

FULL TEST-01

A1
VERSION CODE
THINK

Maximum Marks : 60 Total No. of Questions : 60 Total Duration : 80 Minutes Maximum Time for Answering : 70 Minutes Time : 02.30 PM to 03.50 PM				
MENTION YOUR CET NUMBER				

PHYSICS

Serial Number :

Subject code	2P0025K
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Dos:

1. This question booklet is issued to you by the room invigilator after **02.30 PM**.
2. Check whether the CET Number has been entered and shaded in the respective circles on the OMR answer sheet
3. The version code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
4. The Version Code and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DONTs:

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED/MUTILATED/SPOILED.**
2. The **3rd Bell rings at 02.40 PM, till then.**
 - Do not remove the seal present on the right hand side of this question booklet.
 - Do not look inside this question booklet or start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. In case of usage of signs and symbols in the questions, the regular textbook connotation should be considered unless stated otherwise.
2. This question booklet contains 60 questions and each question will have one statement and four different options / responses & out of which you have to choose one correct answer.
3. After the **3rd Bell rings at 02.40 PM**, remove the paper seal of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items. etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
4. Completely **darken/shade** the relevant circle with a **blue or black ink ballpoint pen against the question number on the OMR answer sheet.**

CORRECT METHOD	WRONG METHODS
(A) ● (C) (D)	(X) (B) (C) (D) (A) (B) (C) (D) (A) ● ● (D)
(A) ● (C) (D)	(A) (B) (C) (D) (A) ● (C) (D)

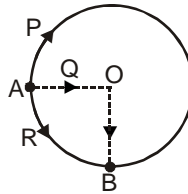
5. Please note that even a minute unintended ink dot on the OMR answer sheet will also be recognized and recored by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
6. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
7. **Last Bell will ring at 03.50 PM**, stop writing on the OMR answer sheet.
8. Hand over the **OMR answer sheet** to the room invigilator as it is.
9. After separating the top sheet (Office copy), the invigilator will return the bottom sheet replica (candidate's copy) to you.

PHYSICS

Q.1 $[L^2M^1T^{-2}]$ are the dimensions of

- (A) torque (B) force
(C) angular acceleration (D) angular momentum

Q.2 Three particles P, Q and R are situated at point A on the circular path of radius 10 m. All three particles move along different path and reach at point B shown in figure. Then the ratio of distance traversed by particle P and Q is :



- (A) $\frac{3}{4}$ (B) $\frac{1}{3}$ (C) $\frac{3\pi}{4}$ (D) $\frac{\pi}{3}$

Q.3 From the top of a tower of height h , a particle is thrown with a speed v . The speed with which the particle strikes the ground is

- (A) maximum if projected at an angle of 45° with horizontal
(B) maximum if projected at an angle of 60° with horizontal
(C) maximum if projected vertically downwards
(D) same for all angles of projections

Q.4 When a speeding bus stops suddenly, passengers are thrown forward from their seats because

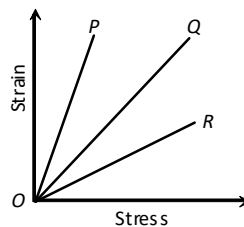
- (A) the back of seat suddenly pushes the passengers forward
(B) inertia of rest stops the bus and takes the body forwards
(C) upper part of the body continues to be in the state of motion whereas the lower part of the body in contact with seat comes to rest
(D) upper part of the body come to rest whereas the lower part of the body in contact with seat begins to move

Q.5 The side of a cube, when measured with the given instrument, gives 10 divisions on main scale and first division of vernier scale coincides with main scale division. The side length of the cube is -

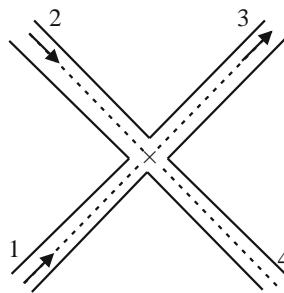
- (A) 10 mm (B) 1 mm (C) 10.1 mm (D) 10.1 cm

