# NEET 2019

(PHYSICS)

1. For a p type semiconductor which of the following statements is true?
    (a) Holes are the majority carriers and trivalent atoms the dopants.
    (b) Holes are the majority carriers and pentavalent atoms the dopants.
    (c) Electrons are the majority carriers and pentavalent atoms the dopants.
    (d) Electrons are the majority carriers and trivalent atoms the dopants.

2. A body weighs 200N on the surface of the earth. How much will it weigh half way?
    (a) 200N   (b) 250N   (c) 100N   (d) 150N

3. In which of the following processes, heat is neither absorbed nor released by a system?
    (a) adiabatic   (b) isobaric   (c) isochoric   (d) isothermal

4. Six similar bulbs are connected as shown in the figure with a DC source of emf E and zero internal resistance.

    The ratio of power consumption by the bulbs when (i) all are glowing and (ii) in the situation when two from section A and one from section B are glowing, will be
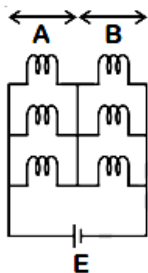

    (a) 9:4   (b) 1:2   (c) 2:1   (d) 4:9

5. A small hole of area of cross section 2 mm^2 is present near the bottom of a fully filled open tank of height 2m. Taking g = 10 m/s^2, the rate of flow of water through the open hole would be nearly
    (a) $8.9 \times 10^{-6} m^3/s$ (b) $2.23 \times 10^{-6} m^3/s$ (c) $6.4 \times 10^{-6} m^3/s$ (d) $12.6 \times 10^{-6} m^3/s$

6. A force F = 20+10y acts on a particle in y-direction where F is in Newton and y in metre. Work done by this force to move the particle from y = 0 to y = 1 m is
    (a) 5J   (b) 25J   (c) 20J   (d) 30J

7. Two point charges A and B, having charges +Q and – Q respectively are placed at certain distance apart and force acting between them is F. If 25% charge of A is transferred to B, then force between the charges becomes
    (a) 9F/16   (b) 16F/9   (c) 4F/3   (d) F

8. When an object is shot from the bottom of a long smooth inclined plane kept at an angle 60° with horizontal, it can travel a distance x_1 along the plane. But when the inclination is decreased to 30° and the same object is shot with the same velocity, it can travel x distance. Then x_1:x will be
    (a) $\sqrt{2}$:1   (b) 1:$\sqrt{3}$ (c) 1:2$\sqrt{3}$ (d) 1:1$\sqrt{2}$

9. Pick the wrong answer in the context with rainbow:
   (a) the order of colours is reversed in the secondary rainbow
   (b) an observer can see a rainbow when his front is towards the sun
   (c) rainbow is a combined effect of dispersion refraction and reflection of sunlight
   (d) when the light rays undergo two internal reflections in a water drop, a secondary rainbow is formed.

10. Average velocity of a particle executing SHM in one complete vibration is
    (a) $A\omega$ (b) $A\omega^2/2$ (c) zero   (d) $A\omega/2$

11. The total energy of an electron in an atom in an orbit is – 3.4eV. Its kinetic energy and potential energies are respectively
    (a) – 3.4eV, – 6.8eV   (b) 3.4eV, –6.8eV   (c) 3.4eV, 3.4eV   (d) –3.4eV, –3.4eV

12. At a point A on the earth's surface the angle of dip, $\delta = +25°$. At a point B on the earth's surface the angle of dip, $\delta = -25°$. We can intercept that
    (a) A is located in the southern hemisphere and B is located in the northern hemisphere.
    (b) A is located in the northern hemisphere and B is located in the southern hemisphere.
    (c) A and B both located in the southern hemisphere
    (d) A and B both located in the northern hemisphere

13. In which of the following devices, the eddy current effect is not used?
    (a) magnetic braking in train   (b) electromagnet
    (c) electric heater   (d) induction furnace

14. Two particles A and B are moving in uniform circular motion in concentric circles of radii r_A and r_B with speed v_A and v_B respectively. Their time period of rotation is the same. The ratio of angular speed of A to that of B will be
    (a) $v_A:v_B$ (b) $r_B:r_A$ (c) 1:1   (d) $r_A:r_B$

15. Two similar thin equi-convex lenses of focal length f each are kept co-axially in contact with each other such that the focal length of the combination is F_1. When the space between the two lenses is filled with glycerine (which has the same index ($\mu = 1.5$) as that of glass) then the equivalent focal length is F_2. The ratio of $F_1:F_2$ will be
    (a) 1:2   (b) 2:3   (c) 3:4   (d) 2:1

16. An electron is accelerated through a potential difference of 10,000V. Its de-Broglie wavelength is (nearly): ($m_e = 9\times10^{-31}$kg)
    (a) 122×10^{-12}m   (b) 122×10^{-14}m   (c) 122 nm   (d) 122×10^{-13}m

