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PHYSICS SAMPLE QUESTIONS – VOL.02

1. Equation of position (x) with time (t) is given by equation $x = 3t^2 + 7t^2 + 5t + 8m$. The acceleration at time $t = 1$ sec is :
   (a) 18 m/sec^2 (b) 32 m/sec^2
   (c) zero (d) 14 m/sec^2

2. One car moving on a straight road covers one third of the distance with 20 km/hr and the rest with 60 km/hr. The Average speed is
   (a) 40 km/hr (b) 80 km/hr
   (c) $46\frac{2}{3}$ km/hr (d) 36 km/hr

3. A particle covers 50 m. distance with 40 kmph and rest half distance with 60 kmph then the average speed of car is:
   (a) 100m (b) 150 m
   (c) 200 m (d) 250 m

4. A car travels half distance with 40 kmph and rest half distance with 60 kmph then the average speed of car is :
   (a) 40 kmph (b) 48 kmph
   (c) 52 kmph (d) 60 kmph

5. Acceleration of a article changes when :
   (a) Direction of velocity changes (b) magnitude of velocity changes
   (c) Both of above (d) speed changes

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6. When a body is moving on a surface, the force of friction is called :
   (a) Static friction (b) dynamic friction
   (c) Limiting friction (d) rolling friction

7. The correct relation between coefficients of static (μ_s) and dynamic (μ_k) friction is
   (a) $\mu_s \geq \mu_k$ (b) $\mu_s \leq \mu_k$
   (b) $\mu_s = \mu_k$ (d) None

8. If a body is in equilibrium under a set of non collinear forces, the minimum number of forces have to be
   (a) four (b) three
   (c) two (d) five

9. The relation $\vec{F} = m\vec{a}$, cannot be deducted from Newton's second law, if
   (a) Force depends on time (b) momentum depends on time
   (c) Acceleration depends on time (d) mass depends on time

10. A force of 100 N acts on a body of mass 2 kg for 10 s. The change in momentum of the body is
    (a) 100 Ns (b) 250 Ns
    (c) 500 Ns (d) 1000 Ns

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11. When a spring is stretched by a distance x. it exerts a force given by $F=(-5x-16x^2)$. The work done, when the spring is stretched from 0.1 m to 0.2 m is

(a) 8.7×10^{-2} J (b) 10.2×10^{-2} J

(b)) 8.7×10^{-2} J (d) 10.2×10^{-1} J

12. The increase in length of a wire of length L is l by the longitudinal stress. Then the stress is proportional to

(a) L/1 (b) 1/L

(c) $i\times L$ (d) $l^2\times L$

13. The Young's modulus of a rubber string 8 cm long and density $1.5\,kg/m^3$ is 5×10^8 N/m^2, is suspended on the ceiling in a room. The increase in length due to its own weight will be

(a) 9.6×10^{-5} m (b) 9.6×10^{-11} m

(c) 9.6×10^{-3} m (d) 9.6 m

14. The force constant of a wire does not depend on

(a) Nature of the material (b) Radius of the wire

(b) Length of the wire (d) None of the above

15. The elasticity of invar

(a) Increases with temperature rise (b) decreases with temperature rise

(b) It has lowest thermal expansion (d) none of the above

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16. On the Celsius scale the absolute zero of temperature is at
(a) $0^{\circ}C$ (b) $-32^{\circ}C$
(c) $100^{\circ}C$ (d) $-273.15^{\circ}C$

17. Thermoelectric thermometer is based on
(a) Photoelectric effect (b) Seeback effect
(b) Compton effect (d) Joule effect

18. The study of physical phenomenon at low temperatures (below liquid nitrogen temperature) is called
(a) Refrigeration (b) Radiation
(c) Cryogenics (d) Pyrometry

19. The absolute zero is the Temperature at which
(a) Water freezes (b) all substances exist in solid state
(c) Molecular motion ceases (d) none of the above

