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**MM : 160** **Time : 1½ Hr.**

# Sample Paper : Campus Recruitment Test
## Physics (Medical)

## *Complete Syllabus of Class XI & XII*

**Instructions:**

(i) Use ball point pen only to darken the appropriate circle.
(ii) Mark should be dark and should completely fill the circle.
(iii) Dark only one circle for each entry.
(iv) Dark the circle in the space provided only.
(v) Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
(vi) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score.

**Choose the correct answer :**

1. The dimension of $\frac{L}{RCV}$ is

(1) [AT] (2) $[A^{-1}T^{0}]$
(3) $[A^{2}T]$ (4) $[AT^{-2}]$

2. Which of the following equations is dimensionally correct?

(1) $T = 2\pi\sqrt{\frac{Gm}{R^2}}$ (2) $T = 2\pi\sqrt{\frac{R^2}{Gm}}$
(3) $T = 2\pi\sqrt{\frac{R^3}{Gm}}$ (4) $T = 2\pi\sqrt{\frac{Gm}{R^3}}$

3. The position vector of a moving particle is given as $\vec{r} = a\cos\omega t\hat{i} + b\sin\omega t\hat{j}$. Then its radial acceleration is given as

(1) $\omega^2\vec{r}$ (2) $\omega\vec{r}$
(3) $-\omega^2\vec{r}$ (4) $\omega\vec{r}^{\,2}$

4. A uniform thick rope of length 10 m is resting on a horizontal frictionless surface. It is pulled by a force of 5 N at one end. Then what is the tension in the rope at 2 m from the end where the force is applied?

(1) 6 N (2) 8 N
(3) Zero (4) 4 N

5. A car of mass ($m$) accelerates, starting from rest, while the engine supplies constant power $P$. Then velocity varies with time ($t$) as

(1) $v \propto t$ (2) $v \propto t^{1/2}$
(3) $v \propto t^{2}$ (4) $v \propto t^{3/2}$

6. Assuming the radius of earth $R$ and acceleration due to gravity at its surface is $g$. If a body of mass ($m$) is sent to a height, $h = \frac{R}{3}$ from the earth's surface. The P.E. increases by

(1) $\frac{mgh}{4}$ (2) $\frac{3}{4}mgh$
(3) $mgh$ (4) $\frac{mgh}{3}$

7. The position ($x$) of a particle varies with time as $t = \alpha x^2 + \beta x$, then acceleration of particle is

(1) $2\beta v^3$ (2) $2\alpha v^3$

(3) $-2\beta v^3$ (4) $-2\alpha v^3$

8. A projectile has same range for two angles of projections from horizontal. If greatest heights achieved by projectile in two cases are $h_1$ and $h_2$, then

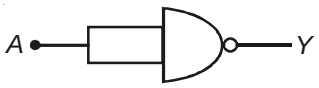
(1) $R = h_1 \cdot h_2$ (2) $R = \sqrt{h_1 \cdot h_2}$

(3) $R = h_1^2 \cdot h_2^2$ (4) $R = 4\sqrt{h_1 \cdot h_2}$

9. The distance covered by a body projected vertically upward during first second of its descent is

(1) 6 m (2) 4 m

(3) 4.9 m (4) 1 m

10. 


Logic gate shown in the figure represents

(1) NAND gate (2) NOT gate

(3) OR gate (4) NOR gate

11. If momentum of a particle is increased by 3%, then, percentage change in kinetic energy will be

(1) 4% (2) 6%

(3) 2% (4) 1%

12. Three point masses ($m$) are brought from infinity to be placed at the vertices of an equilateral triangle of side $L$. Then amount of work done is

(1) $\frac{Gm^2}{L}$ (2) $\frac{-3Gm^2}{L}$

(3) $\frac{3Gm^2}{L}$ (4) $\frac{-Gm^2}{L}$

13. If the coefficient of friction between an ANT and hemispherical bowl is $\mu$ and radius of bowl is $R$, then upto what maximum height ANT may crawl?

