A. The it takes light to travel 3 x 10^{6}m B. The time is takes an atom to make one complete vibration C. The time it takes a caesium atom to make a certain number of vibrations D. The time it takes light to travel between two fixed points in the National Physical Laboratory.
14. One of these is not a vector quantity. A. Electric Potential B. Acceleration C. Momentum D. Density.
15. Two collinear forces of magnitudes 3N and 5N act due North, and due South respectively. Their resultant is. A. 8N due North B. 8N due South, C. 2N due North D. 2 N due south.
16. A motor cyclist travelling at 30m^{-1} starts to apply his brakes when he is 50m from a traffic light which has just turned red. His retardation is A. 18m $^{S-2}$ B. 10m $^{S-2}$ C. 9m $^{S-2}$ D. Sm $^{S-2}$.

17. A uniform meter rule is pivoted at its center. Loads of 15N and 20N are placed at the 10cm and 20cm respectively. The meter rule balances horizontally when a load of 40N is placed on the other side of the pivot. We the distance of the 40N from the pivot. A. 15.0cm B. 20.0cm C. 30.0cm D. 80.0cm.

18. Which of the following motions cannot be regarded as simple Harmonic? A. Angular giving of the balance wheel of a watch B. Dropping of a liquid from a burette at regular intervals C. Vibration of the string of a guitar when plucked D. Motion of an atom in a solid.

19. Which one of the following statements is not correct when three coplanar non parallel forces are in Equilibrium. A. They can be represented in magnitude and direction by the three sides of a triangle taken in order B. Their lines of action meet at a point C. Any one force is the equilibrium of the other two D. The magnitude of any of force equals the magnitude of the other two.

20. A ball of mass 0.5kg moving at $10.m^{S-1}$ Collides with another ball of equal mass at rest. If the two balls move off together after the impact, what is their common velocity? A. $0.2m^{S-1}$ B. $0.5m^{S-1}$ C. $5.0m^{S-1}$ D. $10.0m^{S-1}$.

21. Which of the following is not a consequence of a force field. A. weight B. surface tension C. gravitation D. Electric force.

22. An electric pump raises 100kg of water through a height of 60m in 20s. what is the power of the engine ($g=10m\ S^{-2}$) A. 120.0W B. 3000.0W C. 300.0W D. 30.0W

23. Which of the following is not a fundamental unit. A. Coulomb B. Ampere C. Kilogram D. Meter

24. Two forces of 4 act on the opposite sides of a rectangular plate and oppositely directed they constitute a couple whose magnitude is. A. 1.6NM B. 3.2NM C. 10.0NM D. 1.0NM

25. Which of the following has the same unit as Impulse. A. Couple B. Power C. Moment D. Momentum.

26. A car travelling with a uniform Speed of $120kmh^{-1}$ passes two stations in 4 minutes. The distance between the stations is A. 8.0km B. 150km C. 22.0km D. 30.0km.

27. A train moving at 36km/hr is uniformly accelerated to 54km/hr in 8s. What is the distance the train travels during the interval A. 100m B. 1000M C. 500M D. 2000m

28. A stone tied to a string is made to revolve in a horizontal circle of radius 4m with an angular speed of 2 radiants per second. With what tangential acceleration will the stone move off the circle if the string break A. $16.0m^{S-1}$ B. $8.0m^{S-1}$ C. $6.0m^{S-1}$ D. $0.5m^{S-1}$

29. A ball of mass 5.kg hits a smooth vertical wall normally a spedd of 2ms-1 and rebounds with the same speed. What is the Impulse experienced by the ball A. $10.0kgm^{S-1}$ B. $5.0kgm^{S-1}$ C. $20.0kgm^{S-1}$ D. $1.25kgm^{S-1}$.

30. Which of the following statements is not correct?
    A. The weight of a body depends on its mass
    B. The weight of a body depends on the earth's revolution
    C. The weight of a body depends on the shape of the earth
    D. The weight of a body can be measured with a spring balance.

