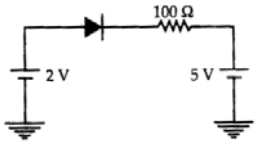
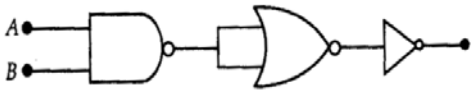
CET MOCK TEST
PHYSICS PAPER – V

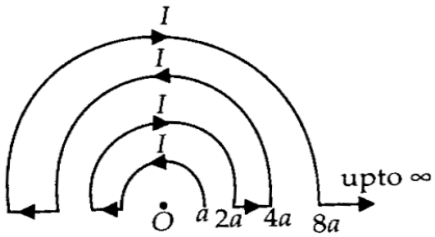
1. In Bohr theory of hydrogen atom, let *r, v* and *E* be the radius of orbit, speed of electron and the total energy of the electron respectively, which of the following quantities is proportional to the quantum number n?
   a) *vr* b) *rE* c) $\frac{r}{E}$ d) $\frac{r}{v}$

2. Current through the ideal diode as shown in fig is
   

   a) zero b) 20A
   c) $\frac{1}{20}$ A d) $\frac{1}{50}$A

3. The circuit shown in fig. is equivalent to
   

   a) NOR gate b) OR gate
   c) AND gate d) NAND gate

4. A conductor is bent in the form of concentric semicircle as shown is the figure. The magnetic field at the point o is
   

   a) zero b) $\frac{\mu_0 I}{6a}$
   c) $\frac{\mu_0 I}{a}$ d) $\frac{\mu_0 I}{4a}$

5. P, Q and R are long straight wires in air, carrying currents as shown in figure. The force on Q is directed
   a) to the left
   b) to the right
   c) perpendicular to the plane of diagram
   d) along the current in Q

P	Q	R
20 A	40 A	60 A

6. A charge q at a distance x from straight current carrying wire is moving towards it with speed v, experiences a magnetic force of magnitude F. If the distance of the charge from the wire is 2x (all other conditions remaining the same) then the force would be
   a) F b) 2F c) $\frac{F}{2}$ d) $\frac{F}{4}$

7. A straight horizontal conducting rod of length 50 cm and mass 50 gm is suspended by two vertical wires at its ends. A current of 5.0 A is set up in the rod through the wires. What magnetic field should be set up normal to the conductor in order that the tension in the wires is zero ? (Take g = 10 ms^{-2})
   a) 0.05 T b) 0.1 T c) 0.2 T d) 0.5 T

8. A proton, a deuteron and an α particle enter a magnetic field perpendicular to field with same velocity. What is the ratio of the radii of circular paths?
   a) 1 : 1 :2 b) 1 : 2 : 1 c) 1 : 2 : 2 d) 2 : 1 : 1

9. A galvanometer having a coil resistance of 60 Ω shows full scale deflection, when a current of 1.0 A passes through it. It can be converted into an ammeter to read current up to 5.0 A by
   a) putting series a resistance of 15 Ω
   b) putting series a resistance of 240 Ω
   c) putting parallel a resistance of 15 Ω
   d) putting parallel a resistance of 240 Ω

10. A capacitor and a coil in series are connected to a 6 V ac source. By varying the frequency of the source, maximum current of 600 mA is observed. If the same coil is now connected to a cell of 6V internal resistance of 2 Ω, the current through it will be
    a) 0.5 A b) 0.6 A c) 1.0 A d) 2.0 A

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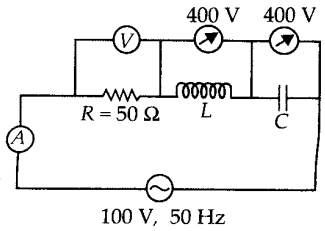
11. A series LCR circuit is connected to an ac source of variable frequency, when the frequency is increased continuously, starting from a small value, the power factor
    a) goes on increasing continuously b) goes on decreasing
    c) become maximum at a particle frequency d) remains constant
12. The instantaneous magnitudes of the electric field (E) and the magnetic field (B) vectors in an electromagnetic wave propagations in vacuum are related as
    a) $E = \frac{B}{C}$ b) $E = CB$ c) $E = \frac{B}{c^2}$ d) $E = c^2B$
13. In the LCR circuit shown in fig, the voltmeter V and ammeter A reading are



