**CHAPTER ONE: MEASUREMENT AND UNIT**

1. In order to remove the error of parallax when taking measurements with a meter rule, the eye should be focused (a) slantingly towards the left on the markings (b) slantingly towards the right on the markings **(c) vertically downwards on the markings** (d) vertically upwards on the markings

2. Which of the following represents the correct precision if the length of a piece of wire is measured with a meter rule? (a) 35mm **(b) 35.0mm** (C) 35.00mm (d) 35.01mm

3. Which of the following readings cannot be determined with a meter rule? **(a) 2.56cm** (b) 2.55cm (c) 2.50cm (d) 2.05cm (e) 2.00cm

4. Which of the following instruments has a reading accuracy of 0.5mm? (a) vernier caliper (b) micrometer screw gauge **(c) meter rule** (d) protractor (e) spring balance

5. Which of the following can be used to measure accurately to three decimal places in centimeters? (a) meter rule (b) ruler (c) vernier caliper **(d) micrometer screw gauge** (e) none of the above

1. Diameter of a small ball bearing
2. Thickness of a piece of paper
3. Diameter of a measuring cylinder
4. Length of a piece of wire

6. Which of the above can be measured using a micrometer screw gauge? (a) I, II and IV only **(b) I and II** **only** (c) II and III only (d) III and IV only

7. The unit of moment of a couple is measured in **(a) Nm** (b)

8**.** This of the following is equivalent to kgms (a)

9. Which of the following quantities has the same unit as the Watt? (a) force time (b) force distance (c) force acceleration **(d) force velocity**

10. The physical quantity that has the same dimensions as impulse is? (a) energy **(b) momentum** (c) surface tension (d) pressure

11. The dimensions of surface tensions are (a) (b) **(c)**  (d)

12. Which of the following is the dimension of pressure? **(a)**  (b) (c) (d)

13. At what respective values of x, y and z would the unit of force, the newton, be dimensionally equivalent to (a) -1, 1, 2 **(b) 1, 1, -2** (c) 1, -1, 2 (d) -1, 1, 2

14. What is the percentage reading error in measuring a distance of 5.00cm using a meter rule marked in mm? (a) 10.0% (b) 5.0% **(c) 1.0%** (d) 0.5%

15. The external and internal diameters of a tube are measured as (32)mm and (211) mm respectively. Determine the percentage error in the thickness of the tube. (a) 27% (b) 14% **(c) 9%** (d) 3%

**CHAPTRER TWO: VECTORS AND SCALAR**

1. An example of scalar quantity is (a) velocity (b) weight **(c) electric charge** (d) acceleration due to gravity (e) momentum

2. Which of the following is a set of vectors? (a) force, mass and moment **(b) acceleration, velocity and moment** (c) mass, weight and density (d) mass, volume and density

3. Which of the following physical quantities is not a vector? (a) velocity **(b) work** (c) force (d) electric field intensity (e) magnetic induction

4. Which of the following quantities are scalar?

I. Electric potential II. Torque

III. Momentum IV. Kinetic energy

(a) II and III (b) I and II (c) III and IV **(d) I and IV only**

5. Which of the following is not a vector quantity? (a) force **(b) altitude** (c) weight (d) displacement (e) acceleration

6. A lorry travels 10km northwards, 4km eastwards, 6km southwards and 4km westwards to arrive at a point T. what is the total displacement? (a) 6m south **(b) 4km north** (c) 6km north (d) 4km east

7. A boy travels 12km eastwards to a point B and then 5km southwards to another point C. calculate the difference between the magnitude of the displacement of the boy and the distance travelled by him. **(a) 4.0km** (b) 7.0km (c) 13.0km (d) 17.0km (e) 30.0km

8. An object moves 4m eastwards (E) and then 3m southwards (S). Its displacement from its original position is? (a) 1m SE **(b) 5m SE** (c) 7m SE (d) 12m SE

9. A man walks 1km due east and then 1km due north his displacement is (a) 1km N(b) 1km N **(c) 2km N** (d) 2km N E (e) 2km NE

10. A man walks 8km north and then 5km in a direction east of north. Find the distance from his starting point. (a) 11.36km (b) 12.36km **(c) 13.00km** (d) 14.36km

**CHAPTER THREE: MOTION**

1. During the same interval, it is observed that a train travels the same distance as does a lorry. The two vehicles therefore have the same (a) uniform acceleration (b) instantaneous velocity (c) initial velocity (d) average velocity **(e) average speed**

2. A moving object has a uniform acceleration. Its (a) displacement increases at a constant rate (b) speed is directly proportional to time (c) velocity varies inversely with time **(d) velocity increases by equal amounts in equal time intervals.**

3. when a ball rolls on a smoot level ground, the motion of it’s center is (a) translation (b) oscillatory (c) random **(d) rotational**

4. If a body moves with a constant speed and at the same time undergos an acceleration, it’s motion is said to be **(a) circular** (b) oscillatory (c) rectilinear (d) rotational

5.The motion of a moving skin of a talking drum can rightly be described as (a) translational (b)random (c) rotational **(d) oscillatory** (e) transitory

6. A car moving with a soeed of 90km/hr was brought uniformly to rest by the application of the breakes in 10s. How far did the car travel after the breaks were applied? (**a) 125m** (b) 150m (c) 250m (d)15km

7. Two particle X and Y starting from rest cover the same distance. The acceleration of X is twice that of Y, the ratio of the time taken by X to that taken by Y is. (a) (b) 2 **(c) 1/** (d) (e) 4

8. The driver in a motor car of which the total mass is 800kg and which is travelling at 20m/s, suddenly observes a stationary dog in his path 50m ahead. If the car brakes exert a force of 2000N, what will most likely happen? (a) the car will be able to stop immediately the driver notices the dog **(b)** **the car will stop 30m after hitting the dog** (c) the car will stop 20m in front of the dog (d) the driver will quickly reverse the car (e) the car will stop 5m beyond the dog.

9. If a car starts from rest and moves with a uniform acceleration of 10m/ for ten seconds. The distance it covers in the last one second of it’s motion is **(a) 95m** (b) 100m (c) 500m (d) 905m (e) 1000m

10. A body starts from rest and moves with uniform acceleration of 6m/. What distance does it cover in the third second? **(a) 15m** (b) 18m (c) 27m (d) 30m.

**CHAPTER FOUR NEWTONS LAW**

1. A body of mass 100g moving with a velocity of 10.0m/s collides with a wall. If after the collision, it moves with a velocity of 2.0m/s in the opposite direction, calculate the change in momentum. (a) 8.0Ns **(b) 1.2Ns** (c) 12.0Ns (d) 80.0Ns

2. When taking a penalty kick, a footbaler applies a force of 30.0N for a period of 0.05s. if the mass of the ball is 0.075kg, calculate the speed with which the ball move off. (a) 4.50 (b) 11.25 **(c) 20.00** (d) 45.0

3. A jet engine develop a trust of 270Ns when the velocity of the exhaust gases relative to the engine is 300. What is the mass of the material ejected per second? (a) 81.00kg (b) 9.00kg **(c) 0.90kg** (d) 0.09kg

4. A ball of mass 200g travelling with a velocity of 100m collides with another ball of mass 800g moving at 50m in the same direction. If they stick together, what will be their common velocity? (a) 20m (b) 50m **(c) 60m** (d) 75m (e) 150m

5. A ball of mass 6.00kg moving with a velocity of 10.0m collides with a 2.00kg ball moving in the opposite direction with a velocity of 5.0m. After the collision, the two balls coalesce and move in the same direction. Calculate the velocity of the composite body (a) 5.00m **(b) 6.25m** (c) 8.75m (d) 12.00m (e) 30.00m.

6. A body of mass 4.2kg moving with velocity 10m due east, hits a stationary body of mass 2.8kg. If they stick together after collision and move with velocity **v** due east, calculate the value of v. (a) 3m **(b) 6m** (c) 7m (d) 15m (e)17m

7. A gun of mass 2.0kg fires a bullet of mass 1.6 due east. If the bullet leaves the nozzle of the gun with a velocity of 150m,what is the recoil velocity of the gun? (a) 150m due west (b) 1.2 due west **(c) 1.2m due west** (d)1.2mdue east (e) 150m due east.

