

# PHYSICS

## PHYSICS (SETA) 2007/2008

1. Which of the following groups are not all fundamental quantities?  
(a) Mass, length, time (b) mass, temperature and length  
(c) Electric current, time an amount of substance  
(d) Luminous intensity, speed and surface tension  
Answer= (d)
2. Which of the following information is NOT true for a velocity-time graph?  
(a) The acceleration of the moving object can be obtained from the slope of the graph  
(b) The area under the graph represents the total distance covered  
(c) A straight line parallel to the X-axis shows that the object is moving with constant velocity  
(d) The area under the graph gives the average velocity of the moving object  
Answer= (d)
3. Which of the following correctly gives the relationship between tangential speed  $V$  and angular speed of a body moving uniformly in a circle of radius  $r$ ?  
(a)  $V = r$  (b)  $V = r\omega$  (c)  $V = \omega$  (d)  $V = r/\omega$

Answer = (a)

4. A machine raises 20kg of sand through a height of 40m in 5s, what is the power of the machine?  
(a) 533W (b) 433W (c) 3600W (d) 500W

Solution:

$$P = \frac{\text{Work done}}{\text{Time}} = \frac{20 \times 10 \times 40}{5} = 1600 \text{ W}$$

Answer=(c)

5. A uniform rod 10m long is balanced on a pivot placed at its mid-point. A girl of mass 30kg sits on one arm of the rod at a point 3m away from the pivot. What mass can be placed 2m away from the other end of the rod to keep the rod horizontal?  
(a) 30kg (b) 45kg (c) 20kg (d) 40kg

Solution:

6. The temperature at which the water vapour presents in the air is just sufficient to saturate it is called (a) Ice point  
(b) Boiling point (c) steam point  
(d) Dew point.

Answer = (d)

7. A thermometer has its stem marked in millimeter instead of degree Celsius. The lower fixed point is 30mm and the upper fixed point is 180mm calculate the temperature in degree Celsius when the thermometer reads 45mm  
(a) 67.5°C (b) 30.0°C (c) 25.0°C (d) 10.0°C

Solution:

8. Which of the following surface will radiate heat energy best?  
(a) Red (b) white (c) black (d) yellow

Answer = (c)

9. Steel bars each of length 3.0m at 28°C are to be used for constructing a rail line. If the linear expansivity of steel is  $10 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ , what is the safety gap that must be left between successive bars if the highest temperature expected is 40°C?  
(a)  $1.2 \times 10^{-1} \text{ cm}$  (b)  $8.4 \times 10^{-1} \text{ cm}$  (c)  $7.2 \times 10^{-2} \text{ cm}$  (d)  $3.6 \times 10^{-2} \text{ cm}$

Solutions

$$l_1 = 3.0\text{m}, t_1 = 28^\circ\text{C}, 40^\circ\text{C}, \alpha = 1.9 \times 10^{-5}, t_2 = ?$$

$$= l_2 = l_1 (1 + \alpha \Delta t)$$

$$l_2 = 3 \{ 1 + 1.9 \times 10^{-5} (40 - 28) \}$$

$$= 3.00036\text{cm}$$

$$\text{Hence safety gap} = 3.00036$$

$$- 3.0$$

$$= 0.00036 = 3.6 \times 10^{-4}\text{m}$$

$$= 3.6 \times 10^{-2}\text{cm}$$

Answer = (d)

10. A given mass of gas at a temperature of  $30^\circ\text{C}$  is boiled in a tube of volume. Calculate the temperature of the gas when the volume is reduced to two-third of its original value by applying a pressure twice the original value.

(a)  $71^\circ\text{C}$  (b)  $40^\circ\text{C}$  (c)  $404^\circ\text{C}$  (d)  $313^\circ\text{C}$

Solution:

$$T_1 = 30^\circ\text{C}, V_1 = V, t_2 = ?, V_2 = 2/3V, P_1 = X, P_2 = 2X$$

$$\frac{P_2 V_2}{T_2} = \frac{P_1 V_1}{T_1}$$

$$T_2 = \frac{P_2 V_2 T_1}{P_1 V_1} = \frac{2X \times 2/3V \times (30 + 273)}{X \times V}$$

11. A solid material of volume  $100\text{cm}^3$  is heated through a temperature difference of  $40^\circ\text{C}$ . Calculate the increase in the volume of the material if its linear expansivity is  $2.0 \times 10^{-6}\text{K}^{-1}$

