# NEET 2020

(PHYSICS)

1. The electromagnetic wave with shortest wavelength among the following is
   (a) UV rays   (b) X-rays   (c) γ-rays   (d) microwaves

2. The angular speed of the wheel of a vehicle is increased from 360rpm to 1200rpm in 14s. Its angular acceleration is
   (a) 2π rad/s^2 (b) 28π rad/s^2 (c) 120π rad/s^2 (d) 1 rad/s^2

3. What happens to the mass number and atomic number of an element when it emits γ-radiation?
   (a) Mass number decreases by four and atomic number decreases by two.
   (b) Mass number and atomic number remain unchanged
   (c) Mass number remains unchanged, while atomic number decreases by one
   (d) Mass number increases by four and atomic number increases by two.

4. The angle of 1' (minute of arc) in radian is nearly equal to
   (a) 2.91×10^{-4} rad   (b) 4.85×10^{-4} rad   (c) 4.80×10^{-6} rad   (d) 1.75×10^{-2} rad

5. The magnetic flux linked with a coil (in Wb) is given by the equation $\phi = 5t^2 + 3t + 16$. The magnitude of induced emf in the coil at the fourth second will be
   (a) 33V   (b) 43V   (c) 108V   (d) 10V

6. The electric field at a point on the equatorial plane at a distance r from the centre of a dipole having dipole moment $\vec{P}$ is given by (r>> separation of two charges forming the dipole ε_0= permittivity of free space)
   (a) $E = \dfrac{P}{4\pi\varepsilon_0 r^3}$ (b) $E = \dfrac{2P}{4\pi\varepsilon_0 r^3}$ (c) $E = -\dfrac{P}{4\pi\varepsilon_0 r^2}$ (d) $E = -\dfrac{P}{4\pi\varepsilon_0 r^3}$

7. A plano-convex lens of unknown material and unknown focal length is given, With the help of a spherometer we can measure the
   (a) focal length of the lens   (b) radius of curvature of the curved surface
   (c) aperture of the lens   (d) refractive index of the material

8. A light bulb and an inductor coil are connected to AC source through a key as shown in the figure below. The key is closed and after some time the interior of the inductor. The glow of the light bulb
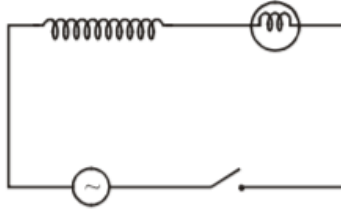
(a) decreases   (b) remains unchanged (c) will fluctuate   (d) increases

9.   The efficiency of a Carnot engine depends upon
      (a) the temperature of the sink only   (b) the temperatures of the source and sink
      (c) the volume of the cylinder of the engine   (d) the temperature of the source only

10.   Out of the following which one is a forward biased diode?
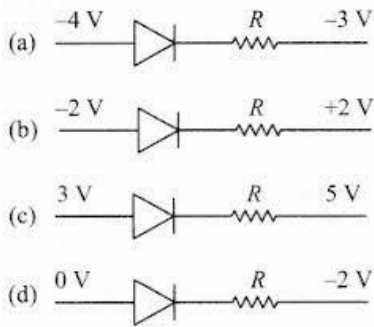
11.   For the circuit shown in the figure, the current I will be
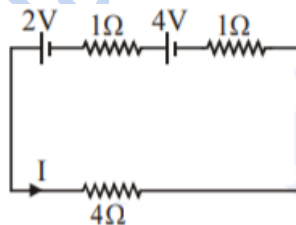
      (a) 0.75A   (b) 1A   (c) 1.5A   (d) 0.5A

12.   Two coherent sources of light interfere and produce fringe pattern on a screen. For
      central maximum, the phase difference between the two waves will be
      (a) zero   (b) π (c) $3\pi/2$ (d) $\pi/2$

13.   The total energy of an electron in the nth stationary orbit of the hydrogen atom can be
      obtained by
      (a) $E_n = \dfrac{136}{n^2}\,\text{eV}$ (b) $E_n = -\dfrac{13.6}{n^2}\,\text{eV}$ (c) $E_n = -\dfrac{1.36}{n^2}\,\text{eV}$ (d) $E_n = -1.36 \times n^2\,\text{eV}$