8. A machine gun with a mass of 5kg fires a 50g bullet at a speed of 100m. The recoil speed of the machine gun is (a) 0.5m (b) 1.5m **(c) 1m** (d)2m (e) 4m

9. The recoil velocity of a gun is less than that of the bullet fired from it because of the difference in (a) force **(b)** **mass** (c) time (d) momentum

**CHAPTER FIVE: CIRCULAR MOTION**

1. An object moving in a circle has an acceleration towards its center. This is proved by (a) a change of momentum **(b) a centripetal force** (c) a centrifugal force (d) newton’s force of gravitation (e) an acceleration due to gravity

2. A gramophone record takes 5s to reach its constant angular velocity of rad from rest. Find its constant angular acceleration. (a) 20.0 rad (b) 1.3 rad **(c) 0.8 rad** (d) 0.4 rad

3. Which of the following statement is/are correct about a car moving moving aroind a circular track at a uniform speed.

1. Its velocity is uniform (II) it undergoes an acceleration (III) the friction between its tyres and the ground provides the necessary centripetal force.

(a) I only (b) II only (c) III only **(d) II & III only** (e) I,II,&III

4. A particle moves in a circular orbit of radius 0.02m. if the speed of the particle is 0.88m, calculate its frequency in cycles per second. (a) 2.0 (b) 8.8 **(c) 7.0** (d) 17.0 (e) 17.6.

5. The force required to make an object of mass, m, travelling with velocity, v, turn in a circle of radius r is **(a)**  (b) (c) (d) (e) .

6. A car of mass 1500kg goes round a circular curve of radius 50m at a speed of 40m. The magnitude of the centripetal force on the car is (a) (b) (c) **(d) .**

7. A stone tied to a string is made to revolve in a horizontal circle of radius 4m with an angular speed of 2rad/s. With that tangential velocity will the stone move off the circle if the string cuts? (a) 16.0m **(b) 8.0m** (c) 6.0m (d) 2.0m (e) 0.5m

8. An object of mass 6kg is whirled round a horizontal circle of radius 3m by a revolving string inclined to the vertical. Calculate the tension in the string if the uniform speed of the object is 9m (g = 10m). (a) 27N (b) 54N (c) 162N **(d) 173N.**

**CHAPTER SIX: SIMPLE HARMONIC MOTION**

1. The motion of a body is simpleharmonnic if the (a) acceleration is always directed towards a fixed point (b) path of motion is a straight line **(c) acceleration is directed towards a fixed point and proportional to its distance from the point** (d) acceleration is constant and directed towards a fixed point.

2. A body moves in SHM between two points 20m on the straight line joining the points. If the angular speed of the body is 5rad, calculate its speed when it is 6m from the center of the motion. (a) 20m (b) 30m **(c) 40m** (d) 50m.

3. A particle executing a simple harmonic motion has a frequency of 50Hz and an amplitude of 8.0 Calculate the maximum velocity of its motion. **(a) 2.51m** (b) 2.20m (c) 2.00m (d) 1.50m.

4. A vibrating diving board has a frequency of 20Hz. What is the angular velocity of the board? (a) 2 (b) 20 (c) 30 **(d) 40** (e) 53.

5. The bob of a simple pendulum of mass 0.025kg is displaced 0.1m from its equilibrium position. If the angular frequency is 4rad and assuming SHM, calculate the energy of the system. (a) 5J **(b) 2J** (c) 5J (d) 7.9J.

6. Which of the following processes will increase the rate of oscillation of a pendulum? (a) increasing the length of the pendulum **(b) decreasing the length of the pendulum** (c) increasing the mass of the pendulum (d) decreasing the mass of the pendulum (e) decreasing the amplitude of oscillation of the pendulum.

7. Which of the following affects the period of a simple pendulum? I. Mass of the pendulum bob II. Length of the pendulum III. Acceleration due to gravity (a) I,II and III **(b) II and III only** (c) I and III only (d) I and II only.

8. A student found out from a simple pendulum experiment that 20 oscillations were completed in 39 seconds. What is the period of oscillation of the pendulum? (a) 8.0s (b) 3.8s (c) 2.0s **(d) 1.9s** (e) 0.5s.

**CHAPTER SEVEN: PROJECTILE**

1. A body is projected horizontally from the top of a hill with a velocity of 20. if it reaches the ground 4s later, what is the height of the hill? (g = 10). (a) 20m (b) 40m **(c) 80m** (d) 160m (e) 200m

2. An object is projected with a velocity of 100 at an angle of 60 to the vertical. Calaulate the time taken by the object to reach the higest point (g = 10). **(a) 5.0s** (b) 8.7s (c) 10.0s (d) 17.3s (e) 20.0s

3. A projetile is lunched from the ground levels with a velocity of 10 at an angle of 15 to the horizontal. Calculate tha range. (a) 17.32m (b) 8.66m **(c) 5.00m** (d) 2.50m

4. An object is projected from a height of 80m above the ground with a velocity of 40 at an angle of 30 to the horizontal. The thime of flight is (a) 16s (b) 10s (c) 8s **(d) 4s**

**CHAPTER EIGHT: GRAVITATIONAL FIELD**

1. Gives that the gravitational constant is 7, what is the force of attraction between mass of copper hanging one meter away from a mass of iron? (a) 7 N (b) 7 N **(c) 7 N** (d) 7 N (e) 7 N

2. A skylab is moving in a circular orbit or radius round the center of the earth of radius R.

3. An astronaut experiences weightlessness in space when he (a) does not hold anything while in space (b) is midway between the sun and the earth **(c) is free from the earth’s gravitational** **field** (d) is walking on the moon

4. Two bodies have masses in the ratio 3 : 1. They experience forces which impact to them accelerations in the ratio 2 : 9 respectively. Find the ratio of the forces the masses experience. (a) 1 : 4 (b) 2 : 1 **(c) 2 : 3** (d) 2 : 5.

5. An astronaut has a mass of 100kg on the earth’s surface where the acceleration due to gravity is 10m/. What would be his mass on the surface of another planet where acceleration due to gravity is one half of earth’s value. **(a) 100kg** (b) 75kg (c) 50kg (d) 20kg (e) 10kg.

6. The gravitational force of the moon is one sixth that of the earth. if a body weights 6.0N on the moon, calculate its weight on the earth. **(a) 36.0N** (b) 12.0N (c) 6.0N (d) 2.0N (e) 1.0N.

7. The force experienced by an object of mass 60.0kg in the earht’s gravitational field is 1.002 . What is the intensity of the gravitational field? (a) 0.60Nk **(b) 1.67Nk** (c) 6.12 (d) 9.81m.

8. A satellite moves in a circular orbit of radius 2R round the earth. What is the accleration of the satellite? (a) 4g2 **(b) g/4** (c) g/2 (d) 2g

9. What is the accelration due to gravity ‘g’ on the moon if g is 10ms-2 on the earth? (a) 0.10ms-2 (b) 0.74ms-2 **(c) 1.67ms-2** (d) 10.00ms-2

10. The earth is four times the size of the moon and the accleartion due to gravity of the earth is 80 times that on the moon. The ratio of the mass of the moon to that of the earth is (a) 1:4 (b) 1:80 (c) 1:320 **(d) 1:1280**

11. A satelite is in a parking orbit, if its period is (a) more than the period of the earth **(b) equal to the period of the earth (**c) the square of the priod of the earth (d) less than the period of the earth

**CHAPTER NINE:** **EQUILIBRIUM OF FORCES**

1. The term torque means

1. **The moment of a couple about an axis**
2. The resultant of several forces acting on a body in equilibrium
3. Two equal and opposite forces whose lines of action do not coincide.
4. Two coplanar forces at right angles to each other.
5. The equilibrant of two concurrent forces.

2. An object is acted upon by a system of parallel forces causing the object to be in static equilibrium. Which of the following statements is not correct?

1. The resultant of the parallel forces is zero
2. The algebraic sum of all the moments of the forces is zero.
3. **All the parallel forces must be equal in magnitude and direction.**
4. The sum of the forces in one direction must be equal to the sum of forces in the opposite direction.

3**.** A technician applied a force of 250N at the end of a spanner of length 0.25m in order to loosen a nut. Determine the moment applied to the nut. (a) 1000.0Nm (b) 625.0Nm **(c) 62.5Nm** (d) 10.0N

4. A weight of 1000g hangs from a lever 20cm to the right of the fulcrum. At the left is a 500g weight 20cm from the fulcrum. If a 200g weight is Xcm away from the fulcrum, what is the value of X that will make the lever balance? **(a) 50cm** (b) 20cm (c) 10cm (d) 30cm (e) 70cm

5. Two masses 40g and 60g respectively, are attached firmly to the ends of a light meter rule. The centre of gravity of the system is (a) at the mid-point of the meter rule (b) 40cm from the lighter mass **(c) 40cm from the heavier mass** (d) 60cm from the heavier mass (e) indeterminate because the meter rule is light.

