

DEPARTMENT OF EDUCATION
CENTRAL TIBETAN ADMINISTRATION, DHARAMSHALA
ENTRANCE EXAMINATION-2012.

PHYSICS

Time : 1 hours

Max. Marks 50.

INSTRUCTIONS:

There are fifty questions in this paper. All the questions are of Multiple Choice type and carry equal marks. Each question is followed by four responses marked (a), (b), (c) and (d). Select the one, which is the best in each case and record it clearly against the question number on the answer sheets provided with the paper.

More than one response indicated against an item or overwriting in the answer sheet would deem as incorrect response and no mark will be granted on that.

Question paper along with the answer sheet of the paper should be returned to the invigilator after the completion of the paper or when the time is over whichever is earlier.

Roll No. _____

Marks obtained by the candidate:

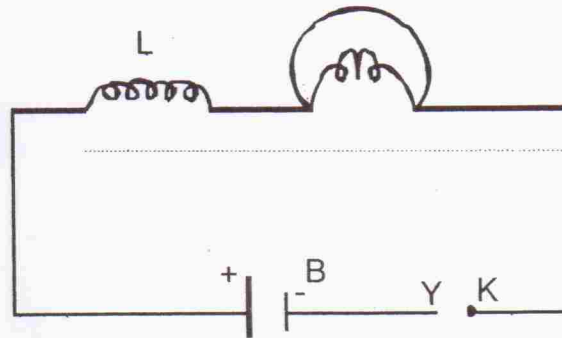
Signature of Examiner

PHYSICS-2012

Q.1. In a plano convex lens the radius of curvature of convex surface is 10cm and the focal length of the lens is 30cm. The refractive index of the material of the lens will be

- (a) 1.5 (b) 1.66
(c) 1.33 (d) 3

Q.2. In the circuit as shown in the fig. the bulb will become suddenly bright if



- (a) Contact is made or broken
(b) Contact is made
(c) Contact is broken
(d) Won't become bright at all

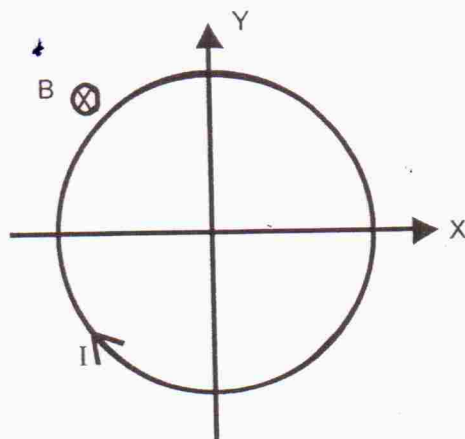
Q.3. A Dipole of Electric Dipole Moment \vec{p} is placed in a uniform electric field of strength \vec{E} . If θ is the angle between positive direction of \vec{p} and \vec{E} then the potential Energy of electric Dipole is largest when θ is

- (a) Zero (b) $\pi/2$
(c) π (d) $\pi/4$

Q.4. Which of the followings have minimum wave length?

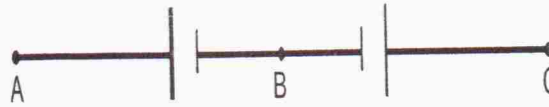
- (a) γ rays
(b) X rays
(c) Cosmic rays
(d) Ultraviolet rays

- Q.5. A stone is projected in air. Its time of flight is 3 sec. and range is 150m. The horizontal component of velocity of projection of stone is ($g = 10m/S^2$)
- (a) $22.5mS^{-1}$ (b) $15mS^{-1}$
 (c) $50mS^{-1}$ (d) $30mS^{-1}$
- Q.6. Two identical particles move towards each other with velocity $2V$ and V respectively. The velocity of centre of mass is:
- (a) V (b) $V/3$
 (c) $V/2$ (d) Zero
- Q.7. Weber ampere per metre is equal to
- (a) Joule (b) Henry
 (c) Newton (d) Watt
- Q.8. If the operating voltage of a X rays tube is increased
- (a) X – Rays intensity increase
 (b) X – Rays wavelength limit on the maximum side increases
 (c) X – Rays wavelength limit on the minimum side increases
 (d) X – Rays intensity decreases
- Q.9. A conducting loop carrying a current I is placed in a uniform magnetic field pointing into the plane of the paper as shown. The loop will have a tendency to