(1) $R\left[1+\frac{1}{\sqrt{1+\mu^2}}\right]$ (2) $R\left[1-\frac{1}{\sqrt{1+\mu^2}}\right]$

(3) $\frac{\sqrt{1+R^2}}{\mu}$ (4) $\frac{\sqrt{1+R^2}}{R\mu}$

14. A body starts from rest and acquires a velocity ($v$) in time ($t$). Then work done on body in time ($T$) is proportional to

(1) $\frac{v}{t}$ (2) $\frac{v^2}{t^2}(T)$

(3) $\frac{v^2}{t^2}\cdot(T)^2$ (4) $\frac{v^2}{t}\cdot T^2$

15. Angle between instantaneous electric field and magnetic field of electromagnetic wave is

(1) $\pi$ (2) Zero

(3) $\frac{\pi}{2}$ (4) $\frac{2\pi}{3}$

16. Two different bodies of masses $M_1$ and $M_2$ are dropped from the same height. Then, ratio of their momenta on reaching the ground is

(1) $\sqrt{\frac{M_1}{M_2}}$ (2) 1 : 1

(3) $\frac{M_1}{M_2}$ (4) $\left(\frac{M_1}{M_2}\right)^2$

17. Above Curie temperature a ferromagnetic substance behaves

(1) Ferromagnetic (2) Paramagnetic

(3) Diamagnetic (4) All of these

18. The radius of gyration of uniform rod of length '$L$' about an axis passing through its CM and perpendicular to its length is

(1) $\frac{L}{12}$ (2) $\frac{L}{\sqrt{12}}$

(3) $\frac{L}{\sqrt{13}}$ (4) $\frac{L}{2}$

19. A flywheel rolls down on an inclined plane. At any instant of time, ratio of rotational kinetic energy to the total kinetic energy is

(1) 1 : 3 (2) 2 : 3

(3) 3 : 1 (4) 3 : 5

20. The depth $d(<<R)$ at which the value of acceleration due to gravity becomes $\frac{1}{x}$ times, the value at the surface is

(1) $\frac{R(x-1)}{R}$ (2) $\frac{R(x-1)}{x}$

(3) $\frac{R\cdot x}{x-1}$ (4) $\frac{R}{x}$

21. The excess pressure inside one soap bubble is four times the excess pressure in other. Then, ratio of their surface areas is

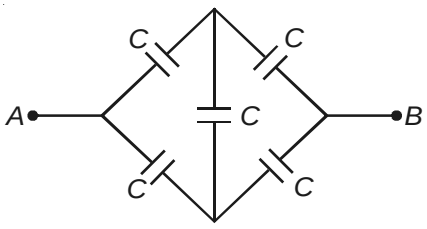
(1) $\frac{1}{4}$ (2) $\frac{3}{16}$

(3) $\frac{4}{1}$ (4) $\frac{1}{16}$

22. If $O_2$ has root-mean square speed of $C$ m/s, then root mean square speed of $H_2$ at same temperature will be

(1) $\frac{C}{4}$ (2) $4C$

(3) $\frac{C}{2}$ (4) $3C$

23. 


Capacity of the arrangement across $AB$ as shown in figure

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

(3) $\frac{C}{4}$ (4) $C$

24. The frequency of a tuning fork with an amplitude $A$ = 1 cm is 250 Hz. Then maximum velocity of any particle in air is

(1) $2\pi$ m/s (2) $5\pi$ m/s

(3) $\frac{3.3}{\pi}$ m/s (4) $\frac{2}{\pi}$ m/s

25. The phase difference between the instantaneous velocity and acceleration of a particle executing SHM is

(1) $\pi$ (2) Zero

(3) $\frac{\pi}{2}$ (4) $\frac{2\pi}{3}$

26. How much electric flux will come out through a surface $\vec{S} = 10\hat{j}$ kept in an electric field $\vec{E} = 3\hat{i} + 2\hat{j} + \hat{k}$?

