MERITSTORE

NEET - PHYSICS

1. R and L represent respectively resistance and self inductance, which of the following combinations has the dimensions of frequency

a) $\frac{R}{L}$ b) $\frac{L}{R}$ c) $\sqrt{\frac{R}{L}}$ d) $\sqrt{\frac{L}{R}}$

2. The unit of self inductance of a coil is

a) $Farad$ b) $Henry$ c) $Weber$ d) $Tesla$

3. Displacement (x) of a particle is related to time (t) as
$x = at + bt^2 - ct^3$
Where $a, b$and c are constants of the motion. The velocity of the particle when its acceleration is zero is given by

a) $a + \frac{b^2}{c}$ b) $a + \frac{b^2}{2c}$
c) $a + \frac{b^2}{3c}$ d) $a + \frac{b^2}{4c}$

4. A large number of bullets are fired in all directions with same speed v. What is the maximum area on the ground on which these bullets will spread

a) $\pi \frac{v^2}{g}$ b) $\pi \frac{v^4}{g^2}$ c) $\pi^2 \frac{v^4}{g^2}$ d) $\pi^2 \frac{v^2}{g^2}$

5. The relation between the time of flight of a projectile T_f and the time to reach the maximum height t_m is

a) $T_f = 2t_m$ b) $T_f = t_m$
c) $T_f = \frac{t_m}{2}$ d) $T_f = \sqrt{2}(t_m)$

6. A person of mass 60 kg is inside a lift of mass 940 kg and presses the button one control panel. The lift starts moving upwards with an acceleration 1.0 m/s^2. If $g = 10\ ms^{-2}$, the tension in the supporting cable is

a) 1200 N b) 8600 N c) 9680 N d) 11000 N

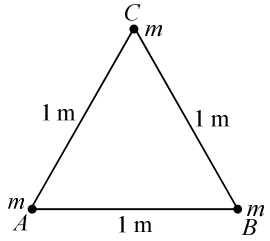
7. A player caught a cricket ball of mass 150 g moving at the rate of 20 ms^{-1}. If the catching process be completed in 0.1 s, the force of blow exerted by the ball on the hands of the player is

a) 0.3 N b) 30 N c) 300 N d) 3000 N

8. A neutron moving with velocity v collides with a stationary $\alpha - particle$.The velocity of the neutron after the collision is

a) $-\frac{3v}{5}$ b) $\frac{3v}{5}$ c) $\frac{2v}{5}$ d) $-\frac{2v}{5}$

9. Two balls each of mass m are placed on the vertices A and B of an equilateral triangle ABC of side 1m. A ball of mass $2m$ is placed at vertex C. The centre of mass of this system from vertex A (located at origin) is



a) $\left(\frac{1}{2}\text{m}, \frac{1}{2}\text{m}\right)$ b) $\left(\frac{1}{2}\text{m}, \sqrt{3}\,\text{m}\right)$

c) $\left(\frac{1}{2}\text{m}, \frac{\sqrt{3}}{4}\text{m}\right)$ d) $\left(\frac{\sqrt{3}}{4}\text{m}, \frac{\sqrt{3}}{4}\text{m}\right)$

10. A solid cylinder of mass 2 kg and radius 0.2 m is rotating about its own axis without friction with angular velocity of 3 rad s^{-1}. Angular moment of the cylinder is

a) 0.2 J-s b) 1.12 J-s c) 0.12 J-s d) 12 J-s

11. The angular velocity of rotation of star (of mass M and radius R) at which the matter start to escape from its equator will be

a) $\sqrt{\frac{2GM^2}{R}}$ b) $\sqrt{\frac{2GM}{g}}$ c) $\sqrt{\frac{2GM}{R^3}}$ d) $\sqrt{\frac{2GR}{M}}$

12. Forces of 100 N each are applied in opposite directions on the upper and lower faces of a cube of side 20 cm. The upper face is shifted parallel to itself by 0.25 cm. If the side of the cube were 10 cm, then the displacement would be

a) 0.25 cm b) 0.5 cm c) 0.75 cm d) 1 cm

13. Two solids A and B float in water. It is observed that A floats with $\frac{1}{2}$ of its body immersed in water and$B$ floats with $\frac{1}{4}$ of its volume above the water level. The ratio of the density of A to that of B is

a) 4 : 3 b) 2 : 3 c) 3 : 4 d) 1 : 2

14. Two very wide parallel glass plates are held vertically at a small separation r, and dipped in water of surface tension S. Some water climbs up in the gap between the plates. If p_0 is the atmospheric pressure, then the pressure of water just below the water surface in the region between the two plates is

a) $p_0 - \frac{2\,S}{r}$ b) $p_0 + \frac{2\,S}{r}$ c) $p_0 - \frac{4\,S}{r}$ d) $p_0 + \frac{4\,S}{r}$

