PRE UPCATET-2025 Question Paper With Solutions

Time Allowed :3 hours	**Maximum Marks :**800	**Total questions :**200

1. The angle between centripetal acceleration and tangential acceleration is.

(A) $180°$

(B) $0°$

(C) $90°$

(D) $45°$

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2. What is the need for laminating the core of a transformer?

(A) To reduce the resistance in the winding

(B) To reduce the eddy currents

(C) To reduce the hysteresis

(D) None of the above

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3. Number of significant figures in 42306, 0.0007 and 6.5×10^{-3} are respectively.

(A) 4, 4, 2

(B) 5, 5, 2

(C) 5, 1, 5

(D) 5, 1, 2

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4. Which is a constant for a freely falling object?

(A) displacement

(B) velocity

(C) acceleration

(D) speed

5. The frame of reference attached to a satellite of the earth is

(A) an inertial frame

(B) an absolute frame at rest with respect to the stars

(C) a non-inertial frame

(D) a gravitational frame

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6. Plane angle and solid angle have –

(A) both units and dimensions

(B) units but no dimensions

(C) dimensions but no units

(D) no units & no dimensions

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7. The ratio of kinetic energy to the total energy of an electron in a Bohr orbit of the hydrogen atom is –

(A) 1 : 1

(B) 1 : -1

(C) 2 : -1

(D) 1 : -2

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8. What happens to the weight of the body if the weight becomes $\frac{1}{16}$ at a certain height? Also, consider the radius of the Earth to be R.

(A) $4R$

(B) $15R$

(C) $5R$

(D) $3R$

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9. The equation of trajectory of a projectile is given by $y = x - 10x^2$. Its speed of projection is – ($g = 10\,\text{m/s}^2$)

(A) 1 m/s

(B) 2 m/s

(C) 3 m/s

(D) 4 m/s

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10. A body of mass m moving with a constant velocity v hits another body of the same mass moving with the same velocity v but in the opposite direction and sticks to it. The velocity of the compound body after the collision is

(A) $2v$

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

(C) v

(D) zero

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11. Choose the correct statement

(A) A body can be accelerated by frictional force

(B) There can be zero friction

(C) Kinetic friction is greater than rolling friction

(D) Frictional force and area of contact between the two surface are proportional

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12. The total energy of a rolling ring of mass M, velocity V, and radius R is -

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

(B) $\frac{1}{2}MV^2$

(C) MV^2

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

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13. When the angle of contact between a solid and a liquid is $90°$, then

(A) Cohesive force $>$ Adhesive force

(B) Cohesive force $<$ Adhesive force

(C) Cohesive force $=$ Adhesive force

(D) None of these

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14. Efficiency of a Carnot heat engine working between the temperatures 27°C and 227°C is –

(A) 0.1

(B) 0.6

(C) 0.2

(D) 0.4

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15. Which of the following is the largest unit of energy?

(A) Electron volt

(B) Joule

(C) Calorie

(D) Erg

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16. Curie temperature is the temperature above which –

(A) a ferromagnetic material becomes paramagnetic

(B) a ferromagnetic material becomes diamagnetic

(C) a paramagnetic material becomes diamagnetic

(D) a paramagnetic material becomes ferromagnetic

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17. What is the time taken by a particle executing SHM with a time period T sec from a positive extreme position to half of the amplitude?

(A) $\frac{2T}{12}$ sec

(B) $\frac{T}{12}$ sec

(C) $\frac{6T}{12}$ sec

(D) $\frac{3T}{12}$ sec

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18. The image formed by the convex mirror is $\frac{1}{n}$ times the object and has a focal length f. What is the distance of the object from the mirror?

(A) $(n+1)f$

(B) $(n-1)f$

(C) $\left(\frac{n+1}{n}\right) f$

(D) $\left(\frac{n-1}{n}\right) f$

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19. Which of the following does not exhibit polarization?

(A) Longitudinal wave in a gas

(B) Transverse wave in a gas

(C) Neither (a) nor (b)

(D) Both (a) and (b)

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20. A spring has a spring constant k. When the spring is stretched through 1 cm, the potential energy is U. What will be the potential energy if it is stretched by 4 cm?