(a)  $2.4 \times 10^{-2} \times 10^{-2}$  (b)  $1.6 \times 10^{-2}\text{cm}^3$  (c)  $8.0 \times 10^{-2}\text{cm}^3$   
(d)  $5.0 \times 10^{-6}\text{cm}^3$

Solution:

$$V_1 = 100\text{cm}^3, 40^\circ\text{C}, \alpha = 2.0 \times 10^{-6}\text{K}^{-1}$$

$$e = 3 \quad e = 3\alpha$$

$$e = 3 \times 2.0 \times 10^{-6}$$

$$V = e V_1 \Delta T = 6.0 \times 10^{-6}$$

$$6.0 \times 10^{-6} \times 100 \times 40$$

$$= 2.4 \times 10^{-2}\text{cm}^3$$

answer = (a)

12. We can see non-luminous object when:  
(a) The object is very near (b) light falls on it and reflected to us  
(c) Light falls on it and is transmitted away  
(d) The object is polished

13. Which of the following statement about the image in a pin hole camera is correct?  
(a) The image is always diminished (b) the image is always inverted  
(c) The image is always enlarged (d) the image is always upright  
Answer = (b)

14. An organ open at both ends has a fundamental frequency of  $400\text{Hz}$ , the frequency of the second overtone is:  
(a)  $400\text{Hz}$ , (b)  $600\text{Hz}$ , (c)  $1200\text{Hz}$  (d)  $800\text{Hz}$

Solution:

$$1 \text{ overtone } \frac{e}{2} \quad 2 \text{nd overtone } 2 \times 400\text{Hz}$$

$$2 \text{nd overtone} = e = 800\text{Hz}$$

$$3 \text{rd overtone } 3e$$

answer = (d)

15. Solar energy reaches the Earth by the process of:  
(a) Conduction (b) refraction (c) radiation (d) reflection

Answer = (c)

A resonating air column in a tube closed at one end emits its fundamental frequency when the length of the tube is 55cm calculate the frequency if the speed of sound in air is  $330\text{ms}^{-1}$ .

- (A) 150.0Hz
- (b) 1.5Hz
- (C) 6.0 Hz
- (d) 300 Hz

Solution:

$$l = \frac{\lambda}{4}$$

$$55 = \frac{\lambda}{4}$$

$$\lambda = 4 \times 55$$

$$= 220\text{cm} = 330 \times 100$$

$$\frac{220}{330}$$

$$= 150 \text{ Hz}$$

answer (a)

A cell supplies current of 0.80A and 0.40A through 2  $\Omega$  and 3 $\Omega$  resistors respectively. The internal resistance of the cell is:

- (a) 0.2 $\Omega$
- (b) 0.4 $\Omega$
- (c) 1.0 $\Omega$
- (d) 3.0 $\Omega$

Solution:

$$I = \frac{E}{R+r}$$

$$0.8 = \frac{E}{2+r}$$

Therefore  $0.8(2+r) \dots \dots \dots (1)$

$$0.4 = \frac{E}{3+r}$$

Therefore  $0.4(2+r) \dots \dots \dots (2)$

$$0.8(2+r) = 0.4(3+r)$$

$$2(2+r) = 3+r$$

$$4+2r = 3+r$$

$r = 1.0 \Omega$  (practically impossible, no answer)

A charge of  $1.0 \times 10^{-5}\text{C}$  experiences a force of 40N out a certain point in space. What is the electric field intensity?

- (a)  $8.0 \times 10^6 \text{NC}^{-1}$
- (b)  $4.0 \times 10^6 \text{NC}^{-1}$
- (c)  $4.0 \times 10^4 \text{NC}^{-1}$
- (d)  $2.0 \times 10^4 \text{NC}^{-1}$

Solution:

$$E = \frac{F}{Q}$$

$$= \frac{40}{1.0 \times 10^{-5}}$$

$$= 4.0 \times 10^6 \text{NC}^{-1}$$

Answer = (b)

When a potential difference, V is applied across the ends of a resistor of resistance, R, a current, I, passes through the resistor. The heat generated in the resistor in time t, is given by the expression,

- (a)  $V^2It$
- (b)  $I^2t/R$
- (c)  $I^2Rt$
- (d)  $IR^2t$

Answer=(c)

The energy stored in a capacitor of capacitance 5 $\mu\text{f}$  is 40J. What is the voltage applied across its terminal?