31. A rod 3.0m long is found to have expanded by 0.091cm in length after a temperature rise of $60^{0}C$ what is the co-efficient of linear expansion for the material of the rod A. $5.10 \times 10^{-7}C^{-1}$ B. 5.1×10^{-7} C. $5.1 \times 10^{-6}C^{-1}$ D. $5.1 \times 10^{-8}C^{-1}$

32. The co-efficient of linear expansion of glass is $9.0 \times 10^{-0}C^{-1}$ if the specific gravity bottle holds 50.00ml at 150C. find its capacity at $25^{0}C$. A. 50.014ml B. 51.020ml C.50.021ml D. 51.01ml

33. The density of gold is $19.30g/cm^{3}$ at $20.0^{0}C$ and the coefficient of linear expansion is $14.3 \times 10^{-6}C^{-1}$. Calculate the density of Gold at $90.0^{0}C$. A. $19.2g/cm^{3}$ B. $19.1gcm^{3}$ C. $20.1g/cm3$ D. $19.19G/CM^{3}$

34. Calculate the increase in volume of $100cm^{3}$ of mercury is $0.00018^{0}C^{-1}$. A. $0.44cm^{3}$ B. $0.45cm^{3}$ C. $0.46cm^{3}$ D. $0.43cm^{3}$

35. A given mass of ideal gas occupies 38ML at 20^0C if its pressure is help constant, what volume does it occupies at a temperature of 45^0C. A.42ml B. 41ml C.43ml D.45ml

36. Given 10×10^2ml of helium at 15^0C and 763 mmHg determine its volume at -6^0C and 420mmHg. A.1.68×10^3ml B. 1.67×10^3ml C. 1.69×10^3ml D. 1.70×10^3ml

37. What volume will 1.216g of SO_2 gas (M 64.1kg/kmol) occupy at 18.0^0C and 577mmHg if it acts like an ideal gas A. 456ml B. 452ml C. 457ml D. 455ml

38. Compute the density of H^2S gas (M = 34.1kg/kmoL) at 27^0C and 2.00 at m assuming it to be ideal gas. A. 2.76kg/m B. 2.80kg/m^3 C. 2.77kg/m^3 D. 2.70kg/m^3.

39. At what temperature will the molecules of an idea gas have twice the (fms) speed they have at 20^0C. A. 900^0C B. 800^0C C. 700^0C D. 1000^0C.

40. Find the mass of a neon atom. The atomic mass of neon is 20.2kg/kmoL. A. 3.36×10^{-26}kg B.3.36×10^{-27}kgkg C. 3.36×10^{-28}kg D. 3.36×10^{-24}kg.

41. The following is the correct definition of a wave (a) a disturbance, which travels through a medium and transfer energy from one point to another, without any permanent displacement of the medium itself (b)a disturbance, which transfers energy from one point to another, without any permanent displacement of the medium itself (c)A fast moving object (d)bright shining light.

42. One of these is not an example of a mechanical wave (a)microwave (b)string state every second (c)are electronic waves (d)have no velocity.

43. Electromagnetic waves (a) do not require any medium of propagation (b)change state every second (c) are electronic waves (d)have no velocity.

44. For a wire kept under constant tension the frequency of oscillation is (a)inversely proportional to the length of the wire (b) directly proportional to the length of the wire (c)not promotional to the length of the wire (d)as long as the length of the wave.

45. The continuous reflection of sound is called (a)reverberation (b)total internal reflection (c)echo (d)deflection.

46. Interference occurs when? This is a pattern created when wave from different sources or which have been allowed to pass through different directions are made to super impose on each other. (a)resultant pattern shows regions of maximum displacement and regions of no displacement (b)resultant pattern shows total annihilation (c)there is a clash of waves (d) resultant pattern shows convertion to other forms.

47. The velocity of a water wave is 6cm per second and the frequency is 10 KHz calculate. The distance between successive crests of the wave. (a)6×10^{-6}m (b)10×10^{-6} (c)6×10^6km (d) 6×10^{-6}cm

48. The phenomenon in which waves generally undergo change in direction when the density of the medium changes is called (a)refraction (b)diffraction (c)reflection (d)lateral inversion.