SPACE FOR ROUGH WORK

- Q.6** A disc of radius 2m and mass 100 kg rolls on a horizontal floor. Its centre of mass has speed of 20 cm/s. How much work is needed to stop it ?
 (A) 3J (B) 30 kJ (C) 2 J (D) 1 J
- Q.7** The angular position of a point over a rotating flywheel is changing according to the relation, $\theta = (2t^3 - 3t^2 - 4t - 5)$ radian. The angular acceleration of the flywheel at time, $t = 1$ s is
 (A) Zero (B) 4 rad/s² (C) 6 rad/s² (D) 12 rad/s²
- Q.8** The orbital speed for an earth satellite near the surface of the earth is 7 km-s⁻¹. If the radius of the orbit is 4 times the radius of the earth the orbital speed would be
 (A) 3.5 km-s⁻¹ (B) 7 km-s⁻¹ (C) $7\sqrt{2}$ km-s⁻¹ (D) 14 km-s⁻¹
- Q.9** The strain-stress curves of three wires of different materials are shown in the figure. P, Q and R are the elastic limits of the wires. The figure shows that



- (A) Elasticity of wire P is maximum (B) Elasticity of wire Q is maximum
 (C) Tensile strength of R is maximum (D) None of the above is true
- Q.10** The amount of liquid flowing per second in the tubes (A), (B) and (C) are 10 m³/s, 5 m³/s and 8 m³/s respectively. The velocity of liquid in the tube (D) having cross - section of 0.5 m² is



- (A) 7m/s (B) 14 m/s (C) 3.5 m/s (D) 12 m/s

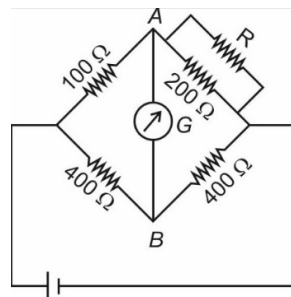
SPACE FOR ROUGH WORK

- Q.11** The temperature of a black body becomes half of its original temperature, the amount of radiation emitted by the body will reduce to-
 (A) 1/16 (B) 1/4 (C) 1/2 (D) remains unchanged.
- Q.12** The teacher allows all the students of a class to perform the experiment to determine the Young's modulus of elasticity with the same experimental wire. It does not give correct result to the last student because of -
 (A) elastic limit (B) elastic fatigue
 (C) plasticity (D) permanent set
- Q.13** Select the incorrect statement
 (A) For isothermal process of ideal gas, $\Delta U=0$
 (B) For isochoric process, $W=0$
 (C) For adiabatic process, $\Delta U=-\Delta W$
 (D) For cyclic process, $\Delta W=0$
- Q.14** The rms speed of oxygen at room temperature is about 500 m/s. The rms speed of Hydrogen at the same temperature is about:
 (A) 125 m/s (B) 2000 m/s (C) 8000 m/s (D) 31 m/s
- Q.15** The S.H.M. of a particle is given by the equation $y = 3 \sin \omega t + 4 \cos \omega t$. The amplitude is :
 (A) 7 (B) 1 (C) 5 (D) 12
- Q.16** The equation of stationary wave along a stretched string is given by:

$$y = 5 \sin \frac{\pi x}{3} \cos 40\pi t$$
 where x and y are in cm and t in second. The separation between two adjacent nodes is—
 (A) 1.5 cm (B) 3 cm (C) 6 cm (D) 4 cm
- Q.17** How much electric flux will come out through a surface of area vector $\vec{S} = 10\hat{j}$ kept in an electrostatic field $E = 2\hat{i} + 4\hat{j} + 3\hat{k}$?
 (A) 20 units (B) 40 units (C) 30 units (D) 90 units
- Q.18** 4×10^{10} electrons are removed from a neutral metal sphere of diameter 20 cm placed in air. The magnitude of the electric field (in NC^{-1}) at a distance of 20 cm from its centre is
 (A) 640 (B) 5760 (C) Zero (D) 1440