(A) $4U$

(B) $8U$

(C) $16U$

(D) $2U$

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21. What will be the flux coming out of any surface of a cube, if a charge $Q\,\mu$C is placed at the centre of the cube?

(A) $\frac{Q}{6\varepsilon_0} \times 10^{-3}$

(B) $\frac{Q}{24\varepsilon_0}$

(C) $\frac{Q}{8\varepsilon_0}$

(D) $\frac{Q}{6\varepsilon_0} \times 10^{-6}$

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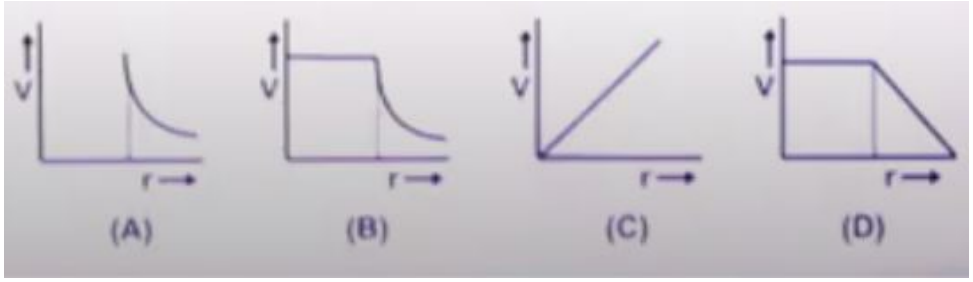
22. For a hollow spherical shell, potential V changes with respect to distance r from the centre. Which graph from the following represents this?



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23. What does an electric dipole experience when it is kept in a non-uniform electric field?

(A) Only a force

(B) Only torque

(C) Force and torque both

(D) Neither force nor torque

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24. The electrical resistance of the depletion layer is large because

(A) It has no charge carriers

(B) It has a large number of charge carriers

(C) It contains electrons as charge carriers

(D) It has holes as charge carriers

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25. A potentiometer is considered a versatile and accurate device to make an electrical measurement of EMF. Why?

(A) Because the method involves a combination

(B) There are cells involved

(C) Because of potential gradients

(D) As there is no flow of current through the galvanometer

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26. At a distance r, two equal charges are kept and they exert a force F on each other. What is the force acting on each charge, if the distance between them is doubled and charges are halved?

(A) $\frac{F}{4}$

(B) $4F$

(C) $\frac{F}{16}$

(D) $\frac{F}{8}$

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27. A long wire carrying a steady current is bent into a circular loop of one turn. The magnetic field at the centre of the loop is B. It is then bent into a circular coil of n turns. The magnetic field at the centre of this coil of n turns will be

(A) $2Bn^2$

(B) n^2B

(C) n^3B

(D) nB

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28. Why can't the DC ammeter measure an alternating current?

(A) AC cannot pass through a DC ammeter

(B) AC changes its direction

(C) AC is virtual

(D) The average value of a complete cycle is zero

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29. Two sources of light are said to be coherent when both give out light waves of the same

(A) amplitude and phase

(B) intensity and wavelength

(C) speed

(D) wavelength and a constant phase difference

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30. What does the area under acceleration-time graph represent for any given time interval?

(A) Final velocity

(B) Distance travelled

(C) Change in the velocity in that time interval

(D) Displacement of the particle

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31. For which of the following is magnetic susceptibility negative?

(A) Paramagnetic and Ferromagnetic materials

(B) Paramagnetic Materials only

(C) Ferromagnetic Materials only

(D) Diamagnetic Materials

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32. Which of the following materials is the most suitable for making a permanent magnet?

(A) Soft Iron

(B) Nickel

(C) Copper

(D) Steel

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33. Cyclotron cannot accelerate

(A) Electrons

(B) Neutrons

(C) Positive ions

(D) Both (A) and (B)

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34. In Young's double slit experiment, the central point on the screen is -

(A) bright

(B) dark

(C) first bright and later dark

(D) first dark and later bright

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35. The isotope generally used for the treatment of cancer is -

(A) I-131

(B) Hg-197

(C) O-15

(D) Co-60

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36. An Astronomical Unit, or AU, is the average distance between

(A) The Sun and Neptune

(B) The Sun and Earth

(C) The Earth and the Moon

(D) The Sun and Mercury

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37. Displacement current is due to -

(A) the flow of electrons

(B) the varying electric field

(C) the ionization of atmosphere

(D) the flow of protons

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38. Photons and alpha particles have the same de-Broglie wavelength. What is the same for both of them?