    a) v = 100 V, I = 2 A
    b) v = 100 V, I = 5 A
    c) v = 400 V, I = 2 A
    d) v = 300 V, I = 2 A
14. The drift velocity is very small, but it is found that as soon as one switch on the light at home, the bulb immediately glows. This is because
    a) the electrons travel very fast b) the electric field travels very fast
    c) this depends on the circuit d) none of these
15. During negative β decay, an antineutrino is also emitted along with the ejected electron. Then
    a) only linear momentum is conserved
    b) total linear momentum and total angular momentum but not total energy will be conserved
    c) total linear momentum and total energy but not total angular momentum will be conserved
    d) total linear momentum, total angular momentum and total energy will be conserved.
16. The number of beta particles emitted by a radioactive substance is twice the number of alpha particles emitted by it. The resulting daughter is an
    a) isomer of parent b) isotone of parent c) isotope of parent d) isobar of parent
17. Light of wavelength λ is incident on a slit of width d, the resulting diffraction pattern is observed on a screen at a distance D. The linear width of the principal maximum is equal to the width of the slit, if D equal to
    a) $\frac{d^2}{2\lambda}$ b) $\frac{d}{\lambda}$ c) $\frac{2\lambda^2}{d}$ d) $\frac{2\lambda}{d}$
18. If a plane glass slab is placed on the letters of different colors, then
    a) all the letters appear to be raised up to the same height
    b) violet colored letters appear to be more raised up
    c) Red colored letters appear to be more raised up
    d) none of these
19. An electron in the ground state of Hydrogen atom goes to an excited state by absorbing 12.1 eV energy. In the course of it's transition to lower energy states, the possible number of spectral lines will be
    a) 1 b) 3 c) 6 4) 10
20. String A has a length l, radius r, density of material **ρ** and is under tension T. sting B has all these quantities double those of string A of f_A and f_B are the corresponding fundamental frequencies of the vibrating string, then
    a) $f_A = 2f_B$ b) $f_A = 4f_B$ c) $f_B = 4f_A$ d) $f_A = f_B$

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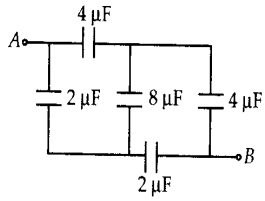
21. Two pipes are each 50 cm in length. One of them is closed at one end while the other is open at both ends. The speed of sound in air is 340 m/s. the frequency at which both the pipes each resonate is
a) 380 Hz b) 570 Hz c) 85 Hz d) None of the above

22. A transverse wave is represented by $y = A\sin(\omega t - kx)$. For what value of the wavelength is the wave velocity equal to the maximum particle velocity?
a) $\frac{\pi A}{2}$ b) πA c) 2 πA d) A

23. Distance between nodes on a string is 5 cm. Velocity of transverse wave is 2 m/s. Then the frequency is
a) 5 Hz b) 10 Hz c) 20 Hz d) 15 Hz

24. On moving a change of 20 C by 2 cm, 2 J of work is done, then the potential difference between the points is
a) 0.1 V b) 8 V c) 2 V d) 0.5 V

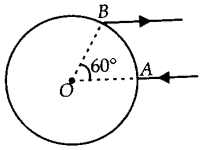
25. The effective capacitance between the points A and B is



a) 3 μ F b) $\frac{8}{3}$ μF c) 20μF d)12 μF

26. Constant current is flowing through a linear conductor of non uniform area of cross section. The charge flowing per second through the area of conductor at any cross section is
a) proportional to the area of cross section b) inversely proportional to the area of cross section
c) independent of area of cross section d) depend on the length of conductor

27. A uniform wire of resistance 36 Ω is bent in the form of a circle. The effective resistance across the points A and B is



a) 5 Ω b) 6 Ω
c) 7.2 Ω d) 30 Ω

28. Of the following quantities which one has the dimensions different from the remaining three?
i) Energy density ii) Force per unit area iii) product of charge per unit volume and voltage
iv) Angular momentum per unit mass
a) (i) b) (ii) c) (iii) d) (iv)

29. A stone of mass 2 kg is projected upward with kinetic energy of 98 J. the height at which the K.E of the stone becomes half its original value is
a) 5 m b) 2.5m c) 1.5 m d) 0.5 m

30. Four balls A, B, C and D are projected with the same speed making angles of 10˚, 30˚, 45˚ and 60˚ respectively with the horizontal. Which ball will strike the ground at the farther point?
a) B b) A c) D d) C

31. The bob of a simple pendulum is of mass 10 g. It is suspended with a thread of 1 m. If we hold the bob so as to stretch the string horizontally and release it, what will be the tension at the lower position (Take g = 10m/s^2)
a) Zero b) 0.1N c) 0.3 N d) 1.0N

32. Two satellites A and B so around a planet P in circular orbits having radii 4R and R respectively. If the speed of satellite A is 3v, the speed of satellite B is
a) 12 v b) 6 v c) $\frac{4}{3}$ v d) $\frac{3}{2}$ v

