GUJCET-PCE-2025

Test Booklet No. | | **Test Booklet Set No.** **03**

This booklet contains 32 pages.

DO NOT open this Test Booklet until you are asked to do so.

Important Instructions :

1) The Physics and Chemistry test consists of 80 questions. Each question carries **1** mark. For each correct response, the candidate will get **1** mark. For each incorrect response ¼ mark will be deducted. The maximum marks are **80**.
2) This Test is of **2 hours** duration.
3) Use **Black Ball Point Pen only** for writing particulars on OMR Answer Sheet and marking answers by darkening the circle '●'.
4) Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5) **On completion of the test, the candidate must handover the Answer Sheet to the Invigilator in the Room / Hall. The candidates are allowed to take away this Test Booklet with them.**
6) The Set No. for this Booklet is **03**. Make sure that the Set No. printed on the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7) The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet.
8) Do not write your Seat No. anywhere else, except in the specified space in the Test Booklet / Answer Sheet.
9) Use of White fluid for correction is not permissible on the Answer Sheet.
10) Each candidate must show on demand his / her Admission Card to the Invigilator.
11) No candidate, without special permission of the Superintendent or Invigilator, should leave his / her seat.
12) Use of Simple (Manual) Calculator is permissible.
13) The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and must sign the Attendance Sheet (Patrak - 01). Cases where a candidate has **not** signed the Attendance Sheet (Patrak - 01) will be deemed not to have handed over the Answer Sheet and will be dealt with as an unfair means case.
14) The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
15) No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16) The candidates will write the Correct Test Booklet Set No. as given in the Test Booklet / Answer Sheet in the Attendance Sheet. (Patrak - 01)

PHYSICS

1) What is the approximate percentage value of maximum voltage to its rms value in LCR AC circuit?

(A) 22.8% (B) 70.7%

(C) 50% (D) 141.4%

2) In which of the following AC circuit, we get the value of power factor 1 at resonance condition?

(A) LCR series circuit (B) CR series circuit

(C) Only inductor (L) circuit (D) LR series circuit

3) The output voltage of a step-down transformer is measured to be 24V, when connected to a 12 watt light bulb. The value of the peak current is _____.

(A) $2\sqrt{2}$ A (B) $\sqrt{2}$ A

(C) 2A (D) $\frac{1}{\sqrt{2}}$ A

4) ____ are used in medicine to destroy cancer cells.

(A) Microwaves (B) Gamma rays

(C) Ultraviolet rays (D) Visible rays

(Space for Rough Work)

5) The speed of light in a medium is 200×10^8 cm/s. Refractive index of a medium is _____ ($c = 3\times10^8$ m/s).

(A) 2.42 (B) 1.0

(C) 1.5 (D) 1.33

6) What is the power of combination of convex lens and concave lens of equal focal length 25 cm?

(A) Zero (B) 25D

(C) Infinite (D) 8D

7) At what angle of incidence should a ray of light incident on a face of an equilateral prism of minimum angle of deviation is 46°?

(A) 35° (B) 38°

(C) 40° (D) 53°

8) If the tube-length (L) of a compound microscope increases, then its magnification _____.

(A) First increases and then decreases (B) Increases

(C) Remains constant (D) Decreases

(Space for Rough Work)

9) Two waves of same intensity I_0 emitted from two sources having same phase difference (ϕ). Due to superposition of two waves, the intensity of resultant wave is directly proportional to _____ .

(A) $\sin^2\left(\frac{\phi}{2}\right)$ (B) $\sin^2\phi$

(C) $\cos^2\left(\frac{\phi}{2}\right)$ (D) $\cos^2\phi$

10) For light diverging from a point source,

(A) the intensity at the wavefront does not depend on the distance

(B) the intensity increases in proportion to the distance squared

(C) the wavefront is parabolic

(D) the wavefront is spherical

11) In Young's double slit experiment, the slits are separated by 0.54 mm and the screen is placed 1.8m away. The distance between central bright fringe and sixth bright fringe is measured to be 1.2 cm. Determine the wavelength of light used in the experiment.

(A) 5000 Å (B) 600 nm

(C) 8000 nm (D) 800 nm

(Space for Rough Work)

$d = 0.54 \times 10^{-3}$ m

$D = 1.8$

$\frac{6\lambda D}{d} = 1.2 \times 10^{-2}$ m $\qquad 0.06 \times 10^{-5}$

$\lambda = \frac{1.2 \times 10^{-2} \times 0.54 \times 10^{-3}}{1.8 \times 6}$

12) The minimum value of electric field required to pulled out electrons from a metal is approximately _____ V/cm.