SPACE FOR ROUGH WORK

- Q.19** A body has 80 microcoulomb of negative charge. Number of additional electrons on it will be :
 (A) 8×10^{-5} (B) 80×10^{15} (C) 5×10^{14} (D) 1.28×10^{-17}
- Q.20** Two charges are placed as shown in fig. Where should a third charge be placed so that it remains in rest condition :-
-
- (A) 30cm from 9e (B) 40cm from 16e (C) 40cm from 9e (D) (A) or (B)
- Q.21** The electric potential at the centre of a charged conductor is
 (A) Zero (B) Twice that on the surface
 (C) Half that on the surface (D) Same as on the surface
- Q.22** An air filled parallel plate capacitor has a capacity of $2\mu\text{F}$. The separation of the plates is doubled and the interspace between the plates is filled with wax. If the capacity is increased to $6\mu\text{F}$, the dielectric constant of wax is :
 (A) 2 (B) 3 (C) 4 (D) 6
- Q.23** A galvanometer of 50 ohm resistance has 25 divisions. A current of 4×10^{-4} ampere gives a deflection of one division. To convert this galvanometer into a voltmeter having a range of 25 volts, it should be connected with a resistance of.
 (A) 245Ω as a shunt (B) 2550Ω in series
 (C) 2450Ω in series (D) 2500Ω as a shunt
- Q.24** The given wheatstone bridge is showing no deflection in the galvanometer joined between the points A and B. The value of resistance R as shown in the circuit is



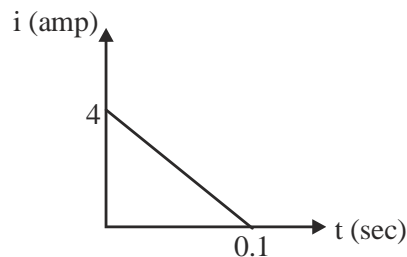
- (A) 50Ω (B) 200Ω (C) 100Ω (D) 150Ω

SPACE FOR ROUGH WORK

- Q.25** Two resistors whose value are in ratio 2 : 1 are connected in parallel with one cell. Then ratio of power dissipated is
 (A) 2 : 1 (B) 4 : 1 (C) 1 : 2 (D) 1 : 1
- Q.26** A potential difference V is applied to a copper wire of length l and radius 'r'. If V is doubled, the drift velocity
 (A) Is doubled (B) Is halved (C) Remains same (D) Becomes zero
- Q.27** At what temperature will the resistance of a copper wire become three times of its value at 0°C ? [Temperature coefficient of resistance for copper = 4×10^{-3} per $^\circ\text{C}$] :-
 (A) 400°C (B) 450°C (C) 500°C (D) 600°C
- Q.28** An electron is travelling along the x-direction. It encounters a magnetic field in the y-direction. Its subsequent motion will be
 (A) straight line along x-direction (B) a circle in the xz-plane
 (C) a circle in the yz-plane (D) a circle in the xy-plane
- Q.29** To increase the current sensitivity of moving coil galvanometer, we should : –
 (A) decrease number of turns in coil
 (B) decrease area of cross section of the coil
 (C) increase torsional constant of spiral springs
 (D) None of the above
- Q.30** A long solenoid having 200 turns/cm and carries current i . Magnetic field at its axis is 6.28×10^{-2} wb/m². An another solenoid having 100 turns/cm and carries $\frac{i}{3}$ current, then magnetic field at its axis will be:
 (A) 1.05×10^{-4} wb/m² (B) 1.05×10^{-2} wb/m²
 (C) 1.05×10^{-5} wb/m² (D) 1.05×10^{-3} wb/m²
- Q.31** A current carrying coil ($I = 5\text{A}$, $R = 10\text{cm}$) having 50 number of turns then magnetic field at its centre is
 (A) 1.57 mT (B) 3.14 mT (C) 1 mT (D) 2 mT
- Q.32** The magnetic induction at a point, distance x from the centre, on the axis of a circular current carrying coil is inversely proportional to (if $x \gg$ radius of coil)
 (A) x (B) x^2 (C) x^3 (D) $x^{3/2}$

SPACE FOR ROUGH WORK

- Q.33** Select the incorrect statement about paramagnetic substance
 (A) When a rod of paramagnetic material is suspended freely between two magnetic poles, its axis becomes parallel to the magnetic field
 (B) In non-uniform magnetic field paramagnetic substance move from weaker to stronger part of the magnetic field slowly
 (C) In this substance the magnetic field lines are closer than in air
 (D) Its susceptibility is directly proportional to absolute temperature
- Q.34** The relation between B, H and I in SI unit is (where B is net magnetic field, H is magnetizing field and I is intensity of magnetisation)
 (A) $B = \mu_0(H + I)$ (B) $B = H + 4\mu I$ (C) $H = \mu_0(B + I)$ (D) None of these
- Q.35** Lenz's law is consequence of the law of conservation of
 (A) charge (B) mass (C) energy (D) momentum
- Q.36** Some magnetic flux is changed from a coil of resistance 10Ω . As a result an induced current is developed in it, which varies with time as shown in figure. The magnitude of change in flux through the coil in weber is :