17. The correct Boolean operation represented by the circuit diagram drawn is
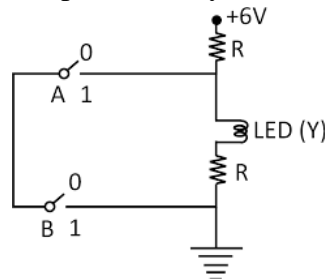
(a) OR   (b) NAND   (c) NOR   (d) AND

18. A soap bubble having radius of 1mm is blown from a detergent solution having a surface tension of 2.5×10^{-2} N/m. The pressure inside the bubble equals at a point Z_0 below the free surface of water in a container. Taking g = 10 m/s^2 density of water = 10^3 kg/m^3, the value of Z_0 is

(a) 10cm   (b) 1cm   (c) 0.5cm   (d) 100cm

19. The displacement of a particle executing simple harmonic motion is given by $y = A_0 + A \sin \omega t + B \cos \omega t$. Then the amplitude of its oscillation is given by

(a) $\sqrt{A^2 + B^2}$ (b) $\sqrt{A_0^2(A+B)^2}$ (c) $A + B$ (d) $A_0 + \sqrt{A^2 + B^2}$

20. The work done to raise a mass m from the surface of the earth to a height h which is equal to the radius of the earth is

(a) 2mgR   (b) 1/2 mgR   (c) 3/2 mgR   (d) mgR

21 The speed of a swimmer in still water is 20m/s. The speed of river water is 10m/s and is flowing due east. If he is standing on the south bank and wishes to cross the river along the shortest path the angle at which he should make his stokes w.r.t. north is given by

(a) 0°   (b) 60°west   (c) 45° west   (d) 30° west

22. Two parallel infinite line charges with linear charge densities $+ \lambda$ C/m and $- \lambda$ C/m are placed at a distance of 2R in free space. What is the electric field mid way between the two line charges?

(a) $2\lambda/\pi\varepsilon_0$ R N/C   (b) $\lambda/\pi\varepsilon_0$ R N/C   (c) $\lambda/2\pi\varepsilon_0$ R N/C   (d) zero

23. Which of the following acts as a circuit protection device?

(a) inductor   (b) switch   (c) fuse   (d) conductor

24. A parallel plate capacitor of capacitance 20µF is being charged by a voltage source whose potential is changing at the rate of 3V/s. The conduction current through the connecting wires and the displacement current through the plates of the capacitor, would be, respectively

(a) 60µA, 6µA   (b) 60µA, zero   (c) zero, zero   (d) zero, 60µA

25. When a block of mass M is suspended by a long wire of length L, the length of the wire becomes (L + l). The elastic potential energy stored in the extended wire is

(a) MgL   (b) 1/2 Mgl   (c) 1/2 MgL   (d) Mgl

26. A hollow metal sphere of radius R is uniformly charged. The electric field due to the sphere at a distance r from the centre

(a) zero as r increases for r<R, decreases as r increases for r>R

(b) zero as r increases for r<R, increases as r increases for r>R

(c) decreases as r increases for r<R and for r>R

(d) increases as r increases for r<R and for r>R

27. A mass m is attached to a thin wire and whirled in a vertical circle. The wire is most likely to break when

(a) the wire is horizontal   (b) the mass is at the lowest point

(c) inclined at an angle of 60° from vertical   (d) the mass is at the highest point

28.   Which colour of the light has the longest wavelength?
      (a) Blue   (b) Green   (c) Violet   (d) Red

29.   A particle moving with velocity v is acted by three forces shown by the vector triangle PQR. The velocity of the particle will
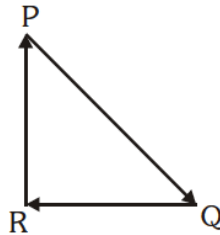

      (a) decrease   (b) remain constant
      (c) change according to the smallest force QR   (d) increase

30.   Ionized hydrogen atoms and α-particles with same momenta enters perpendicular to a constant magnetic field B. The ratio of their radii of their paths $r_B : r_\alpha$ will be
      (a) 1:2   (b) 4:1   (c) 1:4   (d) 2:1

31.   The unit of thermal conductivity is
      (a) $J\ m^{-1}\ K^{-1}$ (b) $W\ m\ K^{-1}$ (c) $W\ m^{-1}\ K^{-1}$ (d) $J\ m\ K^{-1}$

32.   A coil of 800 turns effective area 0.05 m^2 is kept perpendicular to a magnetic field 5×10^{-5} T. When the plane of its co planar will be in 0.1s, the emf induced in the coil will be
      (a) 0.2V   (b) 2×10^{-3}V   (c) 0.02V   (d) 2V

33.   A disc of radius 2m and mass 100kg rolls on a horizontal floor. Its centre of mass has speed of 20 cm/s. How much work is needed to stop it?
      (a) 30 kJ   (b) 2J   (c) 1J   (d) 3J