(A) 10^9 (B) 10^6

(C) 10^{10} (D) 10^8

13) Monochromatic light of frequency 6×10^{14} Hz is produced by a laser. The power emitted is 4×10^{-3}W. How many photons per second on an average are emitted by the source? [$h = 6.63 \times 10^{-34}$Js]

(A) 1×10^{16} Photons per second (B) 5×10^{16} Photons per second

(C) 3×10^{15} Photons per second (D) 5×10^{15} Photons per second

14) What is the de-Broglie wavelength of a bullet of mass 0.033 kg travelling at the speed of 1 km/s? ($h = 6.6 \times 10^{-34}$ Js)

(A) 3×10^{-25}m (B) 2×10^{-35}m

(C) 1.1×10^{-32}m (D) 1.7×10^{-35}m

15) According to Bohr's model, the orbital angular momentum of electrons in third excited state is _____ [$h = 6.63 \times 10^{-34}$ Js]

(A) 4.2×10^{-34} kg m^2s^{-1} (B) 12.350×10^{-34} kg m^2s^{-1}

(C) 1.625×10^{-26} erg-s (D) 6.63×10^{-34} Js

16) 13.6 eV energy is required to separate a hydrogen atom into proton and an electron. If the orbital radius of an electron in hydrogen atom is 5.3×10^{-11}m, then velocity of electron is _____.

(A) 6.25×10^7 ms^{-1} (B) 1.36×10^5 ms^{-1}

(C) 2.4×10^8 ms^{-1} (D) 2.2×10^6 ms^{-1}

(Space for Rough Work)

17) The ground state energy of hydrogen atom is –13.6 eV. The potential and kinetic energies of the electron in this state _____.

(A) –13.6 eV, –27.2 eV
(B) –27.2 eV, –13.6 eV
(C) –27.2 eV, +13.6 eV
(D) –13.6 eV, +27.2 eV

18) Calculate the height of the potential barrier for a head on collision of two deuterons. (Radius of deuteron is 2 fm).

(A) 7.2×10^{-19} J
(B) 7.2×10^{-14} J
(C) 3.6×10^{-19} J
(D) 5.76×10^{-14} J

19) Choose correct option to complete the net effect of fusion reaction occurs in the Sun.

$4\,{}_{1}^{1}H + 2e^{-} \rightarrow \_\_\_ + 2\nu + 6\gamma + \_\_\_$.

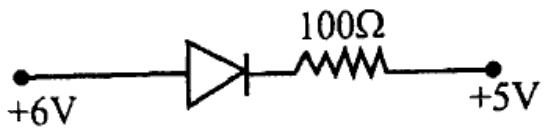
(A) ${}_{2}^{3}He, 5.49\,MeV$
(B) ${}_{2}^{4}He, 26.7\,MeV$
(C) ${}_{2}^{4}He, 22.86\,MeV$
(D) ${}_{2}^{3}He, 0.42\,MeV$

20) _____ pair is called isotones.

(A) ${}_{80}^{198}Hg, {}_{79}^{197}Au$
(B) ${}_{1}^{3}H, {}_{2}^{3}He$
(C) ${}_{82}^{214}Pb, {}_{83}^{214}Bi$
(D) ${}_{6}^{12}C, {}_{6}^{14}C$

(Space for Rough Work)

21) What is the current flowing through the given circuit? A given diode is an ideal diode.



(A) 0.1 A
(B) 100 mA
(C) 50 mA
(D) 10 mA

22) When a reverse bias is applied to a p-n junction, it _____.

(A) increases the majority carrier current and lowers the potential barrier
(B) increases the majority carrier current
(C) lowers the potential barrier
(D) raises the potential barrier

23) A filter circuit used in a rectifier, the value of load resistance and capacitance are 200 Ω and 15 μF. Then the value of time constant is _____.

(A) 1.33 ms
(B) 3 ms
(C) 7.5 ms
(D) 0.3 μs

(Space for Rough Work)

24) The electric field due to point charge $2q$ at a distance r is E. Now, charge q is uniformly distributed over a thin spherical shell of radius R, the electric field at a distance $\frac{r}{2}$ ($r >> R$) from the centre of the thin spherical shell is E′= _____.

(A) 4E

(B) 2E

(C) E

(D) $\frac{E}{2}$

25) 15 charges, each of value q are placed on X - axis at an equal distance 0.5R. The maximum electric flux associated with the spherical closed surface of radius 1.5R, in which one of the charges at the centre is _____.

(A) $\frac{5q}{\varepsilon_0}$

(B) $\frac{7q}{\varepsilon_0}$

(C) Zero

(D) $\frac{15q}{\varepsilon_0}$

26) In the absence of gravity, a charge q and mass $2m$ is placed stationary in a uniform electric field of intensity E. When the charge is released, its speed after n seconds is _____.