6. A cone is in unstable equilibrium has its potential energy **(a) decreased** (b) increased (c) unchanged (d) oscillating

**CHAPTER TEN: WORK ENERGY AND POWER**

1. Which of the following statements correctly defines quantitatively, the workdone by a force? The product of the force and the distance moved. **(a) parallel to the lien of action of the force from a reference point** (b) perpendicular to the line of action of the force from a reference point (c) on a line through the reference point (d) by the object

2**.** One newton x 0] one-meter equals? (a) one watt **(b) one joule** (c) one ampere (d) one kilogram (e) one meter

3. A stone of mass m kg is held h meters above the floor for 50s. the work done in joules over this period is (a) mh (b) mgh (c) mgh/50 **(d) 0**

4. A constant force of 40N acting on a body initially at rest gives it an acceleration of 0.1ms-2 for 4s. Calculate the workdone by the force (a) 8J (b) 10J **(c) 32J** (d) 160J

5**.** The area under a force-distance graph represents (a) acceleration (b) velocity (c) power (c) work **(d) momentum**

6**.** A boy drags a bag of rice along a smooth horizontal floor with a force of 2N applied at an angle of 60 to the floor. The work done after a distance of 3m is (a) 6J (b) 5J (c) 4J **(d) 3J**

7.Which of the following statement is not correct?

1. The P.E of a body is equal to the work the body can do because of its position
2. The P.E is the ability a body possesses to do work because of stored up energy.
3. **The P.E is the ability a body possesses to do work because of stored up energy owing to the movement of its molecules.**
4. Energy cannot normally be destroyed but can be changed into another form of energy.
5. A body can have both kinetic and potential energy at the same time.

8. An object of mass 50kg is released from a height of 2m. find the kinetic energy just before it strikes the ground. (a) 250J **(b) 1000J** (c) 10000J (d) 100000J (g = 10ms-2)

8. A force of 6N acts horizontally on a stationary mass of 2kg for 4s. the kinetic energy gained by the mass is (a) 12J (b) 24J (c) 48J (d) 72J **(e) 144J**

9. Which of the following correctly describes the energy changes in the generation of light by hydro-electric power station?

1. Electrical – mechanical – potential –light
2. Potential – mechanical –electrical – light
3. Mechanical – sound – electrical – light
4. **Kinetic – mechanical – electrical –** **light**

10. How long will it take a 60kg man to climb a height of 22m if he expended energy at the rate of 0.25KW? (a) 5.3s (b) 34.5s (c) 41.6s **(d) 52.8s**

11. On top of a spring of force constant 500Nm-1 is placed a mass of 5 x 10-3kg. If the spring is compressed downwards by a length of 0.02m and then released, calculating the height to which the mass is projected. (g = 10ms-2) (a) 1m (b) 8m (c) 4m **(d) 2m**

12. If a pump is capable of lifting 5000kg of water through a vertical height of 60m in 15min, the power of the pump is (a) 2.5x104Js-1 (b) 3.3x103Js-1 **(c)2.5x105Js-1 (g = 10ms-2)**

**CHAPTER ELEVEN: FRICTION**

1. Which of the following statements are true of friction?

1. Frictional force opposes motion
2. Rolling friction between two surfaces is greater than sliding friction between the same two surfaces.
3. Co-efficient of friction is proportional to the limiting frictional force.
4. It will be impossible to stop a moving car if there were no friction between the road and the tyres.

(a) I, II, III and IV (b) I, III and IV only **(c) I and IV only** (d) I, II and IV only (e) II, III and IV only

2.The coefficient of friction between two perfectly smooth surface is (a) one (b) half **(c) zero** (d) infinity

9.Which of the following could be effectively used to reduce friction? (a) water (b) petrol (c) kerosene **(d) grease**

3. What is the coefficient of static friction between a load of mass 0.75kg and a horizontal surface, if the limiting frictional force is 5N? (g = 10ms-2) (a) 0.066 (b) 0.15 **(c) 0.66** (c) 1.50 (e) 3.75

4. A block of mass 50kg slides down a plane inclined at an angle of 30o to the horizontal. If the coefficient of friction is 0.4, calculate the frictional force between the two surfaces (g = 10m/s2) (a) 200.00N **(b) 173.21N** (c) 100.00N (d) 62.50N

5. A spherical metal ball falling through a viscous liquid is acted upon by the

1. Weight of the ball
2. Viscous force of the liquid of the ball
3. Upthrust of the liquid on the ball

(a) I and II only (b) I and III only (c) II and III only **(d) I, II and III**

**CHAPTER TWELVE: SIMPLE MACHINE**

1. In practice, a machine can never be 100% efficient. This statement implies that;

1. The mechanical advantage of any machine is always less than 1.
2. The velocity ratio of a machine is always more than 1.
3. The velocity ratio of a machine is never greater than the mechanical advantage.
4. **The useful work obtained from a machine is always less than the workdone by it**
5. The ratio of the work output of a machine to the work input is always greater than 1.

2. Which of the following levers is not in the same class as the others in respect of the locations of the load, the effort and the fulcrum? (a) pincers (b) see-saw (c) pliers (d) sugar tongs **(d) scissors**

3. Which of the following instruments, in its normal use, serves as a first class lever? **(a) pair of scissors** (b) a pair of sugar tongs (c) a bottle opener (d) a knife (e) a nut cracker

4. A block and tackle system is used to lift a load of 20N through a vertical height of 10m. if the efficiency of the system is 40%, how much work is done against friction? (a) 80J (b) 120J **(c) 300J** (d) 500J

5. Which of the following actions will improve the efficiency of a pulley system? **(a) reducing the mass of the pulley** (b) increasing the frictional force between the string and the pulley (c) increasing the mass per unit length of the string of the pulley (d) increasing the mass of the pulley

6. An inclined plane of angle acting as a simple machine has a velocity ratio (a) sin **(b) 1/sin** (c) cos (d) 1/cos (e) sin cos

7. An inclined plane which makes an angle of 30o with the horizontal has a velocity ratio of **(a) 2** (b) 1 (c) 0.866 (d) 0.50

8. The pitch of a screw jack is 0.45cm and the arm is 60cm long. If the efficiency of the jack is calculate the mechanical advantage (a) 400 (b) 300 **(c) 200** (d) 150

9. Calculate the velocity ratio of a screw jack of pitch 0.3cm if the length of the tommy bar is 21cm (a) 1/140 (b) 14 (c) 70 **(d) 140**

10. An electric water pump rated 1.5KW, lifts 200kg of water through a vertical height of 6meters in 10 seconds. What is the efficiency of the pump? (a) 90.0% (b) 85.0%  **(c) 80.0%**  (d) 65.0% [g = 10ms2 neglect air resistance]

**CHAPTER THIRTEEN: ELASTICITY**

1. The total length of a spring when a mass of 20g is hung from its end is 14cm, while its total length is 16m when a mass of 30g is hung from the same end. Calculate the unstreteched length of the spring assuming Hooke’s law is obeyed. (a) 9.33cm **(b) 10.00cm** (c) 10.66cm (d) 12.00cm (e) 15.00cm

2. A string of length 4m is extended by 0.02m when a load of 0.4kg is suspended at its end. What will be the length of the string when the applied force is 15N? (g = 10ms-2) (a) 5.05m (b) 6.08m (c) 4.05m **(d) 4.08m**

3. A load of 20N on a wire of cross-sectional area 8 x 10-7m2 produces an extension of 10-4m. Calculate Young’s modulus for the material of the wire if its length is 3m **(a) 7.0 x 1011Nm-2** (b) 7.5 x 1011Nm-2 (c) 8.5 x 1011Nm-2 (d) 7.0 10-3 [young modulus = 1.1x1011Nm-2]

4. The energy per unit volume of stretched wire given by the relation (E = energy per unit volume) is (a) E = 2 strain x stress (b) E = 2 strain stress (c) E = 1/2 stress strain **(d) E = 1/2 strain x stress**

5. If a wire 30m long is extended to 30.5m by a force of 300N, find the strain energy of the wire (a) 750.00J **(b) 75.00J** (c) 7.50J (d) 0.75J

**CHAPTER FOURTEEN: PRESSURE**

1. A man on a bench will exert the greatest pressure on the bench when he (a) lies flat on his back (b) lies flat on his belly (c) stands on both feet (d) stands on one foot only **(e) stands on the toes of one foot**

2. A rectangular solid block has length 10cm, breadth 5cm and height 2cm. If it lies on a horizontal surface, and has density 100kg/m3, calculate the pressure it exerts on the surface.