(1) 30 (2) 20

(3) 10 (4) 60

27. An electron of mass ($m$) and charge ($e$) is accelerated from rest through a potential difference ($V$) in vacuum. Its final speed will be

(1) $\sqrt{\frac{eV}{m}}$ (2) $\sqrt{\frac{2eV}{m}}$

(3) $\sqrt{\frac{eV}{2m}}$ (4) $\frac{eV}{m}$

28. The potential of an electric field $\vec{E} = y\hat{i} + x\hat{j}$ is a function of

(1) $xy$ (2) $x + y$

(3) $x^2 + y^2$ (4) $x^2y$

29. Two copper wires of length 1 m and the other of length 9 m have same resistance. Then diameter are in the ratio

(1) 9 : 1 (2) 1 : 9

(3) 1 : 3 (4) 3 : 1

30. The ratio of heat developed in three wires having lengths in the ratio 1 : 5 : 8 and radii 1 : 2 : 3 in parallel combination

(1) 1 : 25 : 64

(2) 1 : 4 : 9

(3) 40 : 32 : 45

(4) 45 : 32 : 40

31. The flux linked with a coil at an instant is given by $\phi = 5t^2 - 5t + 6$. Then induced emf at $t$ = 4 second is

(1) –10 V (2) 35 V

(3) –35 V (4) 20 V

32. The inductive reactance of an inductor coil of $\frac{2}{\pi}$ H at 100 Hz is

(1) 50 Ω (2) $\frac{50}{\pi}\Omega$

(3) 400 Ω (4) $\frac{400}{\pi}\Omega$

33. If a convex lens of focal length 80 cm and a concave lens of focal length 50 cm are combined together, then, power of combination

(1) 76.8 D (2) –0.75 D

(3) 7.5 D (4) 3.25 D

34. A plano-convex lens of focal length 20 cm silvered at the plane surface will behave as a convergent mirror of focal length

(1) 20 cm (2) 40 cm

(3) 30 cm (4) 10 cm

35. In a Young's double slit experiment, 12 fringes are observed to be formed in a certain region of screen when a light of wavelength 600 nm is used. If a light of 200 nm is used, then number of fringes observed in same region is

(1) 30 (2) 36

(3) 12 (4) 20

36. A radioactive source has half-life of 2 hours emits radiation of intensity which is 64 times, the permissible safe level. Then, after how much time it would be possible to work safely with this source?

(1) 12 hrs (2) 24 hrs

(3) 6 hrs (4) 120 hrs

37. Bohr's radius of the H-atom in the ground state is 0.529 Å. What is the Bohr's radius of H-atom in first excited state?

(1) 0.529 Å (2) 1.058 Å

(3) 2.116 Å (4) 0.265 Å

38. The wavelength associated with an electron accelerated from rest through a PD of 1000 V is

(1) 2.388 Å (2) 0.388 Å

(3) 1.488 Å (4) 0.483 Å

39. A photodetector used to detect the wavelength of 1700 nm, has energy gap of about

(1) 0.73 eV (2) 0.03 eV

(3) 1.2 eV (4) 1.16 eV

40. A proton and an $\alpha$-particle having same kinetic energy are fired through a magnetic field. If $r_1$ and $r_2$ respectively be the radii of their circular paths, then $\frac{r_1}{r_2} =$

(1) 1 (2) 2

(3) $\sqrt{2}$ (4) $\frac{1}{2}$

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | (2) | 11. | (2) | 21. | (4) | 31. | (3) |
| 2. | (3) | 12. | (2) | 22. | (2) | 32. | (3) |
| 3. | (3) | 13. | (2) | 23. | (4) | 33. | (2) |
| 4. | (4) | 14. | (3) | 24. | (2) | 34. | (4) |
| 5. | (2) | 15. | (3) | 25. | (3) | 35. | (2) |
| 6. | (2) | 16. | (3) | 26. | (2) | 36. | (1) |
| 7. | (4) | 17. | (2) | 27. | (2) | 37. | (3) |
| 8. | (4) | 18. | (2) | 28. | (1) | 38. | (2) |
| 9. | (3) | 19. | (1) | 29. | (3) | 39. | (1) |
| 10. | (2) | 20. | (2) | 30. | (3) | 40. | (1) |