SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

Time: 3 Hours **NEET TOT GT-8** **Max. Marks: 720 M**

PHYSICS

1. In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows $P=\frac{a^3b^2}{cd}$ then maximum possible % error in P is

1) 7% 2) 4% 3) 14% 4) 10%

2. The speed of a projectile at its maximum height is half of its initial speed the angle of projection is

1) 60^0 2) 15^0 3) 30^0 4) 45^0

3. A bullet is fired from a gun. The force on the bullet is given by $F=600-2\times10^5 t$ Where, F is in newton and t in seconds. The force on the bullet becomes zero as soon as it leaves the barrel. What is the average impulse imparted to the bullet?

1) 9 N – s 2) zero 3) 1.8 N – s 4) 0.9 N – s

4. A body of mass 1 kg begins to move under the action of a time dependent force $\overline{F}=\left(2t\hat{i}+3t^2\hat{j}\right)N$, where $\hat{i}$ and $\hat{j}$ are unit vectors along x and y axis. What power will be developed by the force at the time t?

1) $\left(2t^3+3t^4\right)W$ 2) $\left(2t^3+3t^5\right)W$ 3) $\left(2t^2+3t^3\right)W$ 4) None of these

5. The moment of inertia of a uniform circular disc of radius 'R' and mass M about an axis passing from the edge of the disc and normal to the disc is

1) MR^2 2) $\frac{MR^2}{2}$ 3) $\frac{3}{2}MR^2$ 4) $\frac{7}{2}MR^2$

6. A light rod of length *l* has two masses m_1 and m_2 attached to its two ends. The moment of inertia of the system about an axis perpendicular to the rod and passing through the centre of mass is

1) $\frac{m_1m_2}{m_1+m_2}l^2$ 2) $\frac{m_1+m_2}{m_1m_2}l^2$ 3) $\left(m_1+m_2\right)l^2$ 4) $\sqrt{m_1m_2l^2}$

7. What is the minimum energy required to launch a satellite of mass m from the surface of earth of radius 'R' in a circular orbit at an attitude of 2R.

1) $\frac{GMm}{R}$ 2) $\frac{GMm}{2R}$ 3) $\frac{3}{4}\frac{GMm}{R}$ 4) $\frac{5}{6}\frac{GMm}{R}$

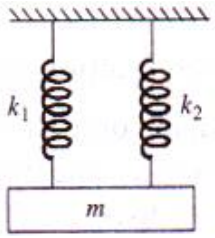
8. If an object of mass *m* is taken from surface of earth to a point at a height 3*R* from the surface of earth, then work done against gravity is (*R* = Radius of earth)

1) $\frac{3}{4}mgR$ 2) $\frac{1}{2}mgR$ 3) $\frac{1}{3}mgR$ 4) $\frac{4}{3}mgR$

9. A string vibrates according to the equation $y=A\sin\frac{\pi x}{6}\cos 200\pi t$. Potential energy of a particle on string will be minimum at t=

1) $\frac{7}{400}s$ 2) $\frac{3}{400}s$ 3) $\frac{5}{400}s$ 4) All of these

10. A mass is suspended separately by two different springs in successive order then time periods is t_1 and t_2 respectively. If it is connected by both spring as shown in figure then time period is t_0 , the correct relation is



1) $t_0^2 = t_1^2 + t_2^2$ 2) $t_0^{-2} = t_1^{-2} + t_2^{-2}$ 3) $t_0^{-1} = t_1^{-1} + t_2^{-1}$ 4) $t_0 = t_1 + t_2$

11. The bulk modulus of a spherical body is B. If it is subjected to uniform pressure P, the fractional decrease in radius is

1) $\frac{B}{3P}$ 2) $\frac{3P}{B}$ 3) $\frac{P}{3B}$ 4) $\frac{P}{B}$

12. An air bubble of diameter 2 cm rises at the rate of 2.5 mm/s through a solution of density 2.25 g/cm^3. Coefficient of viscosity of the solution is

1) 1960 poise 2) 1860 poise 3) 2000 poise 4) 1760 poise

13. The cylindrical tube of a spray pump has radius R, one end of which has n fine holes, each of radius r. If the speed of the liquid in the tube is V, the speed of the ejection of the liquid through the holes is

1) $\frac{VR^2}{n^3r^2}$ 2) $\frac{V^2R}{nr}$ 3) $\frac{VR^2}{n^2r^2}$ 4) $\frac{VR^2}{nr^2}$

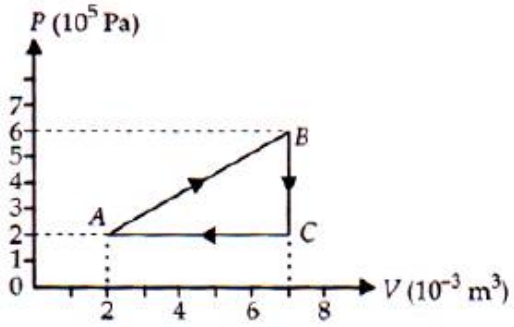
14. The density of water at 20^0C is 998 kg/m^3 and at 40^0C is 992 kg/m^3. The coefficient of volume expansion of water is

1) $3\times10^{-4}/^0C$ 2) $2\times10^{-4}/^0C$ 3) $6\times10^{-4}/^0C$ 4) $10^{-4}/^0C$

15. Consider a compound slab consisting of two different materials having equal thicknesses and thermal conductivities 'K' and '2K' respectively. The equivalent thermal conductivity of the slab is

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

16. A gas is taken through the cycle $A \to B \to C \to A$ as shown. What is the net work done by the gas?



1) Zero 2) -2000 J 3) 2000 J 4) 1000 J

17. An insulated container contains 4 moles of an ideal diatomic gas at temperature T. Heat Q is supplied to this gas, due to which 2 moles of the gas are dissociated in to atoms but temperature of the gas remains constant then.