(A) Energy

(B) Time period

(C) Frequency

(D) Momentum

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39. On increasing the reverse bias to a large value in a PN junction diode, current

(A) Increases slowly

(B) Remains fixed

(C) Suddenly increases

(D) Decreases slowly

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40. The output of the two-input OR gate is high

(A) Only if both inputs are high

(B) Only if both inputs are low

(C) Only if one input is high and the other is low

(D) If at least one of the inputs is high

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41. NAND gate means

(A) Inversion followed by AND gates

(B) AND gates followed by an inverter

(C) AND gate followed by OR gate

(D) None of these

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42. A gun of mass 1000 kg fires a projectile of mass 1 kg with a horizontal velocity of 100 m/s. The velocity of recoil of the gun in the horizontal direction is

(A) 5 m/s

(B) 0.1 m/s

(C) 15 m/s

(D) 20 m/s

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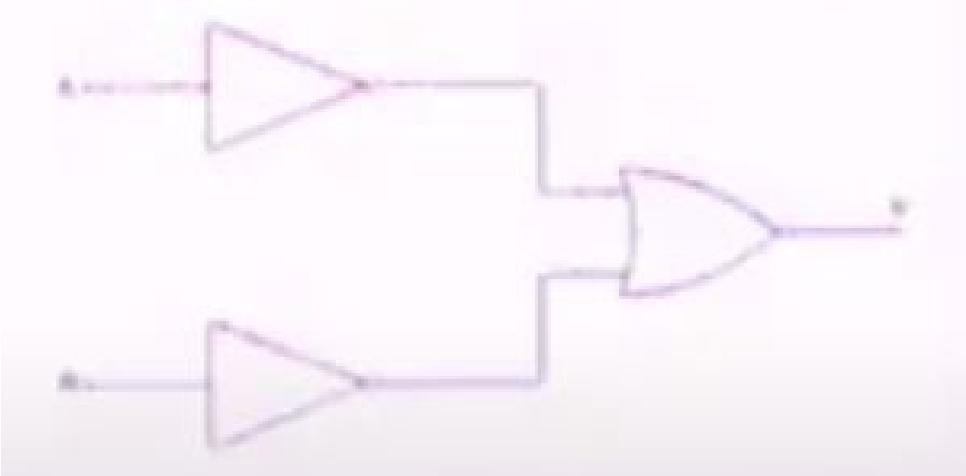
43. Which logic gate is represented by the following combination of logic gates?



(A) OR

(B) NAND

(C) AND

(D) NOR

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44. The number of turns in the primary coil of a transformer is 200 and the number of turns in the secondary is 10. If 240 V AC is applied to the primary, the output from the secondary is –

(A) 6 V

(B) 12 V

(C) 24 V

(D) 48 V

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45. If the radius of Bohr's first orbit is a_0, what is the radius of the nth orbit?

(A) na_0

(B) $\frac{a_0}{n}$

(C) $n^2 a_0$

(D) $\frac{a_0}{n^2}$

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46. Of the various series of the hydrogen spectrum, which of the following lies wholly in the ultraviolet region?

(A) Balmer Series

(B) Paschen Series

(C) Brackett Series

(D) Lyman Series

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47. Isotopes of an element have a different number of

(A) Proton

(B) Neutron

(C) Electron

(D) Atom

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48. The process of heat transfer in which heat is transferred with actual migration of medium particles is known as

(A) Conduction

(B) Convection

(C) Radiation

(D) Reflection

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49. A body of mass 500 gram is rotating in a vertical circle of radius 1 m. What is the difference in its kinetic energies at the top and the bottom of the circle?

(A) 4.9 J

(B) 19.8 J

(C) 2.8 J

(D) 9.8 J

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50. Energy is not carried by

(A) Longitudinal progressive wave

(B) Electromagnetic waves

(C) Transverse progressive waves

(D) Stationary wave