- (A) 2 (B) 4 (C) 6 (D) None of these
- Q.37** When a current changes from 2A to 4A in 0.05 sec. in a coil, induced emf is 8 V. The self inductance of coil is :
 (A) 0.1 H (B) 0.2 H (C) 0.4 H (D) 0.8 H
- Q.38** In a step-down transformer, the number of turns in
 (A) primary are less (B) primary are more
 (C) primary and secondary are equal (D) secondary are infinite

SPACE FOR ROUGH WORK

- Q.39** In an ac circuit, a resistance of $R \Omega$ is connected in series with an inductance L . If phase angle between voltage and current be 45° , the value of inductive reactance will be
 (A) $R/4$ (B) $R/2$
 (C) R (D) Cannot be found with given data

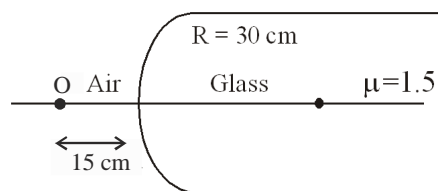
Q.40 The Q-factor of a resonant circuit is equal to

- (A) $\frac{1}{L} \sqrt{\frac{R}{C}}$ (B) $\frac{1}{R} \sqrt{\frac{L}{C}}$ (C) $\frac{1}{RL} \sqrt{C}$ (D) $\frac{1}{C} \sqrt{\frac{R}{L}}$

Q.41 Electromagnetic wave is deflected by

- (A) Electric field (B) Magnetic field
 (C) Both of (A) & (B) (D) Neither electric field nor magnetic field

Q.42 A point object O is placed in front of a glass rod having spherical end of radius of curvature 30cm . The image would be formed at



- (A) 30cm left (B) infinity (C) 1cm to the right (D) 18cm to the left

Q.43 In an astronomical telescope the distance between the eye-piece and the objective is

- (A) f_o (B) f_e (C) $f_o - f_e$ (D) $f_o + f_e$

Q.44 A ray passes through an equilateral prism and suffers minimum deviation. Find the angle between the ray inside the prism and the base of the prism

- (A) 60° (B) 30° (C) 45° (D) 0°

Q.45 Unpolarized beam of light of intensity I_0 is incident on two polarizers in contact. The angle between the transmission axes of the two polarizers is ϕ . The intensity of the light finally emerging from the combination is

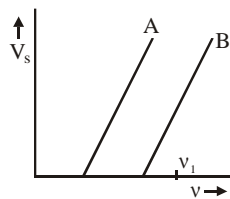
- (A) $I_0 \cos^2 \phi$ (B) $I_0 \cos^4 \phi$ (C) $\left(\frac{I_0}{2}\right) \cos^2 \phi$ (D) $\left(\frac{I_0}{4}\right) \cos^2 \phi$

SPACE FOR ROUGH WORK

- Q.46** In Young's double slit experiment, the distance between the slits is reduced to half and the distance between the slit and screen is doubled, then the fringe width
 (A) will not change (B) will become half
 (C) will be doubled (D) will become four times

- Q.47** A diffraction pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light?
 (A) No change.
 (B) Diffraction bands becomes narrower and crowded together.
 (C) Band become broader and farther apart.
 (D) Bands disappear altogether.