14.   Identify the function which represents a periodic motion

(a) $e^{\omega t}$ (b) $\log_e (\omega t)$ (c) $\sin \omega t + \cos \omega t$ (d) $e^{-\omega t}$

15. The de-Broglie wavelength of an electron moving with kinetic energy of 144 eV is
(a) 102×10^{-3} nm   (b) 102×10^{-4} nm   (c) 102×10^{-5} nm   (d) 102×10^{-2} nm

16. The mean free path λ for a gas molecule depends upon diameter, d of the molecule as
(a) $\lambda \propto 1/d^2$ (b) $\lambda \propto d$ (c) $\lambda \propto d^2$ (d) $\lambda \propto 1/d$

17. A n-p-n transistor is connected in common emitter configuration (see figure) in which collector voltage drop across load resistance (800Ω) connected to the collector circuit is 0.8V. The collector current is
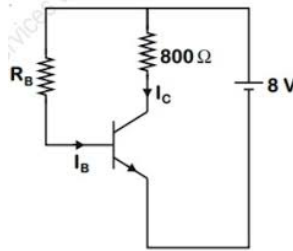

(a) 2mA   (b) 0.1mA   (c) 1mA   (d) 0.2mA

18. A person sitting in the ground floor of a building notices through the window of height 1.5m, a ball dropped from the roof of the building crosses the window in 0.1s. What it the velocity of the ball when it is at the topmost point of the window? ($g = 10$ m/s^2)
(a) 15.5 m/s   (b) 14.5 m/s   (c) 4.5 m/s   (d) 20 m/s

19. The magnetic field in a plane electromagnetic wave is given by: $B_y = 2 \times 10^{-7} \sin(\pi \times 10^3 x + 3\pi \times 10^{11} t)$T. Calculate the wavelength.
(a) $\pi \times 10^3$m   (b) 2×10^{-3}m   (c) 2×10^3m   (d) $\pi \times 10^{-3}$m

20. The length of the string of a musical instrument is 90cm and has a fundamental frequency of 120Hz. Where should it be pressed to produce fundamental frequency of 180 Hz?
(a) 75cm   (b) 60cm   (c) 45cm   (d) 80cm

21. The acceleration of an electron due to the mutual attraction between the electron and proton when they are 1.6Å apart is, ($m_e \approx 9 \times 10^{-31}$ kg, $e = 1.6 \times 10^{-19}$C) (Take $1/4\pi\varepsilon_0 = 9 \times 10^9$ Nm^{2}C^{-2})
(a) 10^{24} m/s^2 (b) 10^{23} m/s^2 (c) 10^{22} m/s^2 (d) 10^{25} m/s^2

22. The wave nature of electrons was experimentally verified by
(a) de-Broglie   (b) Hertz   (c) Einstein   (d) Davisson & Germer

23. Two solid conductors are made up of same material, have same length and same resistance. One of them has a circular cross-section of area A_1 and the other one has a square cross section of A_2. The ratio of A_1/A_2 is

(a) 1.5   (b) 1   (c) 0.8   (d) 2

24. For the circuit given below, the Kirchhoff's loop rule for the loop BCDEB is given by the equation
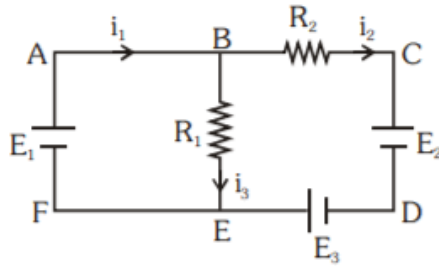

(a) $-i_2R_2 + E_2 - E_3 + i_3R_1 = 0$ (b) $i_2R_2 + E_2 - E_3 - i_3R_1 = 0$
(c) $i_2R_2 + E_2 + E_3 + i_3R_1 = 0$ (d) $-i_2R_2 + E_2 + E_3 + i_3R_1 = 0$

25. Three stars A, B, C have surface temperatures T_A, T_B, T_C respectively. Star A appears bluish, star B appears reddish and star C yellowish. Hence