20. Expansion during heating
(a) Occurs only in solids
(b) Increases the weight of a material
(c) Decreases the density of a material
(d) Occurs at the same rate for the liquids and solids

21. An iron ball and a wooden ball of the same radius are released from a height `h' in vacuum. The time taken by both of them to reach the ground is

(a) unequal (b) exactly equal
(c) roughly equal (d) zero

22. If R is the radius of the earth and g the acceleration due to gravity on the earth's surface, the mean density of the earth is
(a) $4\pi G/3gR$ (b) $3\pi R/4gG$
(c) $3g/4\pi RG$ (d) $\pi RG/12G$

23. The value of g on the earth's surface is 980 cm/$\sec^2$. It value at a height of 64 km from the earth's surface is
(a) 960.40 cm/sec^2 (b) 984.90 cm/sec^2
(c) 982.45 cm/sec^2 (d) 977.55 cm/sec^2

24. The radius of a planet is R. A satellite revolves around it in a circle of radius r with angular speed ω. The acceleration due to gravity in planet's surface will be :
(a) $\frac{r^2\omega}{R}$ (b) $\frac{r^2\omega^3}{R}$
(c) $\frac{r^3\omega^2}{R^2}$ (d) $\frac{r^2\omega^2}{R}$

25. A particle of mass m is placed inside a spherical shell, away from its centre. The mass of the shell is M.
(a) The particle will move towards the centre
(b) The particle will move away from the centre, towards the nearest wall.
(c) The particle will move towards the centre if m < M and away from the centre if m > M.
(d) The particle will remain stationary

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26. If a simple pendulum of length L has maximum angular displacement a, then the maximum kinetic energy of bob of mass M is

(a) $\frac{1}{2}\frac{MI}{g}$ (b) $\frac{Mg}{2L}$

(c) $MgI(1-\cos-a)$ (d) $MgL\sin\frac{a}{2}$

27. A particle executes S.H.M. with a period of 6 second and amplitude of 3 cm. Its maximum speed in cm/sec is

(a) $\pi/2$ (b) π

(c) 2π (d) 3π

28. A.S.H.M. has amplitude `a' and time period T. The maximum velocity will be

(a) $\frac{4a}{T}$ (b) $\frac{2a}{T}$

(c) $2\pi\sqrt{\frac{a}{T}}$ (d) $\frac{2\pi a}{T}$

29. If a simple pendulum oscillates with amplitude of 50 mm and time period of 2 sec, then its maximum velocity is

(a) 0.10 m/s (b) 0.15 m/s

(b) 0.8 m/s (d) 2 rad/sec

30. The velocity of a particle performing simple harmonic motion, when it passes through its mean position is
(a) infinity (b) zero
(c) minimum (d) maximum

31. Number of electrons in one coulomb of charge will be
(a) 5.46×10^{29} (b) 6.25×10^{18}
(c) 1.6×10^{19} (d) 9×10^{11}

32. The electric potential at a point on the axis of an electric dipole depends on the distance r of the point from the dipole as
(a) $\propto \frac{1}{r}$ (b) $\propto \frac{1}{r^2}$
(c) $\propto r$ (d) $\propto \frac{1}{r^3}$

33. An electric charge q is placed at the centre of a cube of side α. The electric flux on one of its faces will be
(a) $\frac{q}{6\varepsilon_0}$ (b) $\frac{q}{\varepsilon_0 a^2}$
(c) $\frac{q}{4\pi\varepsilon_0 a^2}$ (d) $\frac{q}{\varepsilon_0}$

34. The charge on an electron was calculated by
(a) Faraday (b) J.J. Thomson
(c) Millikan (d) Einstein

35. The SI unit of electric flux is
(a) N $C^{-1}m^2$ (b) NCm^{-2}
(c) $NC^{-2}m^2$ (d) $NC^{-1}m^{-2}$

36. The resistivity of a wire
(a) Increases with the length of the wire
(b) Decreases with the area of cross section
(c) Decreases with the length and increases with the cross section of wire
(d) None of the above statement is correct