- (a) 4000V
- (b) 200V
- (c) 16V
- (d) 6V

Solution:

$$E = \frac{1}{2}CV^2$$

$$40 = \frac{1}{2} \times 5 \times 10^{-6} \times V^2$$

$$V = \frac{80 \times 10}{5} = 4000\text{V}$$

answer=(a)

The instrument used for measuring electric current is:

- (a) potentiometer
- (b) Volta meter
- (c) ammeter
- (d) ohm meter

Answer = (c)

The charge of one alpha can be neutralized by:

- (a) 2 photons of  $\gamma$  rays
- (b) 4 photons of  $\gamma$  rays
- (c) 2  $\alpha$  particles
- (d) 4  $\alpha$  particles

Answer= (c). One  $\alpha$ -particle has two positive charges. Hence two  $\alpha$ -particles are required to neutralize it.

23. A radioactive element has a half-life of 100s. The original sample of the element has a mass of 1g. What is the mass of the sample after 5 minutes?  
 (a) 1/16g (b) 1/8g (c) 1/5g (d) 1/3g  
 Solution:  
 5 minutes  $5 \times 60$   
 $= 300s$   
 Answer = (b)      1g                      1/2g                      1/4g                      1/6g
24. When a uranium atom decays radioactively to become protactinium the radiation emitted is  
 (a) one  $\alpha$  particle only (b)  $2\alpha$  particle only (c) one  $\alpha$  particle and one  $\beta$  particle only  
 (c) One  $\alpha$  particle and one  $\beta$  particle  
 Solution  
 ${}_{92}^{238}\text{U} \rightarrow {}_{91}^{234}\text{Pa} + {}_2^4\text{He}$  (No answer)
25. Which of the following quantities is NOT conserved in a nuclear fission process?  
 (a) Atomic number (b) mass number (c) mass (d) charge  
 Answer=(c)

PHYSICS  
 2010/2011

1. The force  $F$  is given by  $F = at + bt^2$ , where  $t$  is time. The dimension of  $a$  and  $b$  are:  
 (a)  $[MLT^{-3}]$  and  $[MLT^{-4}]$  (b)  $[MLT^{-4}]$  and  $[MLT^{-3}]$  (c)  $[MLT^{-1}]$  and  $[MLT^{-2}]$  (d)  $[MLT^{-2}]$  and  $[MLT^{-1}]$
2. The angle between the two vectors  $-2i + 3j + k$  and  $i + 2j - 4k$  is  
 (a)  $0^\circ$  (b)  $90^\circ$  (c)  $180^\circ$  (d) None
3. A shell is fired from a cannon, it explodes in mid air, its total  
 (a) momentum increases (b) momentum decreases (c) KE increases (d) KE decreases
4. A rod of mass  $m$  and length  $L$  is lying horizontally on a table. Work done in making it stand on one end will be  
 (a)  $mgL$  (b)  $mg\frac{L}{2}$  (c)  $mg\frac{L}{4}$  (d)  $2mgL$
5. The escape velocity for a rocket on the earth is  $11.2\text{km s}^{-1}$ . Its value on a planet where acceleration due to gravity is double that on the earth and diameter of the planet is twice that of the earth will in  $\text{km s}^{-1}$   
 (a) 11.2 (b) 5.6 (c) 22.4 (d) 33.6
6. At which of the following temperatures, the value of surface tension of water is minimum?  
 (a)  $4^\circ\text{C}$  (b)  $25^\circ\text{C}$  (c)  $50^\circ\text{C}$  (d)  $75^\circ\text{C}$
7. The internal energy of an ideal gas depends on  
 (a) pressure (b) volume (c) temperature (d) size of the molecules
8. Suppose there is a hole in a copper plate. Upon heating the plate, diameter of hole would.  
 (a) always increase (b) always decrease (c) remain constant (d) none of the above
9. A beaker full of hot water is kept in a room and it cools from  $80^\circ\text{C}$  to  $75^\circ\text{C}$  in  $t_1$  minutes, from  $75^\circ\text{C}$  to  $65^\circ\text{C}$  in  $t_2$  minutes and from  $70^\circ\text{C}$  to  $65^\circ\text{C}$  in 3 minutes then (a)  $t_1 > t_2 > t_3$  (b)  $t_1 = t_2 = t_3$  (c)  $t_1 < t_2 = t_3$  (d)  $t_1 < t_2 < t_3$
10. An electric fan is switched on in a close room. The air in the room is  
 (a) cooled (b) heated (c) at constant room temperature (d) heated or cooled depending on atmospheric temperature
11. The period of a simple pendulum is 2 seconds. If its length is increased by 4 times, then its period becomes  
 (a) 16s (b) 12s (c) 8s (d) 4s
12. Sound waves in air cannot be polarized because  
 (a) their speed is small (b) they required medium (c) they are longitudinal (d) their speed is temperature dependent.
13. The temperature at which speed of sound in air becomes double of its value at  $27^\circ\text{C}$  is  
 (a)  $54^\circ\text{C}$  (b)  $327^\circ\text{C}$  (c)  $927^\circ\text{C}$  (d)  $-123^\circ\text{C}$
14. For correcting long sight defects in the human eye, we require a  
 (a) converging lens (b) diverging lens (c) concave mirror (d) convex mirror
15. For a concave mirror to form a real, diminished image, the object must be placed.  
 (a) between the mirror and its principal focus. (b) at the centre of curvature  
 (c) at a distance greater than the radius of curvature (d) between the principal focus and the centre of curvature
16. A converging lens of focal length 12cm is used to produce a real image of an object enlarged 4 times. How far must the object be placed from the lens?  
 (a) 4cm (b) 9cm (c) 15cm (d) 36cm