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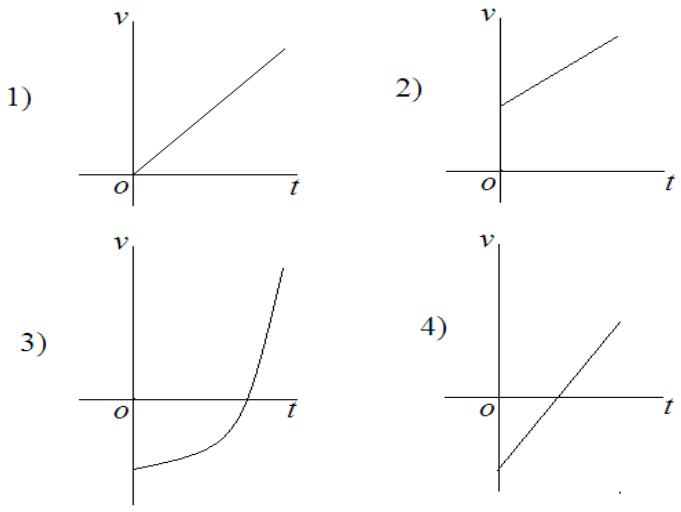
33. The surface energy of a liquid drop is U. It is splitted into 1000 equal droplets. Then its surface energy becomes
    a) U b) 10 U c) 100 U 4) 1000 U
34. The current gain of a transmitter in a common base arrangement is 0.98. Find the change in collector current corresponding to a change of 5.0 mA in emitter current. What would be the change in base current?
    a) 4.9 mA, 0.1 mA b) 4.9 mA, 0.2mA c) 5.9 mA, 0.3mA d) 5.9 mA, 0.8mA
35. A railway carriage has its centre of gravity at a height of 1 m above the rails, which are 1.5 m apart. The maximum safe speed at which it could travel round an unbaked curve 100 m is
    a) 12 m/s b) 18 m/s c) 22 m/s d) 27 m/s
36. A train of weight 10^7 N is running on a level track with uniform speed of 36 kmph. The frictional force is 0.5 kg wt per quintal. If a = 10 ms^{-2}, power of engine is
    a) 5 kW b) 0.5 kW c) 60 kW d) 500 kW
37. Two particles A and B get 4 m closer each second while travelling in opposite direction. Then get 0.4 m closer every second while travelling in same direction. The speed of A and B are respectively
    a) 2.2 m/s and 0.4m/s b) 2.2m/s and 1.8 m/s c) 4 m/s and 0.4 m/s d) none of these
38. A particle moves along x-axis in such a way that it's x-coordinate varies with time t according to the equation $x = 3 - 4t + 6t^2$. The velocity of the particle will vay with time according to graph.



39. An ideal heat engine is working between temperature T_1 and T_2 has efficiency η. If both the temperatures are raised by 100 K each, the new efficiency will be
    a) η b) less than η c) more than η d) cannot be predicted.
40. In the steady state of conduction of rod AB of length 100 cm, the temperature at the end A is 80˚C and at B the temperature is 0˚C. The temperature of the rod at the distance 60 cm from A is
    a) 16˚ C b) 32˚ C c) 48˚ C d) None of these.
41. There are two spherical balls A and B of the same material with same surface finish but the radius of A is half Type equation here.that of B. It A and B are heated to the same temperature and allowed to cool then
    a) rate of cooling of both is same b) rate of cooling of A is 4 times that of B
    c) rate of cooling of A is twice that of B d) rate of cooling of A is ¼ times that of B
42. When the object is at distance u_1 and u_2 from a lens, a real image and virtual image are formed respectively having the same magnification. The focal length of the lens is
    a) $u_1 + \frac{u_2}{2}$ b) $\frac{u_1 - u_2}{2}$ c) $u_1 + u_2$ d) $\frac{u_1 + u_2}{2}$

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43. A screen is placed at a certain distance from a narrow slit which is illuminated by a parallel beam of monochromatic light. If the wavelength of light used in the experiment is λ and d is the width of the slit, then angular width of central maximum will be

a) $sin^{-1}\left(\lambda/_{d}\right)$ b) $sin^{-1}\left(\frac{\lambda}{2d}\right)$ c) $2\ sin^{-1}\left(\frac{\lambda}{d}\right)$ d) none of these

44. In YDSE, the intensity of light at a point on the screen where the path difference is λ is k units. What is the intensity of light at a point where the path difference is $\lambda/_{3}$, λ being the wavelength of light used?