- (a) Contract
 (b) expand
 (c) move towards +ve x axis
 (d) move towards -ve x axis

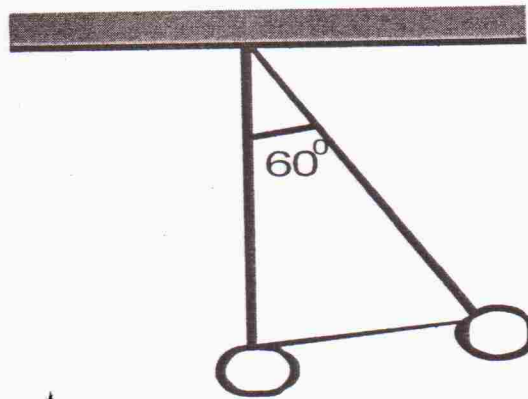
Q.10. Two cells of emf E_1 and E_2 ($E_1 > E_2$) are connected as shown in fig.



When a potentiometer is connected b/w A and B, the balancing length of the Potentiometer wire is 300cm, on connecting the same Potentiometer b/w A and C, the balancing length is 100cm, the ratio E_1/E_2 is

- (a) 3 : 2
(b) 1 : 3
(c) 2 : 3
(d) 3 : 2

Q.11. A Pendulum of length $1m$ is released from $\theta_0 = 60^\circ$. The rate of change of speed of bob at $\theta = 30^\circ$ is



- (a) $5\sqrt{3}m/s^2$
(b) $2.5m/s^2$
(c) $5m/s^2$
(d) $10m/s^2$

Q.12. Surface Tension of water is $0.072Nm^{-1}$. The excess pressure inside the water drop of diameter $1.2mm$ is

- (a) $240Nm^{-1}$
(b) $120Nm^{-1}$
(c) $0.06Nm^{-1}$
(d) $72Nm^{-1}$
(e) $0.086Nm^{-1}$

Q.13. In a communication system, noise is most likely to affect the signal

- (a) In the Information source
(b) At the Transmitter
(c) In the Channel
(d) At the Destination

Q.14. Work done in carrying a charge Q once round the circle of radius r with a charge Q at the centre is

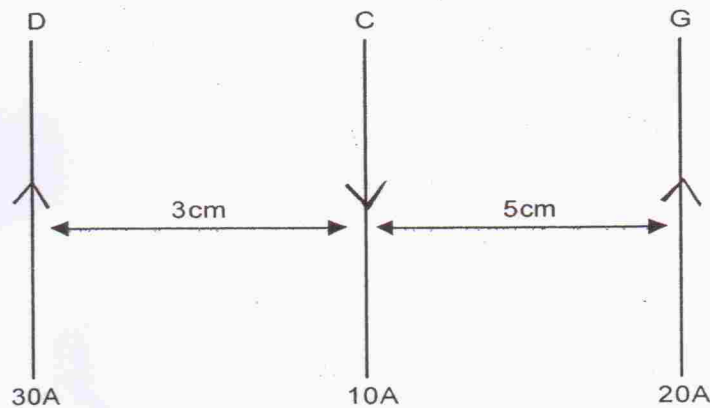
(a) $\frac{1}{4\pi\epsilon_0} \frac{Q}{r}$

(b) $\frac{QQ'}{4\pi\epsilon_0 r}$

(c) 0

(d) $\frac{QQ'}{2r}$

Q.15. Consider three long, straight, parallel wires shown in fig. the force experienced by 25cm length of wire c is



(a) $1 \times 10^{-4} N$ towards right

(b) $3 \times 10^{-4} N$ towards left

(c) $3 \times 10^{-4} N$ towards right

(d) $2 \times 10^{-4} N$ towards left

Q.16. If L denotes the inductance of an inductor through a current is flowing, the dimensions of LI^2 are

(a) ML^2T^{-2}

(b) $ML^{-2}T$

(c) MLT^{-2}

(d) $M^2L^2T^{-2}$

Q.17. The length of a metal wire is ℓ_1 when the tension in it is T_1 and ℓ_2 when the tension in it is T_2 . The natural length of wire is