17. Three identical lamps each of power 100W are connected in parallel across a potential difference of 250V. Calculate the current in the circuit.  
 (a) 2.5A (b) 1.2A (c) 0.8A (d) 7.5A
18. The capacitance of a parallel plate capacitor is increased by making the area of the plates.  
 (a) small and their separation large (b) small and their separation small  
 (c) large and their separation small (d) small and their separation equal
19. The electrochemical equivalent of platinum is  $5.0 \times 10^{-7} \text{ kgC}^{-1}$ . To plate out 1.0kg of platinum, a current of 100A must be passed through an appropriate vessel for. (a) 5.6 hours (b) 56 hours (c)  $1.4 \times 10^4$  hours (d)  $2.0 \times 10^6$  hours
20. A particle of charge 5C moves perpendicularly to a magnetic field of Magnitude 0.01T. If the velocity of the charge is 1.5m/s, calculate the magnitude of the force exerted on the particle.  
 (a) 0.300N (b) 0.050N (c) 3.300N (d) 0.075N
21. A freely suspended magnet swinging in a horizontal plane comes to rest with its axis pointing approximately  
 (a) South-North (b) North-South (c) East-West (d) North-East
22. A steel is more suitable for permanent magnets than iron because the former  
 (a) is easily demagnetized by shaking vigorously (b) is an alloy of many metals  
 (c) retains magnetism more than iron (d) is easily magnetized by alternating current through one cycle.
23. A metal is illuminated with a radiation of energy 6.88eV. If the kinetic energy of the emitted electrons is 1.50eV, calculate the work function of the metal.  
 (a) 0.22eV (b) 10.32eV (c) 8.38eV (d) 5.38eV
24. The threshold frequency for photoelectric effect depends on the  
 (a) intensity of incident light (b) frequency of incident light  
 (c) materials of the photo cathode (d) potential difference between the cathode and anode
25.  $10^6 \text{ J}$  of heat is required to boil off completely 2kg of a certain liquid. Neglecting heat loss to the surroundings, the latent heat of vaporization of the liquid  
 (a)  $5.0 \times 10^5 \text{ Jkg}^{-1}$  (b)  $2.0 \times 10^5 \text{ Jkg}^{-1}$  (c)  $5.0 \times 10^5 \text{ Jkg}^{-1}$  (d)  $2.0 \times 10^5 \text{ Jkg}^{-1}$

#### Physics(Set A) 2011

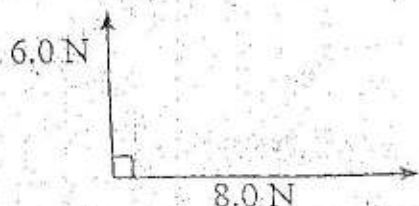
1. In a reverse biased junction diode, current flows in by  
 (a) electrons alone (b) majority carriers (c) minority carriers (d) positive holes alone
2. What types of mirrors are capable of producing parallel beam of light such as those arising from the headlamps of a car?  
 (a) cylindrical mirrors (b) parabolic mirrors (c) spherical mirrors (d) plane mirrors.
3. A person can focus an object only when it lies within 200cm from him. Which spectacles should be used to increase his maximum distance of distinct vision to infinity?  
 (a) concave lens (b) plane glasses (c) binoculars (d) convex lens.
4. In which of the following material media would sound travel faster?  
 (a) water (b) oil (c) metal (d) gas
5. Calculate the angle of minimum deviation for a ray which is refracted through an equiangular prism of refractive index 1.4  
 (a)  $29^\circ$  (b)  $60^\circ$  (c)  $99^\circ$  (d)  $90^\circ$
6. What happens to the rays in a parallel beam of light?  
 (a) they diverges as they travel (b) they meet at infinity (c) they intersect (d) they converge as they travel.
7. Magnification pounced by a convex lens of focal length f?  
 $\frac{U+f}{V}$  (b)  $\frac{U}{f}$  (c)  $\frac{V-1}{f}$  (d)  $\frac{V+1}{f}$
8. A ray of light make an angle of  $35^\circ$  with a plane mirror. What is the angle of reflection  
 (a)  $55^\circ$  (b)  $35^\circ$  (c)  $70^\circ$  (d)  $65^\circ$
9. The pitch of a sound note depends on  
 (a) timbre (b) harmonies (c) quality (d) frequency
10. If the angle between two vectors P and Q is  $0^\circ$ , the vectors are said to be  
 (a) perpendicular (b) be parallel (c) intersect a angle  $60^\circ$  (d) intersect at angle  $45^\circ$
11. A machine whose efficiency is 60% has a velocity ratio of 5, if a force of 500N is applied to lift a load p, what is the magnitude of p?  
 (a) 750N (b) 4166N (c) 50N (d) 1500N
12. A body of mass 4kg is acted on by a constant force of 12N for 3 seconds. The kinetic energy gained by the body at the end of the time is