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

45. A ray of light passing through a prism of refracting angle 60˚ has to deviate at least 30˚. Then R.I of prism should be

a) $\leq \sqrt{2}$ b) $\geq \sqrt{2}$ c) $\geq \sqrt{3}$ d) $\leq \sqrt{3}$

46. Two radioactive material x_1 and x_2 contain same number of nuclei. If 6λ s^{-1} and $4\ \lambda\ s^{-1}$ are the decay constants of x_1 and x_2 respectively, the ratio of number of nuclei undecayed of x_1 to that of x_2 will be $\left(\frac{1}{e}\right)$ after a time

a) $\frac{1}{2\lambda}\ s$ b) $\frac{1}{\lambda}$ s c) $\frac{1}{5\lambda}$ s d) $\frac{1}{\lambda}\ s$

47. A change Q is placed at the center of the line joining two point charges +q and +q. What is the ratio $\frac{Q}{q}$?

a) 4 b) $\frac{1}{4}$ c) -4 d) $-\frac{1}{4}$

48. A ray of light propagates from glass $\left(n_g = \frac{3}{2}\right)$ to water $(n_w = 4_{13})$. The value of critical angle is

a) $sin^{-1}\left(\frac{1}{2}\right)$ b) $sin^{-1}\left(\frac{\sqrt{8}}{9}\right)$ c) $sin^{-1}\left(\frac{8}{9}\right)$ d) $sin^{-1}\left(\frac{5}{7}\right)$

49. An object is placed at 15 cm in front of a convex lens whose focal length is 10 cm. The image formed will be

a) magnified and inverted b) magnified and erect
c) reduced in size and inverted d) reduced in size and erect

50. The electric potential at a point in free space due to a charge Q coulomb is $Q \times 10^{11}\ V$. The electric field at that point is

a) $12\pi\epsilon_0 Q \times 10^{22}\ V/m$ b) $4\pi\epsilon_0 Q \times 10^{22}\ V/m$
c) $12\pi\epsilon_0 Q \times 10^{20}\ V/m$ d) $4\pi\epsilon_0 Q \times 10^{20}\ V/m$

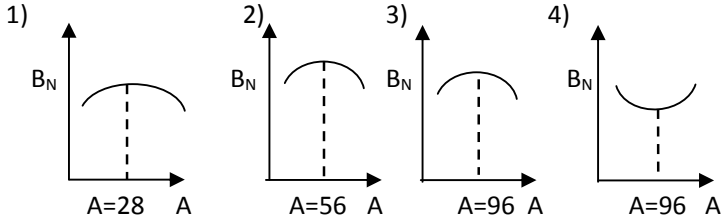
51. A point charge q is placed at the origin. The work done in taking another charge -Q from a point A(0,a) to another point B (a,0) along the straight path is

a) $\left(\frac{-qQ}{4\pi\epsilon_0 a^2}\right)\sqrt{2}$a b) zero c) $\left(\frac{qQ}{4\pi\epsilon_0 a^2}\right)\frac{a}{\sqrt{2}}$ d) $\left(\frac{qQ}{4\pi\epsilon_0 a^2}\right)\sqrt{2}a$

52. A capacitor of capacitance C is connected to a battery of emf E. After full charging a dielectric of same size as that of capacitor and dielectric constant K is inserted. Then

a) Electric field between the plates of capacitor remains same
b) charge on capacitor increases to 2 KCE
c) Energy stored in capacitor decreases
d) Electric field between plates of capacitor increases

53. The dependence of binding energy per nucleus B_N, on the mass number A is represented by



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54. Two Polaroids are kept crossed to each other. Now one of them is rotated through an angle of 45˚. The percentage of incident light now transmitted through the system is

a) 15 % b) 25 % c) 50 % d) 60 %

55. When a metallic surface is illuminated with wavelength λ, the stopping potential for the photoelectric current is 3 V. When the same surface is illuminated by light of wavelength 2λ, the stopping potential is 1 V. The threshold wavelength of this surface is

a) 4λ b) 3.5 λ c) 3 λ d) 2.75 λ

56. If the binding energies of a deuteron and an alpha particle are 1.125 Mev and 7.2 Mev respectively then the more stable of the two is

a) deuteron b) alpha particle c) both a and b

d) some times deuteron and sometimes alpha particle.

57. Two points separated by a distance of 0.1 mm can just be inspected in a microscope when light of wavelength 600˚A is used. If light of wavelength 4800A˚ is used this limit of resolution will became.

a) 0.8 mm b) 0.12 mm c) 0.1 mm d) 0.08 mm

58. As the mass number A increases, which of the following quantities related to a nucleus do not change?

a) binding energy b) density c) volume d) mass.

59. According to Bohr's theory, the moment of an electron revolving in second orbit of hydrogen atom will be

a) 2πh b) πh c) $\frac{h}{\pi}$ d) $\frac{2h}{\pi}$

60. If we consider electron and photons of the same wavelength, then they will have the same

a) velocity b) angular momentum c) energy d) momentum

WISH YOU ALL THE BEST