15. On the Celsius scale the absolute zero of temperature is at

a) 0°C b) −32°C
c) 100°C d) −273.15°C

16. First law of thermodynamics is given by

a) $dQ = dU + PdV$ b) $dQ = dU \times PdV$
c) $dQ = (dU + dV)P$ d) $dQ = PdU + dV$

17. Four engines are working between the given temperatures ranges given below. For which temperature range the efficiency is maximum

a) 100 K, 80 K b) 40 K, 20 K
c) 60 K, 40 K d) 120 K, 100 K

18. One litre of oxygen at a pressure of 1 atm and two litres of nitrogen at a pressure of 0.5 atm, are introduced into a vessel of volume 1 L. If there is no change in temperature, the final pressure of the mixture of gas (in atm) is

a) 1.5 b) 2.5 c) 2 d) 4

19. Out of the following functions representing motion of a particle which represents SHM
(1) $y = \sin\omega t - \cos\omega t$(2) $y = \sin^3\omega t$
(3) $y = 5\cos\left(\frac{3\pi}{4} - 3\omega t\right)$ (4) $y = 1 + \omega t + \omega^2 t^2$

a) Only (1) and (2)
b) Only (1)
c) Only (4) does not represent SHM
d) Only (1) and (3)

20. If the displacement equation of a particle be represented by $y = A\sin PT + B\cos PT$,the particle executes

a) A uniform circular motion
b) A uniform elliptical motion
c) A S.H.M.

d) A rectilinear motion

21. The fundamental frequency of a sonameter wire is v. if its radius is doubled and its tension becomes half, the material of the wire remains same, the new fundamental frequency will be

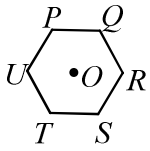
a) V b) $\frac{v}{\sqrt{2}}$ c) $\frac{v}{2}$ d) $\frac{v}{2\sqrt{2}}$

22. Let E_a be the electric field due to a dipole in its axial plane distant l and let E_q be the field in the equatorial plane distant l', then the relation between E_a and E_q will be

a) $E_a = 4E_q$ b) $E_q = 2E_a$

c) $E_a = 2E_q$ d) $E_q = 3E_a$

23. Six charges, three positive and three negative of equal magnitude are to be placed at the vertices of a regular hexagon such that the electric field at O is double the electric field when only one positive charge of same magnitude is placed at R. Which of the following arrangements of charges is possible for P, Q, R, S, T and U respectively?



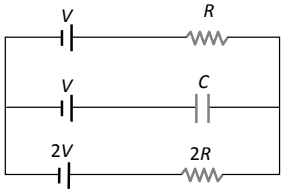
a) $+, -, +, -, -, +$ b) $+, -, +, -, +, -$

c) $+, +, -, +, -, -$ d) $-, +, +, -, +, -$

24. An air parallel plate capacitor has capacity C. The capacity and distance between plates are doubled when immersed in a liquid then dielectric constant of the liquid is

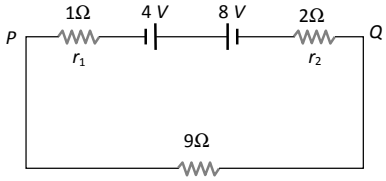
a) 1 b) 2 c) 3 d) 4

25. In the given circuit, with steady current, the potential drop across the capacitor must be



a) V b) $V/2$ c) $V/3$ d) $2V/3$

26. Two batteries of e.m.f. 4 V and 8 V with internal resistances1 Ω and 2 Ω are connected in a circuit with a resistance of 9 Ω as shown in figure. The current and potential difference between the points P and Q are

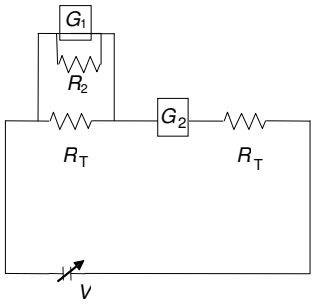


a) $\frac{1}{3}A$ and $3V$ b) $\frac{1}{6}A$ and $4V$

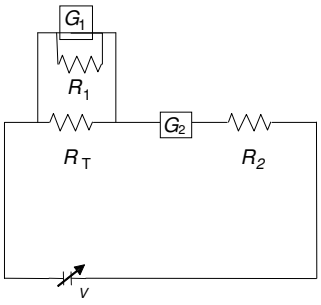
c) $\frac{1}{9}A$ and $9V$ d) $\frac{1}{2}A$ and $12V$

27. To verify Ohm's law, a student is provided with a test resistor R_T, a high resistance R_1, a small resistance R_2, two identical galvanometers G_1 and G_2 and a variable voltage source V. the correct circuit to carry out the experiment is

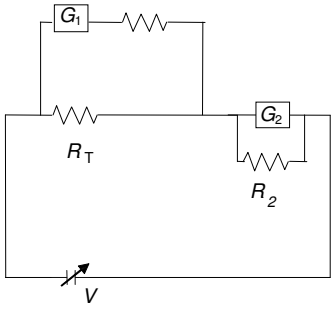
a)