37. In a conductor 4 coulombs of charge flows for 2 seconds. The value of electric current will be
(a) 4 volts (b)4 amperes (c) 2 amperes (d) 2 volts

38. There are 8 equal resistances R. Two are connected in parallel, such four groups are connected in series, the total resistance of the system will be
(a) R/2 (b)2R (c) 4 R (d) 8R

39. Given three equal resistors, how many different combination of all the three resistors can be made
(a) six (b) five (c) four (d)Three

40. One kilowatt hour is equal to
(a) 36×10^5 joules (b) 36×10^3 joules
(c) 10^3 joules (d) 10^5 joules

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41. An electron is accelerated through a potential difference of 1000 volts. Its velocity is nearly
(a) 3.8×10^{7} m/s (b) 1.9×10^{6} m/s (c) 1.9×10^{7} m/s (d) 5.7×10^{7} m/s

42. A photon, an electron and a uranium nucleus all have the same wavelengths. The one with the most energy
(a) Is the photon (b) is the electron (c) is the uranium nucleus
(d) Depends upon the wavelength and the properties of the particle

43. The shortest wavelength of X-rays emitted from an X-ray tube depends on the
(a) Current in the tube (b) voltage applied to the tube
(b) Nature of gas in the tube (d) atomic number of target
(c) Material

44. The penetrating power of X-rays increases with the
(a) Increase in its velocity (b) Increase in its frequency

(c) Increase in its intensity (d) Decrease in its velocity

45. In the following atoms and molecules for the transition form n = 2 to n = 1, the spectral line of minimum wavelength will be produced by
(a) Hydrogen atom (b) Deuterium atom
(c) Uni-ionized helium (d) di-ionized lithium

46. The typical ionisation energy of a donor in silicon is
(a) 10.0 eV (b) 1.0 eV
(c) 0.1 eV (d) 0.001 eV

47. In semiconductor the concentrations of electrons and holes are $8\times10^{18}/\mathrm{m}^3$ and $5\times10^{18}/\mathrm{m}$ respectively. If the mobilities of electrons and hole are 2.3 $\mathrm{m}^2/\mathrm{volt-sec}$ and 0.01 $\mathrm{m}^2/\mathrm{volt-sec}$ respectively, then semiconductor is
(a) N-type and its resistivity is 0.34 $\Omega-\mathrm{m}$
(b) P-type and its resistivity is 0.034 $\Omega-\mathrm{m}$
(c) N-type and its resistivity is 0.034 $\Omega-\mathrm{m}$
(d) P-type and its resistivity is 3.40 $\Omega-\mathrm{m}$

48. A piece of copper and the other of germanium are cooled from the room temperature to 80 K, then which of the following would be a correct statement
(a) Resistance of each increase (b) resistance of each decrease
(b) Resistance of copper increases while that of germanium decrease

(c) Resistance of copper decrease while that of germanium increase

49. To obtain P-type Si semiconductor, we need to dope pre Si with
(a) Aluminium (b) Phosphorous
(c) Oxygen (d) Germanium

50. In a PN-junction diode not connected to any circuit
(a) The potential is the same everywhere
(b) The P-type is a higher potential than the N-type side
(c) There is an electric field at the junction directed from the N-type side to the P-type side
(d) There is an electric field at the junction directed from the P-type side to the N type side

Key Answer:

1	B	9	D	17	B	25	D	33	A	41	C	49	A
2	D	10	D	18	C	26	C	34	B	42	A	50	C
3	C	11	A	19	C	27	B	35	A	43	B		
4	B	12	B	20	C	28	D	36	D	44	B		
5	C	13	B	21	B	29	B	37	C	45	D		
6	B	14	D	22	C	30	D	38	B	46	C		
7	A	15	C	23	A	31	B	39	C	47	A		
8	B	16	D	24	C	32	B	40	A	48	D		

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TMC Shipping Pvt. Ltd., S.C.O. 270, Sector-14, Panchkula - 134109, Haryana, India.
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