- Q.48** The stopping potential as a function of frequency of incident radiation is plotted for two different photo-electric surface A and B. For a given frequency ν_1 (as shown in fig.) maximum kinetic energy of A will be :-



- (A) Greater than B (B) Smaller than B
 (C) Same as B (D) No comparison can be done from given graph
- Q.49** When a metallic surface is illuminated with monochromatic light of wavelength λ , the stopping potential is $5V_0$. When the same surface is illuminated with light of wavelength 3λ , the stopping potential is V_0 . Then the work function of the metallic surface is :
- (A) $\frac{hc}{6\lambda}$ (B) $\frac{hc}{5\lambda}$ (C) $\frac{hc}{4\lambda}$ (D) $\frac{2hc}{4\lambda}$
- Q.50** The radius of first Bohr orbit is 0.5 \AA , then radius of fourth Bohr orbit will be :
 (A) 0.03 \AA (B) 0.12 \AA (C) 2.0 \AA (D) 8.0 \AA
- Q.51** For Bohr's first orbit of circumference $2\pi r$, the de-Broglie wavelength of the revolving electron in the first orbit will be

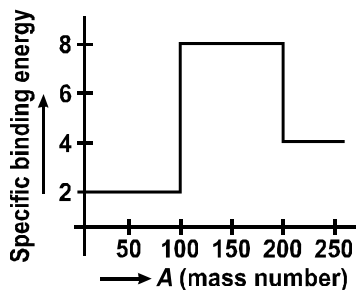
- (A) $2\pi r$ (B) πr (C) $\frac{1}{3\pi r}$ (D) $\frac{1}{4\pi r}$

SPACE FOR ROUGH WORK

- Q.52** The radius of nucleus is
 (A) Proportional to its mass number
 (B) Inversely Proportional to its mass number
 (C) Proportional to the cube root of its mass number
 (D) Not related to its mass number

- Q.53** Mass number of the elements A, B, C and D are 30, 60, 90 and 120 respectively. The specific binding energy of them are 5 MeV, 8.5 MeV, 8 MeV and 7 MeV respectively. Then, in which of the following reaction/s energy is released?
 a. $D \rightarrow 2B$ b. $C \rightarrow B + A$ c. $B \rightarrow 2A$
 (A) in (a), (b) and (c) (B) Only in (a)
 (C) in (b), (c) (D) in (a), (c)

- Q.54** Assume the graph of specific binding energy versus mass number is as shown in the figure. Using this graph, select the correct choice from the following.



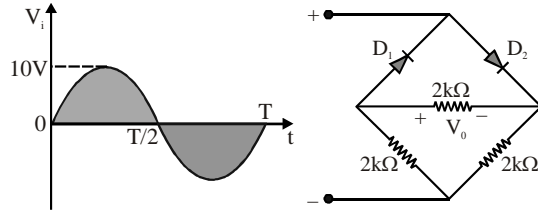
- (A) Fusion of two nuclei of mass number lying in the range of $100 < A < 200$ will release energy
 (B) fusion of two nuclei of mass number lying in the range of $51 < A < 100$ will release energy
 (C) Fusion of two nuclei of mass number lying in the range of $1 < A < 50$ will release energy
 (D) Fission of the nucleus of mass number lying in the rang of $100 < A < 200$ will release energy when broken into two fragments

- Q.55** In which case the P-N junction diode is not in reverse biased condition -



SPACE FOR ROUGH WORK

Q.56 In the circuit shown the peak voltage V_0 is



- (A) 0V (B) 5V (C) 10V (D) $\frac{5}{\sqrt{2}}$ V

Q.57 The diffusion current in a p-n junction is from

- (A) p-side to n-side
 (B) n-side to p-side
 (C) p-side to n-side if the junction is forward biased and in the opposite direction if it is reverse biased
 (D) n-side to p-side if the junction is forward biased and in the opposite direction if it is reverse based

Q.58 A p-n photodiode is fabricated from a semiconductor with a band gap of 2.5 eV. It can detect a signal of wavelength

- (A) 6000Å (B) 4000 nm (C) 6000 nm (D) 4000Å

Q.59 At what distance an object should be placed in front of a concave lens of focal length 20 cm. So as to form an image $\frac{1}{4}$ th of the size of the object :-

- (A) 20 cm (B) 30 cm (C) 40 cm (D) 60 cm

Q.60 The electric dipoles of dipole moments 1.2×10^{-30} Cm and 2.4×10^{-30} Cm are placed in two different uniform electric fields of strengths 5×10^4 NC⁻¹ and 15×10^4 NC⁻¹ respectively. The ratio of maximum torque experienced by the electric dipoles will be:

- (A) 1 : 6 (B) 1 : 3 (C) 1 : 4 (D) 1 : 2

SPACE FOR ROUGH WORK