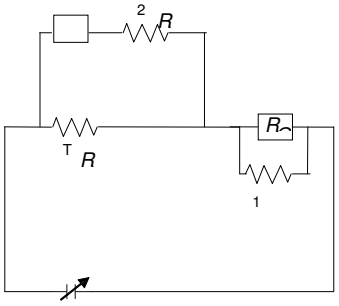
b)



c)



d)



28. Four charged particles are projected perpendicularly into the magnetic field with equal. Which will have minimum frequency?

a) Proton b) Electron c) Li^+ d) He^+

29. Curie-Weiss law is obeyed by iron

a) At Curie temperature only
b) At all temperatures
c) Below Curie temperature
d) Above Curie temperature

30. The only property possessed by ferromagnetic substance is

a) Hysteresis
b) Susceptibility
c) Directional property
d) Attracting magnetic substances

31. The north pole of a long bar magnet was pushed slowly into a short solenoid connected to a galvanometer. The magnet was held stationary for a few seconds with the north pole in the middle of the solenoid and then withdrawn rapidly. The maximum deflection of the galvanometer was observed when the magnet was

a) Moving towards the solenoid
b) Moving into the solenoid
c) At rest inside the solenoid
d) Moving out of the solenoid

32. The instantaneous voltage through a device of impedance 20 Ωis$e = 80 \sin 100\,\pi t$. The effective value of the current is

a) 3 A b) 2.828 A c) 1.732 A d) 4 A

33. A 0.7 $henry$ inductor is connected across a $120V - 60\ Hz$ ac source. The current in the inductor will be very nearly

a) 4.55 amp b) 0.355 amp
c) 0.455 amp d) 3.55 amp

34. The waves which have revolutionized telecommunication in more recent time, are

a) Micro wave b) Radio waves
c) Light waves d) TV waves

35. The focal length of convex lens is 30 cm and the size of image is quarter of the object, then the object distance is

a) $150\ cm$ b) $60\ cm$ c) $30\ cm$ d) $40\ cm$

36. The wavelength of light diminishes μ times ($\mu = 1.33$ for water) in a medium. A diver from inside water looks at an object whose natural colour is green. He sees the object as

a) Green b) Blue c) Yellow d) Red

37. In Young's double slit experiment intensity at a point is $(1/4)$ of the maximum intensity. Angular position of this point is

a) $\sin^{-1}(\lambda/d)$ b) $\sin^{-1}(\lambda/2d)$

c) $\sin^{-1}(\lambda/3d)$ d) $\sin^{-1}(\lambda/4d)$

38. In Millikan's oil drop experiment, a charged drop falls with terminal velocity V. if an electric field E is applied in vertically upward direction then it starts moving in upward direction with terminal velocity $2V$. if magnitude of electric field is decreased to $E/2$, then terminal velocity will becomes

a) $V/2$ b) V c) $3V/2$ d) $2V$

39. If an electron oscillates at a frequency of 1 GHz it gives

a) X-rays b) Mirowaves

c) Infrared rays d) None of these

40. The acceleration of electron in the first orbit of hydrogen atom is

a) $\dfrac{4\pi^2 m}{h^3}$ b) $\dfrac{h^2}{4\pi^2 mr}$ c) $\dfrac{h^2}{4\pi^2 m^2 r^3}$ d) $\dfrac{m^2 h^2}{4\pi^2 r^3}$

41. A radio-isotope has a half-life of 5 $years$. The fraction of the atoms of this material that would decay in 15 $years$ will be

a) $1/8$ b) $2/3$ c) $7/8$ d) $5/8$

42. Bohr's atom model assumes

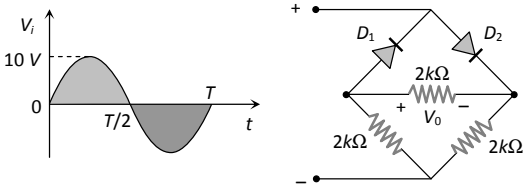
a) The nucleus is of infinite mass and is at rest

b) Electrons in a quantized orbit will not radiate energy

c) Mass of electron remains constant

d) All the above conditions

43. In the circuit shown in figure the maximum output voltage V_0 is



a) $0\ V$ b) $5\ V$ c) $10\ V$ d) $\dfrac{5}{\sqrt{2}}V$

44. A photodetector is made from a semiconductor with $E_g = 0.73\ eV$. What is the maximum wavelength, which it can detect

a) $1000\ nm$ b) $1703\ nm$ c) $500\ nm$ d) $173\ nm$

45. What is the value of frequency at which electromagnetic wave must be propagated for the D-region of atmosphere to have a refractive index of 0.5. Electron density for D-region is 400 electrons/cc

a) 200 kHz b) 104.2 kHz

c) 208.4 kHz d) 312.6 kHz