3. For accurate measurement of atmospheric pressure, it is preferable to use which of the following instrument (a) pressure guage (b) water manometer (c) mercury manometer (**d) fortin barometer**

4. The height at which the atmosphere ceases to exist is about 80km. if the atmospheric pressure on the ground level is 760mmHg, the pressure at a heath of 20km above the ground level is (a) 380mmHg (b) 570mmHg (c) 190mmHg (d) 480mmHg

1. Density of the liquid
2. Depth below the surface of the liquid
3. Surface area of the liquid

5. In which of the statements above will pressure be dependent? (a) I, II, and III (b) I and III only (c) I and II only (d) II and III only

6. Mercury is suitable as a barometric fluid because it (a) expands uniformly (b) is opaque **(c) is several times denser than water** (d) is a good conductor of heat

7. Normal atmospheric pressure at sea-level is 105N/m2. The acceleration due to gravity is approximately 10m/s2. If the atmosphere has uniform density 1kg/m3, the height is (a) 100m (b) 1000m (c) 10000m (d) 100,000m (e) 1000000m

8. A well 1km deep is filled with a liquid of density 950kg/m3. If the atmospheric pressure is 1.00x105Nm2 and g = 10m/s2, the pressure at the bottom of the well is (a) 9.6x106N/m2 (b) 9.5x105N/m2 (c) 9.4x106N/m2 (d) 9.5x105N/m2

9. Two divers G and H are at depth 20m and 40m respectively below the water surface in a lake. The pressure on G is P1 while the pressure on H is P­2, if the atmospheric pressure is equivalent to 10m of water, the value of P2/P1 is (a) 0.50 (b) 60 (c) 1.67 (d) 2.00 (e) 3.00

**CHAPTER FIFTEEN: DENSITY AND UPTHRUST**

1. The density of a solid is defined as the (a) mass of the solid compared to the mass of an equal volume of water (b) amount of water displaced when a unit mass of the solid is immersed in it (c) weight per unit volume of the solid (d) volume per unit mass of the solid (**e) mass per unit volume of the solid**

2. The density of water is 1gcm-3 while that of ice is 0.9gcm-3. Calculate the charge in volume when 90g of ice completely melted (a) 0cm3 (b) 9cm3 (c) 10cm3 **(d) 90cm3** (e) 100cm3

3. A ship floating in clear water of density 1000kgm-3 moves to sea water of density 1050kgm-3 where it floats again. The upthrust on the ship then (a) stays constant (b) decreases **(c) increases** (d) increases by 0.05 times (e) decreases by 0.05 times

4. A test tube of radius 1.0cm is loaded to 8.8g. if it is placed upright in water, find the depth to which it would sink. (g = 10ms-2, density of water = 1000kgm-3) (a) 25.5cm **(b) 2.8cm** (c) 28.0cm (d) 5.2cm

5. A balloon of volume 100m3 and mass 2kg is filled with helium of density 0.18kgm-3 at ground level. The surrounding air has a density of 1.28kgm-3. Calculate the maximum mass which the balloon can lift at the ground

6. If the relative density of a metal is 1.9. what will be the mass of 20cm-3 of the metal when immersed in water? (a) 380g (b) 400g (c) 360g **(d) 38g** (e) 180g

7. An object of volume 1m3 and mass 2kg is totally immersed in a fluid of density 1kgm-3. Calculate is apparent weight (a) 20N **(b) 10N** (c) 2N (d) 1N

8. A solid of weight 0.600N is totally immersed in oil and water respectively. If the upthrust in oil is 0.210N and the relative density of oil is 0.875, find the upthrust in water (a) 0.600N (b) 0.360N **(c) 0.240N** (d) 0.180N

9. A uniform cylindrical block of wood floats in water with one third of its length above the water level. In a liquid of relative density 0.8, what fraction of its height will be above the liquid level? (a) 1/6 (b) 1/5 (c) 1/3 (d) 4/5 **(e) 5/6**

**CHAPTER SISXTEEN: SURFACE TENSION (FLUID)**

**1.** I. mass II. Density III. Temperature IV. Nature of substance. Which of the above affects diffusion? (a) I, II and IV only **(b) II, III and IV only** (c) I, II and IV only (d) I and II only

2. If it takes 5.0 hours to drain a container of 540.0m3 of water. What is the flow rate of water from the container in (a) 32.5 (b)31.5 (c) 30.8 **(d) 30.0**

3. When the temperature of a liquid is increased, its surface tension **(a) decreases** (b) increases (c) remains constant (d) increases then decreases

4. Which of the following can not be correctly explained using the concept of surface tension? **(a) floating of balloon in the air** (b) crawling of insects of the surface of a pond (c) formation of spherical droplets when water drips from a tap (d) formation of soap bubbles.

5. It is observed that water will wet a clean glass because the (a) cohesion of water to glass is stronger than the cohesion of water molecules (b) adhesion of water molecules is weaker than the cohesion of water to glass (c) cohesion of water to glass is weaker than the cohesion of water molecules **(d) adhesion of water molecules is stronger than the cohesion of water molecules**

**CHAPTER SEVENTEEN: TEMPERATURE**

1. Absolute zero temperature can be defined as the temp **(a) at which the average kinetic energy of particles making up a body is zero** (b) at which pure water changes to ice at standard atmospheric pressure (c) of zero degree on the Celsius scale (d) at which pure water and steam co-exist.

2. The absolute zero temperature is defined as the temperature at which **(a) thermal motion ceases** (b) the temperature of a gas is 273oC (c) ice melts (d) the volume of real gas is maximum (e) the pressure of a real gas is maximum

1. High terminal capacity
2. High sensitivity
3. Easy readability
4. Accuracy over a wide range of temperatures.

3. From the statements above, the qualities of a good thermometer is (a) I, III and IV **(b) II, III and IV** (c) I and II (d) I, II, III and IV

4. In the construction of a liquid in glass thermometer, the sensitivity is enhanced if the **(a) volume expansivity of the liquid is high** (b) thermal conductivity of the liquid is low (c) diameter of the capillary tube is large (d) the boiling point of the liquid is high

5. One special advantage of alcohol over mercury as a thermometric liquid is **(a) low freezing point** (b) high specific heat capacity (c) low boiling point (d) low density

6. The clinical thermometer differs from other mercury in glass because it has I. a constriction II. A narrow bone III. A wide rage IV. A short range (a) I and II only (b) II and III only **(c) I and IV only** (d) I, II and III only (e) I, II, III and IV only

7. The thermometric property of a thermocouple is that (a) volume changes with temperature **(b) electromotive forces changes with temperature** (c) atmospheric pressure changes with temperature (d) resistance changes with temperature

8. A temperature of 20oC is the same as (a) 36oF **(b) 68oF** (c)11.1oF (d) 43.1oF

9. A well lagged bar of 100cm has its ends maintained at 100oC and 40oC respectively, what is the temperature at a point 60cm from the hotter end? (a) 58oC (b) 62oC (c) 64oC **(d) 76oC**

10. The resistance of a platinum wire at the ice and steam point are 0.7ohm and 1.05ohm respectively. Determine the temperature at which the resistance of the wire is 0.90ohm (a) 43.0oC (b) 50.0oC (c) 69.0oC **(d) 57.0oC**

**CHAPTER EIGHTEEN: THERMAL EXPANSION**

1. In which of the following devices is the expansion of solid a disadvantage I. fire alarms II. Thermostat III. Simple pendulum IV. Bimetallic thermometer (a) I only (b) II only **(c) III only** (d) I and IV only

2. When very hot water is poured into a thin-walled glass container, it is less likely to break because (a) thin glass does not expand fast (b) glass can withstand very high temperature **(c) all parts of the container get heated uniformly** (d) the other part of the container is cooled than the inner part (e) the molecules of glass are too far apart to cause breakage of the container.