34.   In an experiment, the percentage of error occurred in the measurement of physical quantities A, B, C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the measurement X, where $X = A^2 B^{1/2} / C^{1/3} D^3$ will be
      (a) 16%   (b) – 10%   (c) 10%   (d) (3/13)%

35.   Body A of mass 4m moving with speed u collides with another body B of mass 2m, at rest. The collision is head on and elastic in nature. After the collision the fraction of energy lost by the colliding body A is
      (a) 8/9   (b) 4/9   (c) 5/9   (d) 1/9

36.   The radius of circle, the period of revolution initial position an d sense of revolution are indicated in the blow figure.
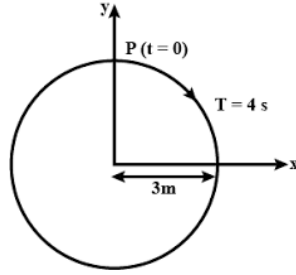
y-projection of the radius vector of rotating particle P is

(a) $y(t) = 4\sin(\pi t/2)$ where y in m   (b) $y(t) = 3\cos(3\pi t/2)$, where y in m

(c) $y(t) = 3\cos(\pi t/2)$ where y in m   (d) $y(t) = -3\cos 2\pi t$ where y in m

37.   In total internal reflection when the angle of incidence is equal to the critical angle for the pair of media in contact, what will be angle of refraction?

(a) $0°$ (b) equal to angle of incidence   (c) $90°$ (d) $180°$

38.   A solid cylinder of mass 2kg and radius 4cm is rotating about its axis at the rate of 3 rpm. The torque required to stop after 2π revolutions is

(a) $2×10^{-3}$ N-m   (b) $12×10^{-4}$ N-m   (c) $2×10^{6}$ N-m   (d) $2×10^{-6}$ N-m

39.   A block of mass 10kg in contact against inner wall of a hollow cylindrical drum of radius 1m. The coefficient of friction between the block and the inner wall of the cylinder is 0.1. The minimum angular velocity needed to the cylinder to keep the block stationary when the cylinder is vertical and rotating about its axis will be (g = 10 m/s^2)

(a) $10/2\pi$ rad/s   (b) 10 rad/s   (c) 10π rad/s   (d) $\sqrt{10}$ rad/s

40.   A cylindrical conductor of radius R is carrying a constant current. The plot of the magnitude of the magnetic field B with the distance d from the centre of the conductor, is correctly represented by the figure

(a)   (b)   (c)   (d)
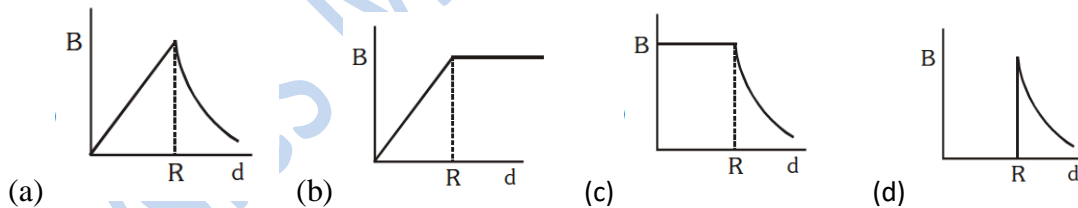
41.   In the circuit shown below, the readings of voltmeters and the ammeters will be
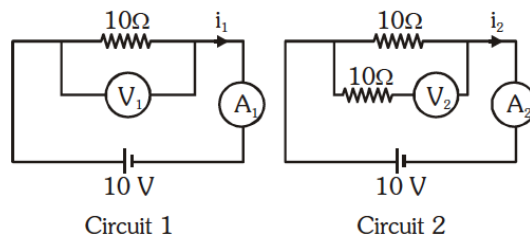
(a) $V_1 = V_2$ and $i_1 > i_2$ (b) $V_1 = V_2$ and $i_1 = i_2$ (c) $V_1 > V_2$ and $i_1 > i_2$ (d) $V_1 > V_2$ and $i_1 = i_2$

42.   Increase in temperature of a gas filled in a container would lead to

(a)increase in its kinetic energy   (b) decrease in its pressure

(c) decrease in intermolecular distance   (d) increase in its mass

43. A copper rod of 88cm and an aluminium rod of unknown length have their increase in length independent of increase in temperature. The length of aluminium rod is
(a) 113.9cm   (b) 88cm   (c) 68cm   (d) 6.8cm

44. α-particle consists of
(a) 2 electrons, 2 protons and 2 neutrons   (b) 2 electrons and 4 protons only
(c) 2 protons only   (d) 2 protons and 2 neutrons only

45. In a double slit experiment, when light of wavelength 400nm was used, the angular width of the first minima formed on a screen placed 1m away, was found to be 0.2°. What will be the angular width of the first minima, if the entire experimental apparatus is immersed in water? ($\mu_{water} = 4/3$).
(a) 0.15°   (b) 0.051°   (c) 0.1°   (d) 0.266°