1) $Q = 2RT$ 2) $Q = RT$ 3) $Q = 3RT$ 4) $Q = 4RT$

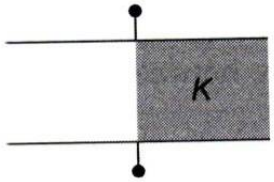
18. A cylindrical resonance tube open at both ends has a fundamental frequency 'f', in air. If half the length is dipped vertically in water, the fundamental frequency of the air column will be

1) $2f$ 2) $\frac{3f}{2}$ 3) f 4) $\frac{f}{2}$

19. A train is moving at 30 m/s in still air. The frequency of train whistle 500 Hz. And the speed of sound is 345 m/s . What would be the apparent wavelengths in front of and behind the train if a wind of speed 10 m/s were blowing in the same direction as that in which the train is travelling.

1) 0.65m, 0.73 m 2) 0.60m, 0.73 m 3) 0.65m, 0.78 m 4) 0.60m, 0.71m

20. A dielectric is placed in between the two parallel plates of a capacitor as shown in figure, the dielectric constant being 'K'. If the initial capacity is 'C', then the new capacity will be

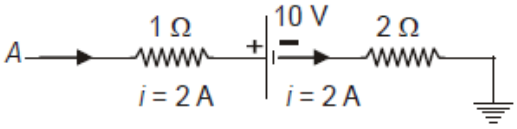


1) KC 2) (K+1) C 3) $\frac{C(K+1)}{2}$ 4) (K-1) C

21. A charge Q is situated at the corner of a cube, the electric flux passed through all the six faces of the cube is

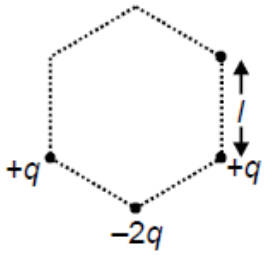
1) $\frac{Q}{6\varepsilon_0}$ 2) $\frac{Q}{8\varepsilon_0}$ 3) $\frac{Q}{\varepsilon_0}$ 4) $\frac{Q}{2\varepsilon_0}$

22. The potential at point A is



1) 10V 2) 11V 3) 16V 4) 4V

23. Three identical charges +q,-2q and +q are placed on the vertices of a regular hexagon of dimension *l* as shown in the given figure. The dipole moment of system is

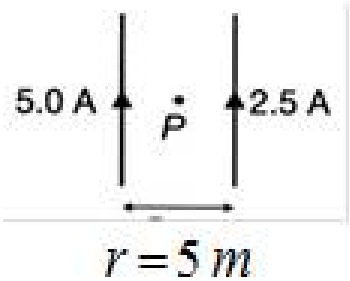


1) ql 2) 2ql 3) $ql\sqrt{2}$ 4) Zero

24. In an ammeter 0.2% of main current passes through the galvanometer. If resistance of galvanometer is G, the resistance of ammeter will be

1) $\frac{1}{499}G$ 2) $\frac{499}{500}G$ 3) $\frac{1}{500}G$ 4) $\frac{500}{499}G$

25. The magnetic field at centre, 'P' will be



1) $\frac{\mu_0}{4\pi}$ 2) $\frac{\mu_0}{\pi}$ 3) $\frac{\mu_0}{2\pi}$ 4) $4\mu_0\pi$

26. The magnetic force acting on a charged particle of charge $-2\mu C$ in a magnetic field of 2 T acting in y direction, when the particle velocity is $\left(2\hat{i}+3\hat{j}\right)\times10^{6}ms^{-1}$

1) 4N in z direction 2) 8N in y direction 3) 8N in z direction 4) 8N in -z direction

27. Electromagnets are made of soft iron because soft iron has

1) Low retentivity and high coercive force
2) High retentivity and high coercive force
3) Low retentivity and low coercive force
4) High retentivity and low coercive force

28. A diverging lens with magnitude of focal length 25 cm is placed at a distance of 15 cm from a converging lens of magnitude of focal length 20 cm. A beam of parallel light falls on the diverging lens. The final image formed is.