3. A metal has a linear expansivity of 0.002K-1. What temperature rise would cause it to increase by1/10 of its original length (a) 200K (b) 250K **(c) 50K** (d) 1000K

4. Two metals P and Q are heated through the same temperature difference. If the ratio of the linear expansivities of P to Q is 2:3 and the ratio of their length is 3:4 respectively, the ratio of the increase in length of P to Q is **(a) 1:2** (b) 2:1 (c) 8:9 (d) 9:8

5. A thin square sheet of metal of sides 0.20m is heated from 15oC to 75oC. If the linear expansivity of the metal is 1.2x10-5K-1, find the increase in its area (a) 6.05x10-5m2 **(b) 5.76x10-5m2** (c) 5.05x10-5m2 (d) 3.75x10-5m2

6. A metal of volume 40cm2 is heated from 30oC to 90oC, the increase in volume is (a) 1.20cm3 (b) 0.40cm3 (c) 0.12cm3 (d) 4.00cm3

7. The length of a side of a metallic cube at 20oC is 5.0cm. Given that the linear expansivity of the metal is 4.0x10-5K-1, find the volume of the cube at 120oC (a) 126.50cm3 (b) 126.25cm3 **(c) 126.00cm3** (d) 125.00cm3

8. Which of the following is observed when water at 0oC is heated to 4oC? (a) the water expands steadily (b) the volume of the water remains constant **(c) the volume of water contracts** (d) the density of water decreases

**CHAPTER NINTEEN: EXPANSION OF GASES**

1. Which of the following gas laws is equivalent to the work done? (a) pressure law (b) Van der Waal’s law **(c) Boyle’s law** (d) Charles’ law

2. A column of air 10.0cm long is trapped in a tube at 27oC. What is the length of the column at 100oC **(a) 12.4cm** (b) 13.7cm (c) 18.5cm (d) 37.0cm

3. Before starting a journey, the tyre pressure o f a car was 3x105Nm-2 at 27oC. At the end of the journey, the pressure rose 4x105Nm-2. Calculate the temperature of the tyre after the journey assuming the volume is constant. **(a) 400oC** (b) 300oC (c) 273oC (d) 127oC

4. If the volume of a gas increases steadily as the temperature decreases at constant pressure, the gas obeys (a) pressure law **(b) Charles’ law** (c) Graham’s law (d) Boyle’s law

5. When the volume of a given gas is halved and its temperature doubled, the pressure (a) remain constant **(b) increases by a factor of 4** (c) increase by a factor of 3 (d) decrease by a factor of 4.

**CHAPTER TWENTY: SOURCES OF ENERGY**

1. The amount of heat required to raise the temperature of a body is **(a) thermal energy** (b) thermal conduction (c) heat loss (d) specific heat capacity (e) thermal capacity

On a sunny day, sand on a beach is hotter than the sea water nearby mainly because (a) there is less sand than water (b) the specific heat capacity of water is higher than that of sand (c) the specific heat capacity of sand is higher than that of water (d) the specific

latent heat of water is higher than that of sand (e) the specific latent heat of sand is higher than that of water

2. Two liquids X and Y having the same mass are supplied with the same quantity of heat. If the temperature rise in X is twice that of Y, the ratio of specific heat capacity of X to that of Y is (a) 1:2 (b) 4:1 (c) 1:4 **(d) 2:1**

3. Two liquids, P at a temperature of 20oC and Q at a temperature of 80oC have specific heat capacities of 1.0Jkg-1C-1 and 1.5JKg-1C-1 respectively. If equal masses of P and Q are mixed in a lagged calorimeter, then the equilibrium temperature is (a) 44oC (b) 50oC (c) 56oC (d) 60oC **(e) 70oC**

4. When 100g of liquid L1 at 78oC was mixed with Xg of liquid L2 at 50oC, the final temperature was 66oC. Given that the specific heat capacity of L­2 is half that of L1, find X (a) 50g (b) 100g **(c) 150g** (d) 200g

5. Two thermos flasks of volume Vx and Vy are filled with liquid water at an initial temperature of 0oC. After some time, the temperature were found to be respectively.

The ratio of the heat flow into the flasks is (a) ¼ (b) ½ (c) 4 **(d) 1** (e) 2

6. An electric heater rated 220V, 1000 W is immersed into a bucket full of water. Calculate the mass of water if the temperature changes from 30oC to 100oC and the current flows for 300seconds. Specific heat capacity of water = 4200Jkg-1K-1 (a) 4.28kg (b) 42.86kg **(c) 1.02kg** (d) 7.14kg

7. Change of state is accompanied by change of (a) temperature (b) volume **(C) heat content** (d) temperature and volume (e) volume and heat content

8. The melting point of a solid is given at 80oC. If 105J of heat energy is required at this temperature to melt 10g of the solid, the specific latent heat of fusion of the solid is (a) 1.00x103Jkg-1 (b) 1.25x105Jkg-1 **(c) 1.00x107Jkg-1** (d) 8.00x108Jkg-1

**CHAPTER TWENTY ONE:**

1. When the vapour of a substance is in equilibrium with its own liquid, it is said to be (a) gaseous (b) unsaturated (c) liquefied (d) diffused **(e) saturated**

2. The saturated vaporu pressure of a liquid increases as the (a) volume of the liquid increases (b) volume of the liquid decreases **(c) temperature of the liquid increases** (d) temperature of the liquid decreases

3. The boiling point of water exceeds 100oC when (a) its vapour is less than the atmospheric pressure **(b) its vapour pressure is greater than atmospheric pressure** (c) it is slowly heated (d) it is rapidly heated

4. A pressure cooker saves both time and fuel in cooking because inside the cooker **the (a) boiling point of water is raised** (b) pressure is constant (c) heat is completely trapped (d) temperature is evenly distributed (e) volume of steam varies

5. Blowing air over a liquid aids evaporation by **(a) decreasing its vapour pressure** (b) decreasing its density (c) increasing its surface area (d) increasing its temperature

6. The small droplet of water that forms on the grass in the early of the morning is **(a) dew** (b) fog (c) mist (d) hail

7. Dew forms readily on a cloudless might because under this condition **(a) there is no sun to dry up the moisture** (b) there is no cloud from which moisture can fall (c) the earth loses heat by radiation more easily (d) the atmospheric pressure is very high.

8. The air temperature on a certain day was 26oC and the dew point of air was found to be 12oC. Calculate the relative humidity if the saturation vapour pressure of water at 26oC and 12oC are 19mm and 10mm of mercury respectively (a) 36.5% (b) 42.6% (c) 50.0% **(d) 52.6%**

9. At which of the following temperatures will the relative humidity of the air in a room be least if the dew point in the room is 20oC (a) 10oC (b) 15oC **(c) 20oC** (d) 25oC (e) 30oC

**CHAPTER TWENTY TWO: HEAT TRANSFER**

1. The temperature gradient across a copper rod of thickness 0.02m, maintained at two temperature junctions of 20oC and 80oC respectively is (a) 3.0x102km-1 **(b) 3.0x103km-1** (c) 5.0x103km-1 (d) 3.0x104km-1

2. What are the units of thermal conductivity? (a) kg m sec2 **(b) joule sec-1 K-1** (c) kg m (d) Newton sec-1 K-1 (e) m3

3. Which of the following properties makes metal ideal for cooking utensils? (a) high coefficient of expansion **(b) good conduction of heat** (c) low specific heat capacity (d) poor radiation of heat

4. Heat may be transferred by conduction, convection and radiation. By which of these methods does heat travel through vacuum? (a) conduction only (b) convection only **(c) radiation only** (d) all three methods (e) none of the methods

5. The heat from the sun reaches the earth by the process of (a) insulation (b) precipitation (c) conduction (d) convection (**e) radiation**

6. A room is heated by means of charcoal fire. An occupant of the room standing away from the fire is warmed mainly by (a) convection **(b) radiation** (c) conduction (d) reflection

7. The mode of heat transfer which does not require a material medium is (a) conduction **(b) radiation** (c) convection (d) propagation

8. Which of the following phenomena explains the fact that a house whose roof is coated with white paint will be cooler in the hot season than one coated with black paint? (a) conduction (b) convection (c) refraction **(d) reflection**

9. The vacuum in a thermos flask helps to reduce heat transfer by (a) convection and radiation **(b) convection and conduction** (c) conduction and radiation (d) radiation only

**CHAPTER TWENTY - THREE: STRUCTURE OF MATTER AND KINETIC THEORY**

1. The differences observed in solids, liquids and gases may be accounted for by (a) their relative masses (b) their melting points (c) the different molecules in each other them **(d) the spacing and forces acting between the molecules**

2. Form the kinetic theory of gases, temperature is a

1. Form of energy and is proportional to the total kinetic energy of the molecules.
2. Form of energy and is proportional to the average kinetic energy of the molecules.
3. Physical property and is proportional to the total kinetic energy of the molecules.
4. **Physical property and is proportional to the average kinetic energy of the molecules.**

3. The absolute temperature of a perfect gas is proportional to the average (a) potential energy of the molecules (b) separation between the molecules **(c) kinetic energy of the molecules** (d) velocity of the molecules

4. The pressure of a gas when cooled at constant volume will decrease because the molecules **(a) collide less frequently with the walls of the container** (b) have the same average kinetic energy (C) break up into smaller molecules (d) decreases in number