- (a) 162j                      (b) 144j                      (c) 72j                      (d) 81j
13. As the pressure of a fluid increase, its velocity  
 (a) Decreased    (b) Remains constant    (c) Increases ten decrease    (d) increase.
14. i. Jet-propelled aircraft  
 ii. Rocket propulsion  
 iii. The recoil of a gun  
 iv. A person walking  
 Which of the above is based on Newton's third law of motion?  
 (a) I,II,III and IV    (b) I and III only    (c) I and II only    (d) I, II and III only
15. In a hydraulic press, a force of 40N is applied on the effort piston area  $0.4\text{m}^2$ . If the force exerted on the load piston is 400N, the area of the large piston is  
 (a)  $8\text{m}^2$     (b)  $4\text{m}^2$     (c)  $2\text{m}^2$     (d)  $1\text{m}^2$
16. A 100kg box is pushed along a road with a force of 500N if the box moves with a uniform velocity, the coefficient of friction between the box and the road is  
 (a) 0.5    (b) 0.4    (c) 1.0    (d) 0.8    (g= $10\text{ms}^{-2}$ )
17. The earth is four times the size of the moon and the acceleration due to gravity on the earth is 80 time that on the moon. What is the ratio of the mass of the moon to that of the earth.  
 (a) 1:320    (b) 1:1280    (c) 1:80    (d) 1:4
18. X-rays can be used in the study of crystal structure because they  
 (a) have an extremely short wavelength    (b) have a very long reaching wavelength  
 (c) are very fast    (d) are invisible
19. A radioisotope has a decay constant of  $10^{-7}\text{s}^{-1}$ . the average life of the radioisotope is  
 (a)  $6.93 \times 10^5$     (b)  $1.00 \times 10^7$     (c)  $1.00 \times 10^{7.5}$     (d)  $6.93 \times 10^{7.5}$
20. A moving coil galvanometer has a full scale deflection of 3a equivalent to 300 deflection. Then sensitivity of the instrument is  
 (a) 10.0    (b) 33.0    (c) 90.0    (d) 0.1
21. The binding energy of helium  ${}^4_2\text{He}$  is  
 (a) 2.017U    (b) 0.033U    (c) 4.033U    (d) 0.330U  
 (atomic mass of proton =  $1.00783\text{u}$ , atomic mass of neutron =  $1.00867\text{u}$ )
22. In a tuned radio receiver R,L,C series circuit for resonance the inductive and capacitive reactance  $X_L$  and  $X_C$  respectively as related as  
 (a)  $X_L = \frac{1}{X_C}$     (b)  $X_L = \frac{1}{2}X_C$     (c)  $X_L = X_C$     (d)  $X_L = 2X_C$
23. An a.c circuit of e.m.f 12v has a resistor of resistance 8 ohms connected in series to an inductor of inductive reactance 16 ohms and a capacitor of capacitive 10 ohms. The current flow  
 (a) 1.4A    (b) 14.0A    (c) 1.2A    (d) 12.0A
24. For semiconductors to have negative temperature coefficient of resistance implies that  
 (a) They have electrons and holes at high temperatures    (b) their resistance is constantly changing with temperature  
 (c) Their resistance increase with temperature    (d) their resistance decreases with temperature.
25. Fluorescent tubes produce light by the  
 (a) Refraction of light by gas molecules    (b) excitation of gas molecules  
 (c) Conduction of solar energy    (d) thermal agitation of electrons in the tube.