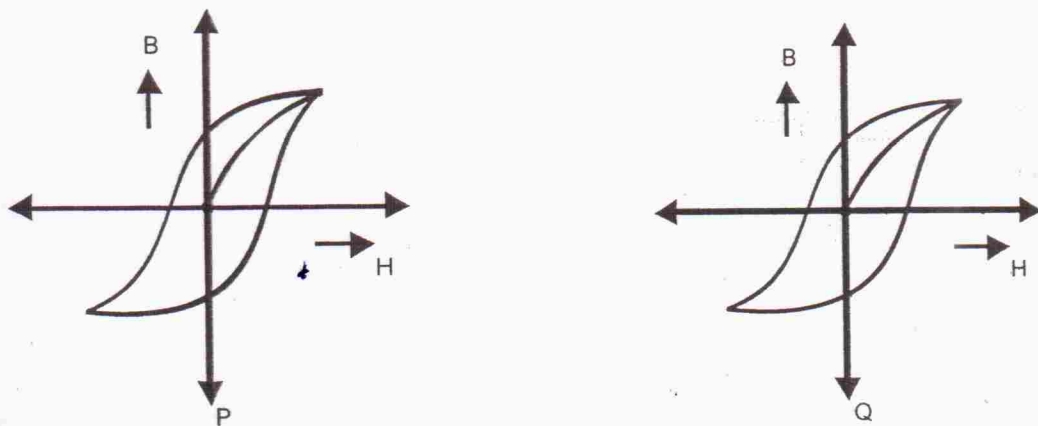
(a) $\frac{\ell_1 + T_2}{2}$

(b) $\frac{\ell_1 T_2 - \ell_2 T_1}{T_2 - T_1}$

(c) $\frac{\ell_1 T_2 - \ell_2 T_1}{T_2 + T_1}$

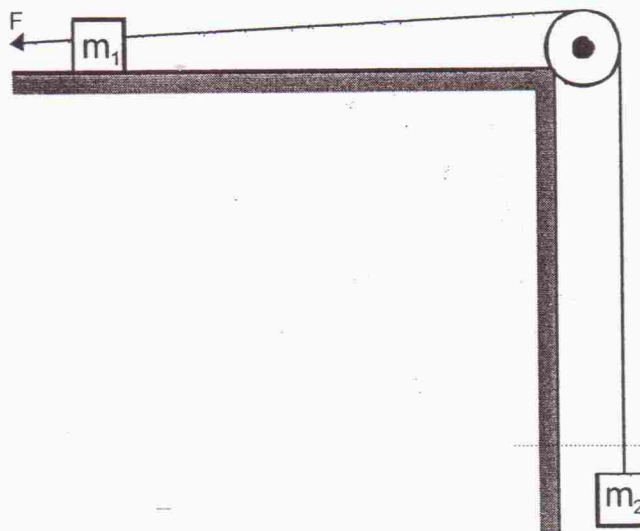
(d) $\sqrt{\ell_1 \ell_2}$

- Q.18. A conducting Sphere of radius 10cm is charge with $10\mu\text{C}$. Another uncharged sphere of radius 20cm is allowed to touch it for sometime. After that if the spheres are separated. Then surface density of charges on the spheres will in the ratio of
- (a) 1 : 4
 (b) 1 : 3
 (c) 2 : 1
 (d) 1 : 1
- Q.19. To convert a galvanometer into a volt meter, one should connect a
- (a) High resistance in series with galvanometer
 (b) Low resistance in series with galvanometer
 (c) High resistance in parallel with galvanometer
 (d) Low resistance in parallel with galvanometer
- Q.20. B – H curves of the samples P and Q of iron are show in fig. then we may conclude



- (a) Both P and Q are suitable for making permanent magnets
 (b) P is suitable for making permanent magnet and Q for making electro magnet
 (c) P is suitable for making electro magnet and Q for making permanent magnet
 (d) Both P and Q are suitable for making electro magnets

- Q.21. A constant Force $F = m_2(g/2)$ is applied on the block of mass m_1 as shown in fig. The string and pulley are light and surface of table is smooth. The acceleration of m_1 is:



- (a) $\frac{m_2 g}{2(m_1 + m_2)}$ towards right (b) $\frac{m_2 g}{2(m_1 - m_2)}$ towards left
- (c) $\frac{m_2 g}{2(m_2 - m_1)}$ towards right (d) $\frac{m_2 g}{2(m_2 - m_1)}$ towards left
- Q.22. A point moves in a straight line so that its displacement X (metre) at time t (seconds) is given by $x^2 = t^2 + 1$. Its acceleration in ms^{-2} , at time t second is
- (a) $\frac{1}{x} - \frac{1}{x^2}$ (b) $\frac{-t}{x^2}$
- (c) $\frac{-t^2}{x^3}$ (d) $\frac{1}{x^3}$
- Q.23. A satellite is launched into a circular orbit of radius R around the earth. A second satellite is launched into an orbit of radius $1.01 R$. The time period of the second satellite is larger than that of the first one by approximately
- (a) 0.5% (b) 1.5%
- (c) 1% (d) 3.0%
- Q.24. The peak value of 220 volt A.C. mains is
- (a) 155.6 volt (b) 220 volt
- (c) 311 volt (d) 440 volt

Q.25. An astronomical telescope has an angular magnification of magnitude 5 for distant objects. The separation b/w the objective & the eye piece is 36cm and the final image is formed at infinity. The focal length of the objective f_o and f_e of the eye piece are

- (a) $f_o = 45\text{cm}$ and $f_e = -9\text{cm}$ (b) $f_o = 50\text{cm}$ and $f_e = 10\text{cm}$
 (c) $f_o = 7.2\text{cm}$ and $f_e = 5\text{cm}$ (d) $f_o = 30\text{cm}$ and $f_e = 6\text{cm}$

Q.26. A net force of 16N acts on a body of mass 8kg initially at rest. Then work done by the force in the first, second and third second is

- (a) 16J, 64J, 144J (b) 16J, 48J, 80J
 (c) 16J, 24J, 36J (d) 16J, 32J, 64J

Q.27. A man walks 40m north, then 70m east and then 40m south. What is the displacement from the starting point?

- (a) 150m east (b) 50m west
 (c) 70m east (d) 70m west

Q.28. Quantity that remains unchanged in a transformer is

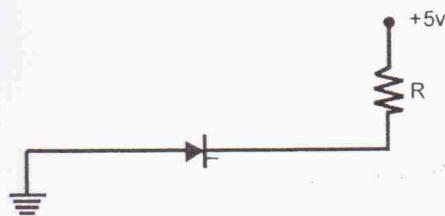
- (a) Voltage (b) Current
 (c) Frequency (d) None of these

Q.29. If in the Fission of one part of uranium, 0.5gm mass is decayed, then how much energy will be obtained by it?

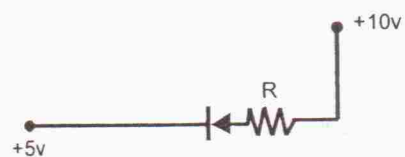
- (a) 1.25 kilo watt hour (b) 1.25×10^7 kilo watt hour
 (c) 0.25 kilo watt hour (d) 1.25×10^4 kilo watt hour

Q.30. Of the diodes shown in the following diagrams, which one is reversed biased?

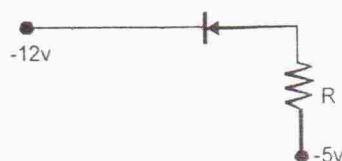
(a)



(b)



(c)



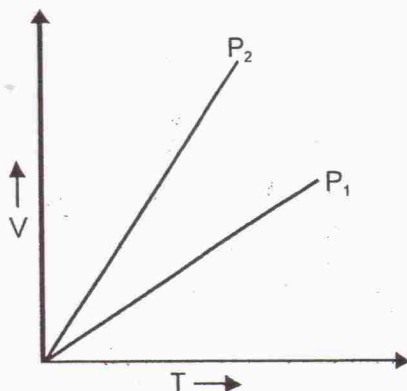
(d)



- Q.35. In young's experiment with one source and two slits, one slit is covered with black opaque paper
- (a) The fringes will be darker
 - (b) The fringes will be narrower
 - (c) The fringes will be broader
 - (d) No fringes will be obtained and the screen will have uniform illumination
- Q.36. When NPN transistor is used as an amplifier
- (a) Electrons moves from base to collector
 - (b) Electrons moves from emitter to base
 - (c) Electrons moves from collector to base
 - (d) Holes moves from base to emitter
- Q.37. A man stands between two parallel cliffs (not in middle) when he claps his hands, he hears two echos one after one second and other after two second. If velocity of sound in Air is 330 m/s, the width of the valley is
- (a) 330 m
 - (b) 495 m
 - (c) 660 m
 - (d) 990 m
- Q.38. The rate of loss heat from the body cooling under condition of forced convection is proportional to its (a) heat capacity (b) surface area (c) absolute temp. (d) excess of the temperature over that of surroundings; of these
- (a) a, b, c are correct
 - (b) only a and c are correct
 - (c) only b and d are correct
 - (d) only d is correct
- Q.39. For Balmer Series that lies in the visible region, shortest wavelength corresponds to Quantum Number
- (a) $n = 1$
 - (b) $n = 3$
 - (c) $n = 4$
 - (d) $n = \infty$
- Q.40. The work function of a substance is 4.0eV . The longest wavelength of light that can cause photoelectron emission from this substance is approximately
- (a) 540 Nm
 - (b) 400 Nm
 - (c) 310 Nm
 - (d) 220 Nm