5. I. change of state II. Diffusion III. Radiation IV. Osmosis

Which of the processes above can be explained using the kinetic theory? (a) I, III and IV **(b) I, II and IV** (c) I, II III and IV (d) I, II and III

6. A few grains of table salt were put in a cup of cold water at a constant temperature and left undisturbed. Eventually all the water tasted salty. This action is due to (a) Convention (b) osmosis (c) capillarity **(d) diffusion**

7. The process by which molecules of different substances moves randomly is called (a) surface tension **(b) diffusion** (c) capillary (d) osmosis

8. I. Mass II. Density III. Temperature IV. Nature of substance

(a) I, II and IV only (b) II, III and IV only (c) I, II, III and IV (d) I and II only

**CHAPTER TWENTY FOUR: WAVE**

1. Which of the following is true of light and sound waves? **(a) they both transmit energy** (b) they both need a material medium for propagation (c) they are both transverse waves (d) their velocities in air are equal

2. Any line or section taken through an advancing wave in which all the particles are in the same phase is called the (a) wavelength (b) wave crest (c) wave trough (d) wave amplitude **(E) wave front**

3. A wave has a frequency of 2Hz and a wavelength of 30cm. the velocity of the wave is (a) 60.0ms-1 (b) 6.0ms-1 (c) 1.5ms-1 **(d) 0.6ms-**1

4. What is the frequency of the sound made by a siren having a disc with 32 holes and making 25 revolutions per second? (a) 80Hz (b) 600Hz **(c) 800Hz** (d) 1600Hz

5. In a sound wave in air the adjacent refractions and compressions are separated by a distance of 17cm. if the velocity of the sound wave is 340ms-1 determine the frequency (a) 10Hz (b) 20Hz **(c) 1000Hz** (d) 5780Hz

6. The equation of a wave is; Y = 0.005sin where x and Y are in metres and t in seconds. What is the velocity of the wave? (a) 4000 **(b) 400** (c) 250 (d) 40

7. The equation of a transverse wave travelling along a string is given by; y = 0.3sin(0.5x – 500t) where y and x are in cm and t is in seconds. Find maximum displacement of the particles from the equilibrium position (a) 50.0cm (b) 2.5cm (c) 0.5cm **(d) 0.3cm**

8. A progressive wave has wavelength of 50cm. Calculate the phase difference between two points at a distance 20cm apart. (a) 10 /3 (b) 5 /2 **(c) 4 /5** (d) 2/3

9. Determine the distance between the consecutive antinodes XX. IF the wavelength is 60cm (a) 15cm **(b) 30cm** (c) 60cm (d) 120cm

10. A wave of frequency 10Hz forms a stationary wave pattern in a medium where the velocity is 20cm-1. The distance between adjacent nodes is **(a) 1.0cm** (b) 1.5cm (c) 2.0cm (d) 5.0cm

11. The following types of waves are all transverse except (a) light waves (b) radio waves **(C) sound waves** (d) surface on water (e) x-rays

12. The combination of sound waves with different frequencies is known as (a) interference (b) diffraction **(C) superposition** (d) resonance

13. The colours seen in the thin films of oil on the road and in soap bubbles are due to (a) reflection (**b) interference** (c) diffraction (d) polarization

14. Which of the following media allow the transmission of sound waves through them I. air II. Liquid III. Solids (a) I and II only (b) I and III only (c) II and III only **(d) I, II and III**

15. Which of the following characteristics of wave is used in the measurement of the depth of the sea? (a) diffraction (b) interference (c) refraction **(d) reflection**

16. The sound from a source travelled to the bottom of the sea and the echo was heard 4s later. If the speed of sound in sea water is 1500ms-1, the depth of the sea is (a) 6000m **(b) 3000m** (c) 15000m (d) 375m

17. The speed of sound in air at sea-level is 340ms-1 while that of light is 300,000kms-1. How far (to the nearest metre) from the centre of a thunderstorm in an observer who hears a thunder 2s after a lightening flash? (a) 170m (b) 340m (C) 600m **(d) 680m**

18. Given that young’s modulus for aluminum is 7.0x1010Nm-2 and density is 2.7x103kmg-3, find the speed of the sound produced if a solid bar is struck at one end with a hammer (a) 3.6x103ms-1 (b) 2.8x103ms-1 (c) 4.2x103ms-1 **(d) 5.1x103ms-1**

19. Which of the following factors will affect the velocity of sound (a) an increase in the pitch of the sound (b) an increase in the loudness of the sound **(C) wind travelling in the same direction of the sound** (d) change in the atmospheric pressure at constant temperature

20. The pitch of an acoustic device can be increased by **(a) increasing the frequency** (b) increasing the amplitude (c) decreasing the loudness (d) decreasing the intensity

21. All the following frequencies are overtones of 320Hz except (a) 960Hz (b) 640Hz **(c) 520Hz** (d) 1280Hz (e) 1600Hz

22. When the length *l* of a piece of wire under constant tension is varied, the relationship of the frequency of vibration f with *l* is (a) (b) F I1/2 (C) F **(d)**

23. A sonometer wire of length 100cm under a tension of 10N has a frequency of 250Hz. Keeping the length of the wire constant, the tension is adjusted to produce a new frequency of 350Hz. The new tension is (a) 5.1N (b) 7.1N (c) 14.0N **(d) 19.6N**

24. If the fundamental frequency of a closed pipe organ on a day when the speed of sound is 340ms-1 is 170Hz, then the length of the pipe is **(a) 50cm** (b) 70cm (c) 100cm (d) 150cm (e) 200cm

25. A slight loading of a turning fork has the effect of (a) decreasing its amplitude (b) increasing its amplitude **(C) decreasing its frequency** (d) increasing its frequency

26. Which of the following pairs is not part of the electromagnetic spectrum? I. radio waves II. Beta rays III. Gamma rays IV. Alpha rays (a) I and II (b) III and IV (c) I and III **(d) II and IV**

27. Shadows and eclipses result from the (a) refraction of light **(b) rectilinear propagation of light** (C) diffraction of light (d) reflection of light

28. What is the effect of the increase in the size of the hole of a pinhole camera on the image? It **(a) gives a blurred image** (b) corrects for chromatic aberration (C) magnifies the image (d) brings the image into a sharper focus

29. A boy 1.200m tall stands 3.600m in front of a pinhole camera. If his image is formed on a screen 30.00cm behind the pinhole, calculate the height of the image **(a) 10.00cm** (b) 5.00cm (c) 3.00cm (d) 4.00cm (e) 0.33cm

31. Which of the following statements is not true of the image in a plane mirror? The image is (a) the same size as the object (b) laterally inverted (c) virtual **(d) magnified** (e) the same distance behind the mirrors as the object in front

32. An object is positioned between two plane mirrors inclined at right angles to each other. The object is 1 unit distance from each mirror. The number of images formed is (a) 1 (b) 2 (**C) 3** (d) 4 (e) 5

33. When a plane mirror at which a ray is incident is rotated through an angle , the reflected ray will be rotated through (a) ½ (b) ** (c) 2** (d) 3

34. The plane mirror in a kaleidoscope are usually placed **(a) at an angle of 60o** (b) parallel to one another (c) perpendicular to one another (d) at an angle of 45o

35. Heat from the sun is to be used to burn a piece of paper with the aid of a concave mirror of radius of curvature 32cm. to enable the paper to start burning in the shortest possible time, the paper is coloured X and positioned at a distance Y from the mirror. What are X and Y respectively? (a) black and infinity (b) white and 32cm **(c) black and 16cm** (d) black and 32cm (e) white and 16cm

36. When an object is placed very close to the pole of a concave mirror, the virtual image obtained is (a) diminished and upright (b) diminished and inverted (c) enlarged and inverted **(d) enlarged and upright**

37. An object is placed 15cm in front of a concave mirror of radius 40cm. the image formed is **(a) virtual and 60cm behind the mirror** (b) real and 60cm in front of the mirror (c) virtual and at infinity (d) real and infinity (e) virtual and 40cm from the mirror.