PHYSICS 2012/2013

1. Which Question Paper Type of Physics is given to you?  
 A. Type A.    B. Type B.    C. Type C.    D. Type D.

2.



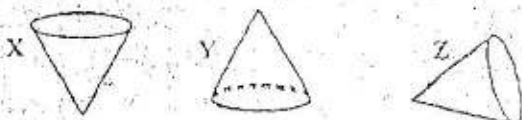
The diagram above shows two vectors at right angles to each other. The value of the resultant vector

- A. 14.0 N      B. 10.0 N      C. 12.0 N      D. 13.0 N

3. A man standing on a lift that is descending does not feel any weight because

- A. the inside of the lift is airtight      B. the lift is in vacuum  
C. there is no reaction from the floor of the lift      D. there is no gravitational pull on the man lift.

4.



The diagrams above show the positions of a cone. The position which can be described as neutral equilibrium is represented as

- A. Z only      B. X only      C. Y and Z      D. Y and X

5. Two balls X and Y weighing 5 g and 50 kg respectively were thrown up vertically at the same time with a velocity of 100 ms<sup>-1</sup>. How will their positions be one second later?

- A. X and Y will be 500 m from each other      B. Y will be 500 m ahead of X  
C. X will be 500 m ahead of Y      D. X and Y will both be 500 m from the point of throw.

6. If it takes an object 3 s to fall freely to the ground from a certain height, what is the distance covered by the object?

- A. 90 m      B. 30 m      C. 45 m      D. 60 m      [ $g = 10 \text{ ms}^{-2}$ ]

7. An object of mass 2 kg moves with a velocity of 10 ms<sup>-1</sup> round a circle of radius 4 m. Calculate the centripetal force on the object.

- A. 25 N      B. 100 N      C. 50 N      D. 40 N

8. A carpenter on top of a roof 20.0 m high dropped a hammer of mass 1.5 kg and it fell freely to the ground. The kinetic energy of the hammer just before hitting the ground

- A. 600 J      B. 150 J      C. 300 J      D. 450 J      [ $g = 10 \text{ ms}^{-2}$ ]

9. If the volume of a gas increases steadily as its temperature decreases at constant pressure, the gas obeys

- A. Graham's law      B. Boyle's law      C. pressure law      D. Charles' law.

10. If a tube of small radius opened at both ends is placed in a liquid, the liquid will

- A. remain at the same level irrespective of whether the liquid wets the glass or not  
B. fall below the liquid level if the liquid wets the glass  
C. fall below the liquid level if the liquid does not wet the glass  
D. rise above the liquid level if the liquid does not wet the glass.

11. An object weighs 22 kg in water and 30 kg in air. What is the up thrust exerted by the liquid on the object?

- A. 50 N      B. 520 N      C. 220 N      D. 80 N      [ $g \approx 10 \text{ ms}^{-2}$ ]

12. A metal of volume 40 cm<sup>3</sup> is heated from 30°C to 90°C, the increase in volume is

- A. 0.12 cm<sup>3</sup>      B. 4.00 cm<sup>3</sup>      C. 1.20 cm<sup>3</sup>      D. 0.40 cm<sup>3</sup>

[Linear expansivity of the metal =  $2.0 \times 10^{-5} \text{ K}^{-1}$ ]

13. A copper wire was subjected to a tensile stress of  $7.7 \times 10^8 \text{ Nm}^{-2}$ . Calculate the tensile strain of the wire.

- A.  $2.0 \times 10^5$       B.  $7.0 \times 10$       C.  $7.0 \times 10$       D.  $2.2 \times 10^4$

[Young modulus =  $1.1 \times 10^{11} \text{ Nm}^{-2}$ ]

14. I. High thermal capacity.      II. High sensitivity.  
III. Easy readability.      IV. Accuracy over a wide range of temperatures.

From the statements above, the qualities of a good thermometer are

- A. I and II      B. I, II, III and IV      C. I, III and IV      D. II, III and IV

A machine is used to lift a load of 20 N through a height of 10m. If the efficiency of the machine is 40%, how much work is done?

- A. 80J      B. 500J      C. 300J      D. 120J

I. Density of the liquid.

II. Depth below the surface of the liquid.

III. Surface area of the liquid.

In which of the statements above will pressure be dependent?

- A. I and II only      B. II and III only      C. I, II and III      D. I and III only.

Which of the following could be effectively used to reduce friction?

- A. Kerosene.      B. Grease.      C. Water.      D. Petrol.