(a) $T_A > T_B > T_C$ (b) $T_B > T_C > T_A$ (c) $T_C > T_B > T_A$ (d) $T_A > T_C > T_B$

26. A liquid does not wet the solid surface if angle of contact is

(a) equal to 45°   (b) equal to 60°   (c) greater than 90°   (d) zero

27. A point mass m is moved in a vertical circle of radius r with the help of a string. The velocity of the mass is $\sqrt{7gr}$ at the lowest point. The tension in the string at the lowest point is

(a) 6mg   (b) 7mg   (c) 8mg   (d) 1mg

28. An object is placed on the principal axis of a concave mirror at a distance of 1.5f (f is the focal length). The image will be at

(a) – 3f   (b) 1.5f   (c) – 1.5f   (d) 3f

29. The half life of radioactive sample undergoing α-decay is 1.4×10^{17}s. If the number of nuclei in the sample is 2.0×10^{21}. The activity of the sample is nearly

(a) 10^4 Bq   (b) 10^5Bq   (c) 10^6Bq   (d) 10^3Bq

30. If the critical angle for total internal reflection from a medium to vacuum is 45°, then velocity of light in the medium is

(a) 1.5×10^8 m/s   (b) $3\sqrt{2}\times10^8$ m/s   (c) $\sqrt{2}\times10^8$ m/s   (d) 3×10^8 m/s

31. A wheel with 20 metallic spokes each 1m long is rotated with a speed of 120rpm in a plane perpendicular to a magnetic field of 0.4G. The induced emf between the axle and rim of the wheel will be $(1G = 10^{-4}T)$
(a) $2.51 \times 10^{-4}V$ (b) $2.51 \times 10^{-5}V$ (c) $4.0 \times 10^{-5}V$ (d) 2.51V

32. An ideal gas equation can be written as $p = \rho RT/ M_0$ where ρ and M_0 are respectively.
(a) mass, density, mass of the gas   (b) number density, molar mass
(c) mass density, molar mass   (d) number density, mass of the gas

33. The variation of the electrostatic potential with radial distance r from the centre of a positively charged metallic thin shell of radius R is given by the graph

(a)   (b)   (c)   (d)
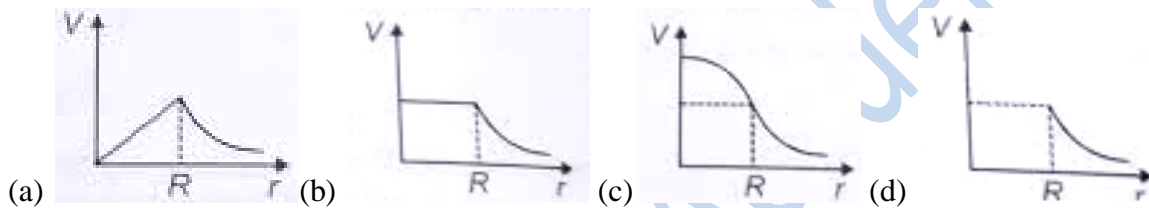
34. Which of the following gate is called universal gate?
(a) OR gate   (b) AND gate   (c) NAND gate   (d) NOT gate

35. The pv diagram for an ideal gas in a piston cylinder assembly undergoing a thermodynamic process is shown in the figure. The process is
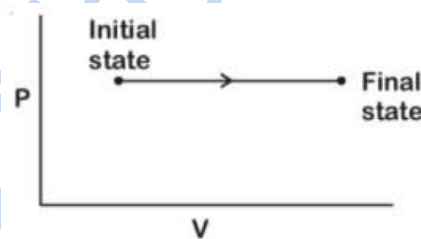

(a) adiabatic   (b) isochoric   (c) isobaric   (d) isothermal

36. The power of a biconvex lens is 10D and the radius of curvature of each surface is 10cm. Then, the refractive index of the material of the lens is
(a) 4/3   (b) 9/8   (c) 5/3   (d) 3/2

37. An intrinsic semiconductor is converted into n-type extrinsic semiconductor by doping it with
(a) phosphorous   (b) aluminium   (c) silver   (d) germanium