38. Light of velocity 3.0x108ms-1 is incident on a material of refractive index n. if the velocity of light is reduced to 2.4x108ms-1 in the material, what is n? (a) 2.33 (b) 2.25 (c) 1.33 (**d) 1.25**

39. The absolute refractive indices of glass and water are 3/2 and 4/3 respectively. The refractive index at the interface when a ray travels from water to glass is (a) ½ (b) 8/9 **(c) 9/8** (d) 17/12 (e) 2

40. What must be the distance between an object and a converging lens of focal length 20cm to produce an erect image two times the object height? (a) 20cm (b) 15cm **(c) 10cm** (d) 5cm

41. An object is placed in front of a converging lens of focal length 20cm. The image is virtual and has a magnification of 2. What is the distance of the object from the lens? (a) 5cm **(b) 10cm** (c) 30cm (d) 40cm

42. To obtain a magnification of 2.5, how far should an object be placed form the pole of a thin converging lens of focal length 0.2m? (a) 0.13m (b) 0.25m **(c) 0.28m** (d) 0.50m

43. A concave lens of focal length 20cm forms an image ¼ the size of the object. The object distance is (a) 100cm (b) 100/9cm (**c) 60cm** (d) 60/9cm (e) none of the above

44. Which of the following statements is correct about a long sighted boy who does not put on glasses (a) he cannot see distant object clearly (b) rays of light from a close object are focused in front of his retina (c) his eyeball is too long **(d) parallel rays of light are focused behind his retina**

45. A far-sighted person cannot see objects that are less than 100cm away. If the person want to read a book at 25cm, what type and focal length of lens does he need? **(a) convex, 20cm** (b) concave, 20cm (c) convex, 33cm (d) concave 33cm

46. An observer with normal eye views an object with a magnifying glass of focal length 5cm. the angular magnification is (a) -6 (b) -5 (c) 5 **(d) 6**

47. Four lenses are being considered for use as a microscope objective. Which of the following focal lengths is most suitable (a) -5mm **(b) +5mm** (c) -5cm (d) +5cm

48. A projection lantern is used to give the image of a slide on a screen. If the image is 24 times as large as the slide and the screen is 72.0m form the projecting lens, what is the position of the slide from the lens? (a) 0.3m **(b) 3.0m** (c) 3.5m (d) 4.0m

49. When a yellow card is observed through a blue glass, the card would appear **(a) black** (b) green (c) red (d) white

**CHAPTER TWNETY – FIVE : ELECTRICITY, ELECTROSTATIC, CAPACITOR AND ELECTROLYSIS**

1. A charge 50C has an electric field strength of 360NC-1 at a certain point. The electric field strength due to another charge 120C kept at the same distance apart and in the same medium is (a) 18NC-1 (b) 144NC-1 (c) 150NC-1 **(d) 864NC-1**

2. A charged 50mC has an electric field strength of 360NC-1 at a certain point. The electric field strength due to another charge 120mC kept at the same distance apart and in the same medium is (a) 18NC-1 (b) 144NC-1 (c)864NC-1 **(d) 150NC-1**

3. If 8x10-2J of work is required to move 100mC of charge from a point X to a point Y in an electrical circuit, the potential difference between X and Y is (a) 4.0x102 (b) 4.0x104 (**c) 8.0x102** (d) 8.0x104

4. The purpose of a dielectric material in a parallel plate capacitor is to **(a) increase its capacitance** (b) decrease its capacitance (c) insulate the plates from each other (d) increase the magnetic field between the plates

5. The major defects of a simple cell **are (a) polarization and local action** (b) depolarization and local action (c) polarization and discharging of the cell (d) discharging of the cell and local action

6. Which of the following components is not combined in a dry cell? (a) carbon rod (b) pastes of manganese oxide (C) paste of ammonium chloride (d) zinc case **(e) copper rod.**

7. Which of the following factors has no effect on the e.m.f of a primary cell? (a) temperature **(b) size of the cell** (C) nature of the plates (d) nature of the electrolyte

8. Which of the following is a secondary cell? (a) Daniel cell (b) Wet leclanche cell (c) voltaic cell **(D) alkaline cell**

9. The electrochemical equivalent of silver is 0.0012g/C. If 36.0g silver is to be deposited by electrolysis on a surface by passing a steady current of 5.0 minutes, the current must be (a) 6000A **(b) 100A** (C) 10A (d) 1A

10. According to Ohm’s law, the ratio V/I is constant for (a) an electrolyte (b) a diode (c) a transistor **(d)** **silver** (e) all of the above

11. A high resistance voltmeter, reads 3.0V when connected across the terminals of a battery on open circuit and 2.6V when the battery supplies a current of 0.2A through a lamp. The resistance of the lamp is (a) 2.00 **(b) 13.00** (c) 0.52 (d) 0.13 (e) 1.50

12. Calculate the terminal potential difference across a 20 resistor connected to a battery of emf 15V and internal resistance 5 (a) 60.0V (b) 15.0V **(c) 12.0V** (d) 6.3V (e) 0.5V

13. An electric kettle, connected to 240V mains produces 6.0x105J of heat energy to boil a quantity of water in 5minutes. Find the resistance of the kettle. (a) 14.4 **(b) 28.8** (c) 144 (d) 288 (e) 2880

16. A household refrigerator is rated 200watts. If electricity costs 5k per kWh, what is the cost of operating it for 20 days. **(a) N4.80** (b) N48.00 (c) N480.00 (d) 4800.00

17. Which of the following is a desirable property of fuse wire? (a) high specific heat capacity **(b) low melting point** (c) low resistivity (d) high latent heat of fusion (e) high expansivity

18. Electric power is transmitted at a high voltage rather than low voltage because the amount of energy loss is reduced due to **(a) heat dissipation** (b) production of eddy currents (c) excessive current discharge (d) excessive voltage discharge

**CHAPTER TWENTY – SIX: MAGNETISM**

1. The angle between the magnetic medium and the geographic meridian at a locality on the earth is the (a) longitude of the locality (b) angle of inclination at the locality (C) latitude of the locality **(d) angle of declination of the locality**

2. An equipment that functions as a result of the magnetic effect of electric current is (a) rheostat (b) Thermostat **(c) electric bell** (d) carbon microphone

3. The force exerted by a current carrying conductor on another is owning to (a) electrostatic effect **(b) magnetic effect** (C) gravitational effect (d) electromagnetic effect

4. A particle carrying a charge of enters a magnetic field at at right angles to the field. If the force on the particle is , what isthe magnitude of the filed? (a) (b)  **(c)** (d)

5. Which of the following is not a part of a d.c. electric motor? (a) field motor (b) armature (c) commutator **(d) transformer**

6. A galvanometer of resistance of 20 is to be provided with a shunt such that 1/10 of the whole current in a circuit passes through the galvanometer. 7. The resistance of the shunt is (a) 2.00 **(b) 2.22** (c) 18.00 (d) 18.22

8. The magnetic flux in a coil having 200 turns changes at the time rate of 0.08Wbs-1. The induced emf in the coil is (a) 250.0V (b) 25.0V **(c) 16.0V** (d) 1.6V

9. A dynamo primarily converts **(a) mechanical energy into electrical energy** (b) electrical energy into mechanical energy (c) potential energy into kinetic energy (d) kinetic energy into potential energy

10. A transformer which can produce 8V from 240V a.c. supply has an efficiency of 80%. If the current in the secondary coil is 15A, calculate the current in the primary coil **(a) 0.625A** (b) 1.600A (c) 2.500A (d) 6.250A

11. The best material for the core of the primary and secondary coils of an induction cell is (a) copper, because it is a good conductor of electricity (B) steel, because it become magnetic and retains its magnetism for a long time (c) rubber, because it is a good insulator and the user is prevented from the shock (d) soft iron, because it becomes magnetic but easily losses its magnetism (E) glass, because it is transparent

12. The iron core of an induction coil is made from bundles of wires so as to (a) minimize eddy currents (b) generate eddy currents (c) prevent sparking at the contact beaker (d) get the greatest possible secondary voltage

13. The principle of operation of an induction coil is based on (a) ohm’s law (b) ampere’s law (c) faraday’s law (d) coulomb’s law

14. If two inductors of inductances 3H and 6H are arranged in series, the total inductance is (a) 0.5H (b) 2.0H (c) 9.0H (d) 18.0H

**CHAPTER TWENTY – SEVEN:** **AC CIRCUIT**

1. In an a.c. circuit, the alternating current across a resistor is given by . Calculate the root mean square value of the current **(a)** (b) (c) (d)

2. A 120V, 60/𝜋 a.c source is connected across a 2𝜇𝐹 capacitor. Calculate the current passing through the circuit (a) 4.9x102A **(b) 2.0x102** (c) 2.2x10-2 (d) 2.0x10-2

3. A series RLC circuit is said to resonate if the (a) capacitive reactance is zero (b) inductive reactance is zero **(c) current is maximum** (d) impedance is zero

4. In a purely inductive circuit, the current **(a) lags behind the voltage in phase by 90o** (b) leads the voltage in phase by 90o (C) is in the same phase with the voltage (d) leads the voltage by 180o