Which of the following types of waves needs a medium for propagation?

- A. Sound waves.      B. Light waves.      C. Radio waves      D. X-rays.

Which of the following electromagnetic waves has the highest frequency?

- A. Ultra-violet rays.      B. Radio waves.      C. X-rays.      D. Infrared-rays.

A perfect emitter or absorber of radiant

- A. conductor      B. black body      C. white body      D. red body.

The ground is always cold at night because the

- A. atmosphere absorbs the sun's energy at night      B. earth radiates heat to the atmosphere at night  
C. sun no longer shines at night      D. atmosphere reflects the sun's energy at night.

A cannon is fired from town X. After how long is the sound heard at town Y 4.94 km away?

- A. 30s      B. 10s      C. 12s      D. 15s [Velocity of sound in air 330 ms]

The phenomenon that shows that increase in pressure lowers the melting point can be observed in

- A. sublimation.      B. condensation      C. coagulation      D. regelation.

A block of aluminium is heated electrically by a 30 W heater. If the temperature rises by 10°C in 5 minutes, the heat capacity of the aluminium is

- A. 900 JK<sup>-1</sup>      B. 90 JK<sup>-1</sup>      C. 100 JK<sup>-1</sup>      D. 200 JK<sup>-1</sup>

Steam burn is more severe than that of boiling water because

- A. steam burn is independent of relative humidity      B. steam possesses greater heat energy per unit mass  
C. water boils at a higher temperature      D. steam burn is dependent on relative humidity.

I. Change of state      II. Diffusion      III. Radiation      IV. Osmosis

Which of the processes above can be explained using the kinetic theory?

- A. I, II, III and IV      B. I, II and III      C. I, III and IV

D. I, II and IV

Three similar cells each of e.m.f V and internal resistance 2Ω are connected in parallel, the total e.m.f and total internal resistance are respectively

- A. 6V, 6.0Ω      B. 2V, 0.Ω      C. 2V, 6.0Ω      D. 6V, 0.7Ω

When the human eye loses its power of accommodation, the defect is known as

- A. short-sightedness      B. presbyopia      C. astigmatism      D. long-sightedness.

When a red rose flower is observed in blue light, what colour does the observer see?

- A. Red,      B. Blue.      C. Magenta.      D. Yellow.

The correct expression for the potential at a point, distance r from a charge q, in an electric field is

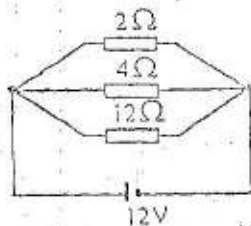
A.  $\frac{q^2}{4\pi\epsilon_0 r^2}$       C.  $\frac{q}{4\pi\epsilon_0 r^2}$

B.  $\frac{q^2}{4\pi\epsilon_0 r}$       D.  $\frac{q}{4\pi\epsilon_0 r}$



31. The capacitance of a parallel plate capacitor is  $20 \mu\text{F}$  in air and  $60 \mu\text{F}$  in the presence of a dielectric. What is the dielectric constant?  
 A. 0.3      B. 6.0      C. 3.0      D. 2.0
32. A certain far-sighted person cannot see objects that are closer to the eye than 50 cm clearly. Determine the power of the converging lens which will enable him to see at 25 cm,  
 A. 0.06 D      B. 0.02 D      C. 0.03 D      D. 0.04 D
33. An image in a convex lens is upright and magnified 3 times. If the focal length of the lens is 15 cm, what is the object distance?  
 A. 10 cm      B. 25 cm      C. 16 cm      D. 14 cm
34. The eclipse of the sun occurs when the  
 A. moon is between the sun and the earth      B. earth is between the sun and the moon  
 C. moon is not completely hidden in the earth's shadow      D. moon's umbra falls on some part of the earth.
35. A length of wire has a frequency of 255 Hz when stretched by a force of 225 N. If the force increases to 324 N, what is the new frequency of vibration?  
 A. 306 Hz      B. 512 Hz      C. 488 Hz      D. 356 Hz
36. In homes, electrical appliances and lamps connected in parallel because  
 A. parallel connection does not heat up the wires      B. series connection uses high voltage  
 C. less current will be used      D. less voltage will be used.
37. Which of the following is a property of steel?  
 A. It cannot retain its magnetism longer than iron.      B. It can be used for making temporary magnets.  
 C. It can be used for making permanent magnets.      D. It can easily be magnetized and demagnetized.
38. In measuring high frequency a.c., the instrument used is the  
 A. d.c. ammeter.      B. moving coil ammeter  
 C. moving iron ammeter      D. hot wire ammeter.
39. In an a.c circuit, the ratio of r.m.s value to peak value of current is  
 A. 2.      B.  $\frac{1}{2}$       C.  $1/\sqrt{2}$       D.  $\sqrt{2}$

40.