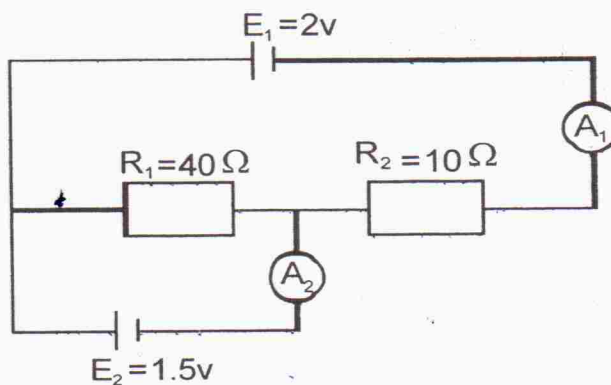
- Q.41. The latent heat of vapourisation of water is 2240 J. If the work done in the process of vapourisation of 1 gm is 168 J then increase in internal energy is
 (a) 2480 J (b) 2240 J
 (c) 2072 J (d) 1904 J
- Q.42. For a certain gas, the ratio of specific heat is given to be $\gamma = 1.5$. For this gas
 (a) $C_v = 3\frac{R}{J}$ (b) $C_p = 3\frac{R}{J}$
 (c) $C_p = 5\frac{R}{J}$ (d) $C_v = 5\frac{R}{J}$
- Q.43. Amplitude of a wave is represented by $A = C/A + B - C$ then resonance will occur when
 (a) $b = -c/2$ (b) $b = 0$ & $a = c$
 (c) $b = -a/2$ (d) None
- Q.44. If N_0 is the original mass of the substance of half life period $t_{1/2} = 5$ years, then the amount of substance left after 15 years is
 (a) $N_0/8$ (b) $N_0/16$
 (c) $N_0/2$ (d) $N_0/4$
- Q.45. The Boolean equation of NOR gate is
 (a) $C = A + B$ (b) $\overline{A + B}$
 (c) $C = A \cdot B$ (d) $C = \overline{A \cdot B}$
- Q.46. The unit of magnetic susceptibility is
 (a) Henry (b) Weber
 (c) Weber/metre (d) Dimensionless
- Q.47. A bomb of mass 3.0 kg explodes in air into two pieces of masses 2.0 kg and 1.0 kg. The smaller mass goes at a speed of 80 m/s. The total energy imparted to the two fragments is
 (a) 1.07 KJ
 (b) 2.14 KJ
 (c) 2.4 KJ
 (d) 4.8 KJ

Q.48. The figure shows the volume V versus temp. T . graphs for a certain mass of a perfect gas at two constant pressures of P_1 and P_2 what inference can you draw from the graphs?



- (a) $P_1 > P_2$
- (b) $P_1 < P_2$
- (c) $P_1 = P_2$
- (d) no inferences can be drawn due to insufficient information

Q.49. For the values shown in the figure below (Assume internal Resistance of each cell is negligible)



The current through Ammeter A_1 is

- (a) 0.03 A
- (b) 0.04 A
- (c) 0.02 A
- (d) 0.05 A

Q.50. Young's Modulus is defined as the ratio of longitudinal stress to longitudinal strain. The units of stress in the old *c.g.s* system are

- (a) dyne per square *cm*
- (b) dyne cm^2
- (c) dyne cm^{-1}
- (d) dyne *cm*



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ANSWER SHEET FOR PHYSICS	Roll No.
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Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1		2		3		4		5	
6		7		8		9		10	
11		12		13		14		15	
16		17		18		19		20	
21		22		23		24		25	
26		27		28		29		30	
31		32		33		34		35	
36		37		38		39		40	
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46		47		48		49		50	