5. Determine the inductive reactance when a 30.0mH inductor with a negligible resistance is connected to a 1.30x103Hz oscillator (a) 39.0 (b) 122.5 **(c) 245.0** (d) 39000.0

6. The power dissipated in an a.c. circuit with an r.m.s current of 5A, r.m.s voltage of 10V and a phase angle of 60o is **(a) 25W** (b) 50W (C)120W (d) 125W

7. A circuit contains 100 capacitor, 10 resistor and an inductor L, all connected in series. If the resonant frequency of the circuit is 100Hz, find the value of (a) (b) (c) (D)

8. At resonance, the phase angle in a.c circuit is (a) 90o (b) 60o **(c) 0o** (d)180o

**CHAPTER TWENTY EIGHT: ATOMIC AND QUANTUM PHYSICS**

1. The mass of a proton is approximately equal to that of (a) an 𝛼−particle (b) a B-particle (c) a y-ray (d) an electron **(e) neutron**

2. The atomic number and mass number of X in the equation above are respectively (a) 5 and 9 **(b) 5 and 10** (c) 9 and 13 (d) 9 and 14

3. Calculate the wavelength of the photon emitted when an electron falls from the energy level 4 to 2 as shown by T. (a) 2.55m **(b) 4.9x10-7m** (c) 4.9x107m (d) 225m

4. What is the ionization of the hydrogen atom (a) 3.4eB (b) 13.6eB **(C) -13.6eV** (d) -3.4eV (e) 0

5. The energy gained by a proton accelerated through a p.d. of 600V is (a) 2.66x10-22J (b) 0.26x10-26J (c) 0.26x10-17J **(d) 9.60x10-17**

6. When a metal surface is illuminated with radiation of appropriate frequency, photo electrons are ejected from the metal surface. The number of photo electrons ejected depends on the (a) source of radiation (b) period of radiation (c) atmospheric pressure (d) nature metal surface **(e) intensity of radiation**

7.The energy of a photon having a wavelength of 10-10m is (a) 1.7x10-13J (b) 2.0x10-12J (c) 1.7x10-12J **(d) 2.0x10-15J** (h = 6.63x10-34Js, C = 3.0x108ms-1)

8. A metal has a work function of 3.3eV. Find its threshold frequency **(a) 8x1014Hz** (b) 8.25x1014Hz (c) 8.35x1014Hz (d) 8.4x1014Hz (h = 6.6x10-34)

9. In photo electric field, electrons will leave the metal surface when illuminated by light of appropriate frequency if the photon energy is **(a) greater than the work function** (b) less than the work function (C) equal to the work function (d) equal to the maximum kinetic energy of the electrons

10. Which of the following elements is the best absorber of X-rays (a) hydrogen (b) oxygen (c) calcium (d) copper **(e) lead**

11. A radioactive source emits X-rays of very short wavelength (10-11) m. What is the frequency of these rays? (a) 2x1018Hz **(b) 3x1019Hz** (c) 3x103Hz (d) 3x10-19Hz

12. Which of the scientists postulated that moving particle exhibit wave properties? (a) Niels Bohr (b) Ernest Rutherford (c) Werner Heisenberg **(D) Louis de Broglie** (e) Erwin Schrödinger

13. Radium has a half life of 1600 years. A lead box contained 24x106 atoms of radium in 1976. How many atoms of radium will remain in the box in the year 5176 (a) 24x106 atoms (b) 18x106 atoms (c) 12x106 atoms **(d) 6x106 atoms** (e) no atoms

14. A radioactive substance has a half-life of 20 days. What fraction of the original radioactive nuclei will remain after 80 days? **(a) 1/16** (b) 1/8 (c) ¼ (d) 1/32

15. A substance has a half-life of 3min. after 6min, the count rate was observed to be 400. What was its count rate at zero time? (a) 200 (b) 1200 **(c) 1600** (d) 2400

16.A piece of radioactive contains 1026 atoms. If the

half life of the material is 20seconds, the number of disintegration in the first second is (a) 3.47x1018 (b) 6.93x1020 **(c) 3.47x1025** (d) 6.93x1018

17. A radioactive isotope has a decay constant of 10-5S-1. Calculate its half life **(a) 6.93x104s** (b) 6.93x106s (c) 6.93x10-5s (d) 6.93x105s

18. One of the features of the fission process is that (a) its products are not radioactive **(b) it leads to chains reaction** (C) neutrons are not released (d) the sum of the masses of the reactants equals the sum of the masses of the products.

19. In a nuclear fusion process four protons each of mass Mp were fused to produce a nucleus X of mass Mx. Which of the following equation is correct? **(a) 4Mp > Mx** (b) **4Mp = Mx** (c) 4Mp < Mx (d) Mp = Mx

20. The graphite rods surrounding the uranium fuel rods in a nuclear reactor are used to: (a) absorb the neutrons and hence halt the nuclear process (b) create the neutrons and hence start up the nuclear process **(c) slow down the neutrons and hence slow the nuclear process** (d) speed up the neutrons and hence speed up the nuclear process

21. In a fission of uranium isotope, a mass defect of 0.25 a.m.u is observed. Calculate the binding energy of the isotope (a) 1.25x10-19J **(b) 3.72x10-11J** (c) 1.49x10-10J (d) 1.86x10-9J (a.m.u = 931 MeV, IeV = 1.6x10-19J)

22. In a nuclear reaction, the mass defect is 2x10-6g calculate the energy released, given that the velocity of light is 3x108m/s (a) 9x107J (b) 1.8x108J **(c) 1.8x1011J** (d) 9x1018J (e) 3.6x1011J

23. In photo emission the number of photo electrons ejected per seconds depends on the (a) Threshold frequency **(b) intensity of the beam** (c) frequency of the beam (d) work function of metal

24. If the uncertainty in the measurement of the position of a particle is the uncertainty in the momentum of the particle is

(a) (b) **(c)**  (d)

24. Caesum has a work function of . the maximum energy of liberated electrons when it is illuminated by light of frequency is **(a)**  (b) (c) (d) (h =

25. The energy associated with the emitted photon when a mercury action charges from one state to another is 3.3eV. Calculate the frequency of the photon. (a) (b) (c) (d)

26. If X is the uncertainty in the measurement of the position of a particle along the X-axis and Px is the uncertainty in the measurement of the linear momentum along the X-axis, then the uncertainty principle relation is given as **(a)** (b) (c) (d)

27. The particle nature of light is demonstrated by the (a) speed of light (b) colors of light (c) diffraction of light (d) **photoelectric effect**

**CHAPTER TWENTY NINE: SEMI CONDUCTOR**

1. Which of the following is a pure semi-conductor **(a) silicon** (b) carbon (c) transistor (d) phosphorus

2. For semiconductors to have negative temperature coefficient of resistance implies that (a) their resistance increases with temperature **(B) their resistance decreases with temperat**ure (c) they have electrons and holes at high temperature (d) their resistance is constantly changing with temperature

3. When impurities are added to semiconductors, the conductivity of the semiconductor **(a) increases** (b) decrease (c) remains constant (d) increases then decreases

4. In semiconductors, the carriers of current at room temperature are (a) electrons only **(b) electrons and holes** (c) holes only (d) electrons and ions

5. A certain manufacturer wishes to make a n-type semiconductor. Which materials would be select for doping? **(a) arsenic and antimony** (b) aluminum and indium (c) boron and antimony (d) helium and boron

6. In a semiconductor junction diode, as the depletion or barrier layer is forward biased, the layer **(a) narrows** (b) remain constant (c) widens then narrows (d) widens

7. The battery connection that permits current to flow across a p-n junction is called (a) amplification (b) rectification **(c) forward biased** (d) reverse biased

8. A p-n junction diode is used as (a) a rectifier in a d.c. circuit (b) an amplifier in an a.c. circuit **(c) a rectifier in an a.c. circuit** (d) an amplifier in an a.c. circuit

9. A semiconductor diode is used in rectifying alternating current into direct current mainly because it (a) allows current to flow in either direction (b) is non-linear (c) offers a high input resistance **(d) allows current to flows only in one direction.**

10. A transistor functions mainly as **(a) switch and amplifier** (b) rectifier and amplifier (c) charge storer and amplifier (d) charge storer and switch

11. A transistor is used in the amplification of signals because it (a) allows doping (**b) controls the flow of current** (c) contains electrons and hole carriers (d) consumes a lot of power

12. When a base current of common emitter transistor is kept at zero, it operates in the (a) active-on region (b) breakdown region (c) saturation region (**d) cut off region**