(A) $2mq$E

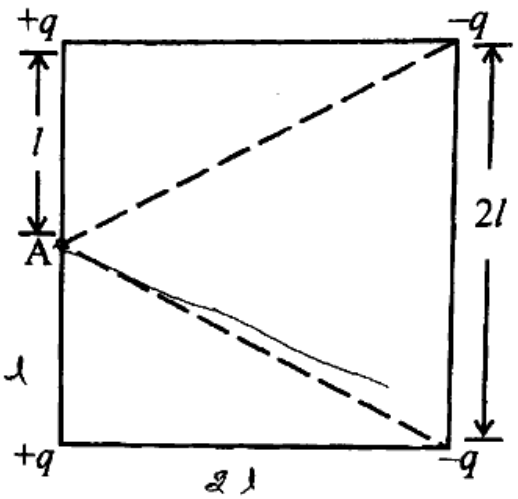
(B) $\frac{qEn}{m}$

(C) $\frac{qEn}{2m}$

(D) $\frac{2qEn}{m}$

(Space for Rough Work)

27) As shown in figure charges $+q$, $+q$, $-q$ and $-q$ are placed on the vertices of square, each side length is $2l$. The electric potential at mid-point 'A' of charges $+q$ and $+q$ is _____.



(A) Zero

(B) $\frac{2kq}{l}\left[1+\frac{1}{\sqrt{5}}\right]$

(C) $\frac{kq}{l}\left[1-\frac{1}{\sqrt{5}}\right]$

(D) $\frac{2kq}{l}\left[1-\frac{1}{\sqrt{5}}\right]$

28) Charge 1.6×10^{-7}C are distributed uniformly over the surface of spherical conductor of radius R. The ratio of electric potential inside the spherical conductor to the electric field on the surface is _____.

(A) $1.6\times10^{-7}R^2$

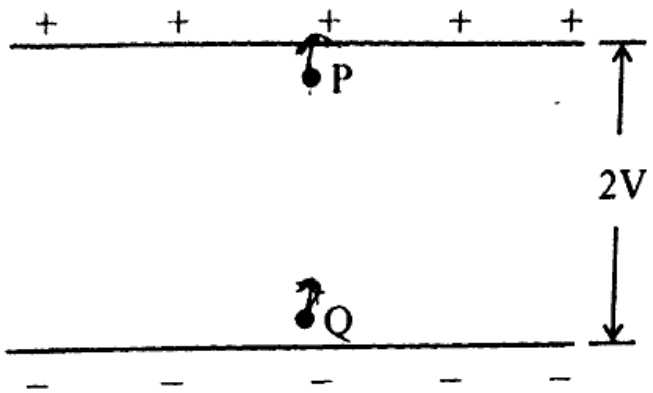
(B) R

(C) $1.6\times10^{-7}R$

(D) $\frac{1}{R}$

(Space for Rough Work)

29) The potential difference between two plates of parallel plate capacitor is 2V. As shown in figure electrons are placed at point P and Q. So



(A) Electric forces acting on both the electrons are same.

(B) Electric force acting on the electron at point P is greater than the electron at point Q.

(C) Electric force acting on the electron at point P is less than the electron at point Q.

(D) Electric forces acting on both the electrons are zero.

30) The drift velocity of an electron is v_d in a conductor of area of cross-section A and carries a current I. Now, the area of cross-section and current flowing through the conductor are double, then new drift velocity of the electron is _____.

(A) $\frac{v_d}{2}$

(B) $\frac{v_d}{4}$

(C) $4v_d$

(D) v_d

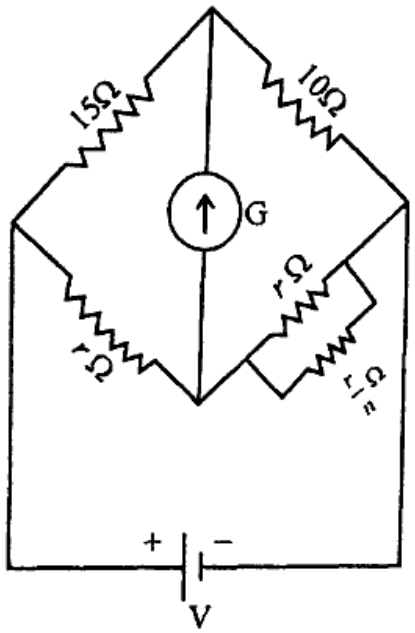
(Space for Rough Work)

$v_d =$

$I = v_d n e A$

$\frac{I}{neA} = v_d$

31) As shown in the figure, balanced condition of Wheatstone Bridge is $n =$ _____.



(A) $\frac{3}{2}$

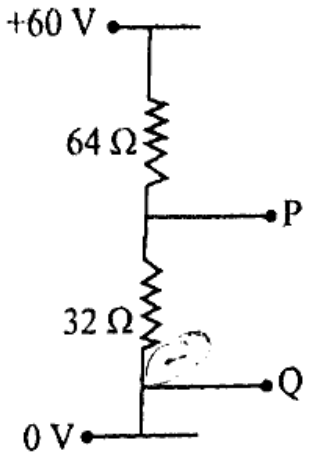
(B) $\frac{2}{5}$

(C) $\frac{1}{2}$

(D) $\frac{5}{2}$

(Space for Rough Work)

32) In the given circuit, potential difference between points P and Q is _____.