49. When are two sources of waves said to be coherent (a)if the phase difference between them is constant (b)if the waves maintain the same frequency (c)if the waves are of the same type (d)if the waves have the same velocity.

50. A radio station broadcast at a frequency of 300KHz. If the speed of the wave is 3×10^8m/s. Calculate the period and wave length of the wave (a) $33. \times 10-6$, 0.1Km (b)$3.3 \times 10-6$, 0.1km (c) 3.3×10^{-6}, 0.1km (d) 3.3×10^{-6}, 0.1km.

PHY 1101: General Physics I   **Time: 1.30mins**

Instruction: Answer all questions

1. Write down using dimensional analysis the unit of impulse _____

2. Given the equation, $\tan \theta = \frac{\sin \theta}{\cos \theta}$, Why do we declare this equation dimensionally not homogenous

   _____?

3. Rectilinear acceleration occurs when _____?

4. A car of mass 600kg travelling at 54kmh^{-1} is bought to rest in 3.0 seconds. Calculate the average deceleration _____?

5. If a force of 20N acts on a body for 3seconds. What is the change in momentum _____?

6.

7. Two forces 10.0N and 3.0N, act in opposite direction on a body of mass 10kg. Calculate the acceleration of the body _____.

8. For a soldier aiming at a target, at what angle would be position his raffle to get the maximum range _____.

9. Given that; Vectors a = i+2j-3k, and b=2i-3j +4k. Find a. b _____?

10. A projected stone describes a parabola. Write down a simple equation to determine the resultant velocity _____?

11. Two balls of masses 8kg moving in opposite direction with velocities 5m-1 and 2m-1 respectively collide with each other. If A and B stick together after collision. Calculate their common velocity after impact

    _____

12. A bucket full of sand, has a mass 40kg, is drawn out of a well by means of a rope. If the depth of the well is 5m, how much work has been done. Take g = 10ms^{-2} _____.

13. The statement, "the net heat energy added to the system equals the change in the internal energy of the system plus the work done by the system" is ascribed to _____.

14. The volume of dry air at 27^{0}C is 100cm. fine its volume at 57^{0}C if the pressure is kept constant

    _____.

15. If 500J is added to a gas it expands and does 200J of work. What is the change in the internal energy of the gas _____?

16. Distinguish between heat capacity and specific heat capacity of a substance by the use of their S.I. units only _____.

17. The unusual behaviour of water between 0^0C and 4^0C is otherwise known as _____ .

18. The phenomenon of land and sea breezes is the natural application of _____ process.

19. What is the period of a wave of wavelength 60m at a speed of 60ms^{-1}_____

20. In a stationary wave, the points which are permanently at rest are called _____?

21. The ability of all waves to spread round corners is called _____?

22. How many minutes will it take to heat 3kg of water from 28^0C in an electric kette which takes 6A from a 220V supply? (Specific heat capacity of water is 4180JKg^{-1}K^{-1}) _____

23. Plane polarized light can be produced by passing light through crystals such as _____?

24. Two sounds of frequencies f$_1$=25Hz and f$_2$=30Hz, produce boats. What is the beat frequency _____?

25. When does eclipse of the sun occur _____?

26. A soldier 408m from a cliff fires a raffle. He hears the echo from the cliff after 2.4sec. Calculate the speed of sound in air _____.

27. Draw a simple ray diagram to show the formation of infinite number of images when two plane mirrors are placed parallel to each other _____

28. How is a virtual image formed _____

29. If the angle of incidence of a ray from air to water is 50^0 and the refractive index is 1.33. Calculate the direction of the refracted ray _____?

30. The fish in water enjoys a full view of everything above water through the process of _____?

31. An instrument used in the ship for the purpose of measuring the sea depth is called _____?

32. A stream flows west to east with a speed of 3ms^{-1}. A boy swims north to south with a speed of 4ms^{-1} relative to the water. What is the velocity of the boy relative to the shore _____?

33. Name the three primary colours _____?

34. The power of a lens is given by _____?

35. Mention four example of vibrating instruments that can produce sound _____

_____?