In the circuit above, three resistors,  $2\Omega$ ,  $4\Omega$  and  $12\Omega$  are connected in parallel and a 12 V battery is connected across the combination. The current flowing through the  $12\Omega$  resistor is

- A. 14.4 A  
 B. 1.0 A  
 C. 3.2 A  
 D. 9.6 A
41. Two resistors  $5\Omega$  and  $10\Omega$  are arranged first in series and later in parallel to a 24V source. The ratio of total power dissipated in the series and parallel arrangements respectively is  
 A. 5:3      B. 1:50      C. 50:1      D. 3:5
42. If the charge of electricity per kWh is N4, what is the cost of operating an electrical appliance rated 2.50 V, 2A for 6 hours?

- A. N28      B. N12      C. N16      D. N24
43. Under which of the following conditions do gases conduct electricity?  
 A. Low pressure and low p.d.      B. Low pressure and high p.d.  
 C. High pressure and low p.d.      D. High pressure and high p.d.
44. Two inductors of inductances 4H and 8H are arranged in series and a current of 10 A is passed through them. What is the energy stored in them?  
 A. 500 J      B. 50 J      C. 133J      D. 250J
45. Which of the following materials has an increase in resistance with temperature?  
 A. Water.      B. Metals.      C. Woods      D. Electrolyte.
46. The bond between silicon and germanium is  
 A. covalent      B. ionic      C. d1ive      D. electrovalent.
47. A radioactive isotope has a decay constant of  $10^5 \text{ s}^{-1}$ . Calculate its half life.  
 A.  $6.93 \times 10^{-5} \text{ s}$       B.  $6.93 \times 10^5 \text{ s}$       C.  $6.93 \times 10^4 \text{ s}$       D.  $6.93 \times 10^{-6} \text{ s}$
48. The electrical properties of germanium can be altered drastically by the addition of impurities. This process is referred to as  
 A. saturation.      B. bonding.      C. amplification.      D. doping.
49. If the threshold frequency for tungsten is  $1.3 \times 10^{15} \text{ Hz}$ , what is its work function?  
 A.  $8.58 \times 10^{-19} \text{ J}$       B.  $8.58 \times 10^{-15} \text{ J}$       C.  $8.58 \times 10^{-17} \text{ J}$       D.  $8.85 \times 10^{-18} \text{ J}$   
 [h =  $6.6 \times 10^{-34} \text{ Js}$ ]
50. Which of the following will be applied when a metal Y is used to electroplate another metal X in electrolysis?  
 A. X is the anode and very high current is used.      B. X is the anode and Y is the cathode  
 C. Y is the cathode and X is the anode.      D. Y is the anode and very high current is Used

PHYSICS (SET A)  
2007,2008

1. D  
 2. D  
 3. A  
 4. C  
 5.  
 6. D  
 7.  
 8. C  
 9. D  
 10.  
 11. A  
 12. B  
 13. B  
 14. D  
 15. C  
 16. A  
 17.  
 18. B  
 19. C  
 20. A  
 21. C  
 22. C  
 23. B  
 24.  
 25. C

PHYSICS (BATCH 20)  
2009/2010

1. D  
 2  
 3. A  
 4. C  
 5. A  
 6. A  
 7. A  
 8. B  
 9. D  
 10. B  
 11.  
 12. A  
 13. B  
 14.  
 15. C  
 16. A  
 17. C  
 18. A  
 19.  
 20. B  
 21. C  
 22. A  
 23. C  
 24. B  
 25. C

Physics 2010/2011

1 b	6 c	11 c	16 c	21 b
2 b	7 d	12 c	17 b	22 c
3 a	8 d	13 a	18 c	23 b
4 a	9 a	14 a	19 c	24 a
5 b	10 d	15 d	20 c	25 b

PHYSICS 2012/2013

QUESTION PAPER TYPES: D

1. D	17. B	33.	49. A
2. B	18. A	34. A	50.
3. D	19. C	35.	
4. A	20. B	36.	
5.	21.	37. C	
6. C	22. A	38.	
7. C	23.	39. C	
8. C	24. A	40. B	
9.	25.	41.	
10.	26. D	42.	
11. D	27. B	43.	
12.	28. B	44. C	
13. C	29. C	45.	
14.	30. D	46.	
15. B	31.	47. C	
16. A	32. A	48.	