(A) 128 V
(B) 20 V
(C) 96 V
(D) 60 V

33) The ratio of magnetic field at the centre of the ring of radius R to the point on the axis at a distance $2\sqrt{2}\,R$ from its centre is _____.

(A) 27 : 1
(B) 81 : 1
(C) 1 : 9
(D) $1 : 2\sqrt{2}$

34) The dimensional formula of current sensitivity of moving coil galvanometer is

(A) $[L^2]$
(B) $[M^1L^2T^{-2}A^{-1}]$
(C) $[A^{-1}]$
(D) $[M^1L^2T^{-2}]$

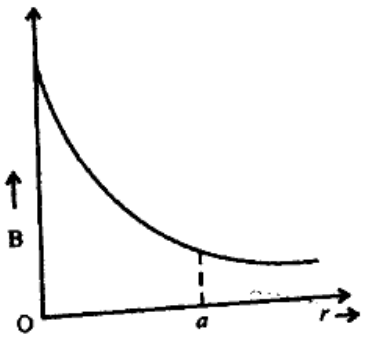
35) The horizontal component of the Earth's magnetic field at a certain plate is 3×10^{-5}T and the direction of the field is from the geographic South to the geographic North. A very long straight conductor is carrying a steady current of 1A. What is the force per unit length on it when it is placed on a horizontal table and the direction of current is South to North?

(A) zero
(B) $1\times10^{-5}\ Nm^{-1}$
(C) $6\times10^{-5}\ Nm^{-1}$
(D) $9\times10^{-5}\ Nm^{-1}$

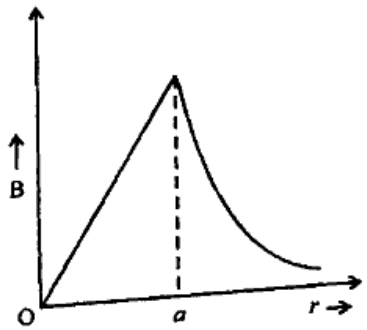
(Space for Rough Work)

36) The magnetic field produced by a very long straight conducting wire of radius 'a' and carrying current I is B, then the graph of magnetic field (B) → distance (r) (perpendicular to the axis of the wire) is _____.

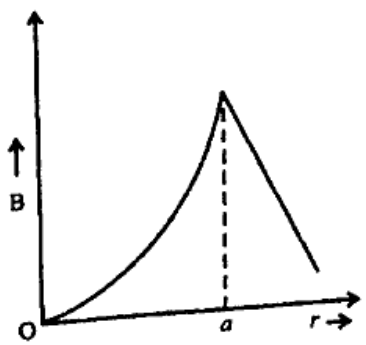
(A)



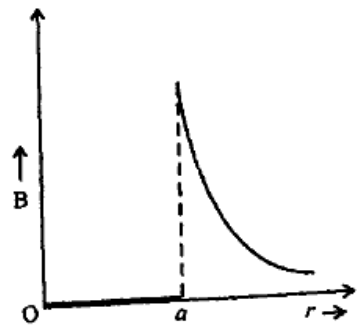
(B)



(C)



(D)



37) A paramagnetic substance is placed in a non-uniform magnetic field, then

(A) perform continuous rotation

(B) to move from a region of weak magnetic field to strong magnetic field

(C) remain stationary

(D) to move from a region of strong magnetic field to weak magnetic field

(Space for Rough Work)

38) 

(a) (b)

As shown in figure two identical conducting rings of radius r are placed in magnetic field. In figure (a) magnetic field increasing at the rate of 0.3 T/s and in figure(b) magnetic field decreasing at the rate of 0.2 T/s. The direction of current in ring (a) and ring(b), when observe from top are _____.

(A) Clockwise, Anticlockwise (B) Anticlockwise, Anticlockwise

(C) Clockwise, Clockwise (D) Anticlockwise, Clockwise

39) A pair of adjacent coils has a mutual inductance of 2H. If the current in one coil changes from 0 to 30A in 0.15s, what is the change of flux linkage with the other coil?

(A) 300 Wb (B) 6 Wb

(C) 60 Wb (D) 15 Wb

40) In an AC generator, induced emf $\varepsilon = 0$ at t = 0, then its value _____.

(A) minimum at time $\frac{2\pi}{3\omega}$ (B) minimum at time $\frac{\pi}{2\omega}$

(C) maximum at time $\frac{2\pi}{\omega}$ (D) maximum at time $\frac{\pi}{2\omega}$

(Space for Rough Work)