38. A barometer is constructed using a liquid (density = 760 kg/m^3). What would be the height of the liquid column, when a mercury barometer reads 76cm? (density of mercury = 13600 kg/m^3)

(a) 1.36m   (b) 13.6m   (c) 136m   (d) 0.76m

39. A wire of length L metre carrying a current of I ampere is bent in the form of a circle. Its magnetic moment is

(a) $IL^2/4 Am^2$ (b) $I\pi L^2/4 Am^2$ (c) $2 IL^2/\pi Am^2$ (d) $IL^2/4\pi Am^2$

40. A parallel plate capacitor having cross sectional area A and separation d has air in between the plates. Now an insulating slab of same area but thickness d/2 is inserted between the plates as shown in figure having dielectric constant K (=4). The capacitance will be
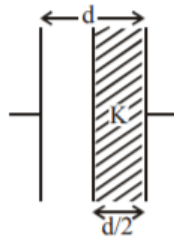

(a) 2:1   (b) 8:5   (c) 6:5   (d) 4:1

41. What is the depth at which the value of acceleration due to gravity becomes 1/n times the value that the surface of earth? (Radius of earth = R)
(a) R/n^2 (b) R(n – 1)/n   (c) Rn/ (n – 1)   (d) R/n

42. Time interval measured by a clock give the following readings: 1.25s, 1.24s, 1.27s, 1.21s and 1.28s. What is the percentage relative error of the observations?
(a) 2%   (b) 4%   (c) 16%   (d) 1.6%

43. Three equivalent spheres each of mass M are placed at the corners of a right angle triangle with the mutually perpendicular sides equal to 2m (see figure). Taking the point of intersection of the two mutually perpendicular sides as the origin, find the position vector of centre of mass.
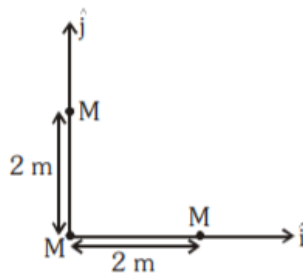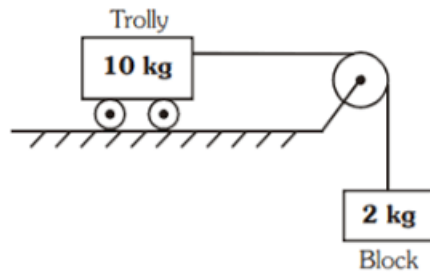

(a) $2(\hat{i} + \hat{j})$ (b) $(\hat{i} + \hat{j})$ (c) $\frac{2}{3}(\hat{i} + \hat{j})$ (d) $\frac{4}{3}(\hat{i} + \hat{j})$

44. The equivalent resistance between A and B for the mesh shown in the figure is

(a) 7.2Ω   (b) 16 Ω   (c) 30 Ω   (d) 4.8 Ω
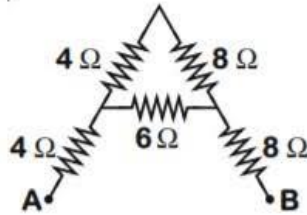
45. Calculate the acceleration of the block and trolly system shown in the figure. The coefficient of kinetic friction between the trolly and the surface is 0.05. ($g = 10$ m/s^2, mass of the string is negligible and no other friction exists).

(a) 1.25 m/s^2 (b) 1.50 m/s^2 (c) 1.66 m/s^2 (d) 1.00 m/s^2

Answers

1. (c) 2. (a) 3. (b) 4. (a) 5. (d) 6. (a) 7. (b) 8. (a) 9. (b) 10. (d) 11. (b) 12. (a) 13. (b)

14. (c) 15. (d) 16. (a) 17. (c) 18. (b) 19. (b) 20. (b) 21. (c) 22. (a) 23. (b) 24. (b) 25. (d) 26. (c)

27. (c) 28. (a) 29. (a) 30. (b) 31. (a) 32. (a) 33. (b) 34. (c) 35. (c) 36. (d) 37. (a) 38. (b) 39. (d)

40. (b) 41. (b) 42. (d) 43. (b) 44. (b) 45. (a)