1) Real and at a distance of 40 cm from convergent lens.
2) Virtual and at a distance of 40 cm from convergent lens.
3) Real and at a distance of 20 cm from convergent lens.
4) Real and at a distance of 6 cm from the convergent lens

29. The interference pattern is obtained with two coherent light sources of intensity ratio 'n' . In the interference pattern, the ratio $\frac{I_{max}-I_{min}}{I_{max}+I_{min}}$ will be

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

30. In young's double slit experiment, the slits are 2mm apart and are illuminated by photons of two wavelengths $\lambda_1=12000\overset{0}{A}$ and $\lambda_2=10000\overset{0}{A}$ At what minimum distance from the common central bright fringe on the screen 2m from the slit will a bright fringe from one interference pattern coincide with a bright fringe from the other?

1) 4mm 2) 3 mm 3) 8 mm 4) 6 mm

31. A concave lens with unequal radii of curvature made of glass $\left(\mu_g=1.5\right)$ has a focal length of 40 cm. If it is immersed in a liquid of refractive index $\mu_1=2$ then

1) It behaves like a convex lens of 80 cm focal length
2) It behaves like a convex lens of 20 cm focal length
3) Its focal length becomes 60 cm
4) Its focal length remains unchanged

32. In a series LCR circuit, voltage applied is $V=3\sin\left(314t+\frac{\pi}{6}\right)V$ and current from the supply is $i=2\sin\left(314t+\frac{\pi}{3}\right)A$ The wattles component of current in given voltage current supply is

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

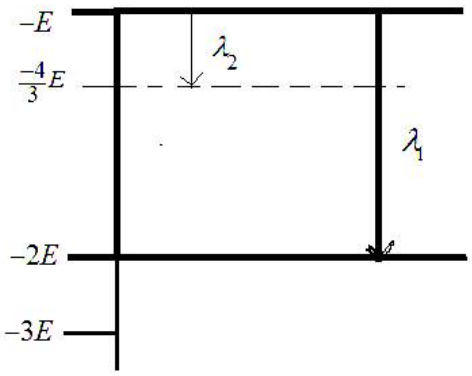
33. A metallic rod of length $'\ell'$ is tied to a string of length 2ℓ and made to rotate with an angular speed ω on a horizontal table with one end of the string fixed. If there is a vertical magnetic field 'B' in the region, the e .m.f induced across the ends of the rods is.

1) $\frac{B\omega l^2}{2}$ 2) $\frac{3B\omega l^2}{2}$ 3) $\frac{4B\omega l^2}{2}$ 4) $\frac{5B\omega l^2}{2}$

34. If the kinetic energy of a α-particle is increased to 16 times, the percentage change in the deBroglie wave length of the particle is

1) 25 % 2) 75 % 3) 60 % 4) 50 %

35. Some energy levels of a molecule are shown in the figure. The ratio of the wavelength $r = \lambda_1 / \lambda_2$ is given by



1) $r = \frac{1}{3}$ 2) $r = \frac{4}{3}$ 3) $r = \frac{2}{3}$ 4) $r = \frac{3}{4}$

36. The energy released when 3α – particles combine to from a C^{12} nucleus is (mass of $_2He^4$=4.002603)

1) 23.67 MeV 2) 0.961 MeV 3) 1.367 MeV 4) 7.27 MeV

37. A mixture consists of two radioactive material A_1 and A_2 with half lives of 20 s and 10 s respectively . Initially the mixture has 40 g of A1 and 160 g of A2. The amount of two in the mixture will become equal after

1) 60 s 2) 80 s 3) 20 s 4) 40 s

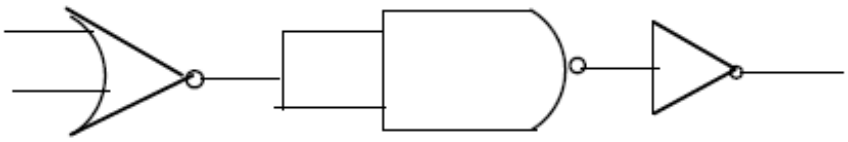
38. An alpha nucleus of energy $\frac{1}{2}mV^2$ bombards a heavy nuclear target of charge Ze. Then the distance of closest approach for the alpha nucleus will be proportional to

1) $\frac{1}{Ze}$ 2) V^2 3) $\frac{1}{m}$ 4) $\frac{1}{\sqrt{2}}$

39. In a n-type semiconductor, which of the following statement is true.

1) Electrons are majority carriers and trivalent atoms are dopants
2) Electrons are minority carriers and pentavalent atoms are dopants
3) Holes are minority carriers and pentavalent atoms are dopants
4) Holes are majority carries and trivalent atoms are dopants

40. The circuit is equivalent to



1) AND gate 2) NAND gate 3) NOR gate 4) OR gate

41. In a common emitter amplifier, the output resistance is 5000 Ω and the input resistance is 2000 Ω . If the peak value of signal voltage is 10 mV and $\beta = 50$, then peak value of output voltage is

1) 125 V 2) 1.25 V 3) $5\times10^{-6}V$ 4) $2.5\times10^{-4}V$

42. A rod of length 10cm lies along the principal axis of a concave mirror of focal length 10cm in such a way that its end closer to the pole is 20cm a way from the mirror. The length of the image is

1) 10cm 2) 15cm 3) 2.5 cm 4) 5 cm

43. Two radioactive nuclei P and Q in a given sample decay into a stable nucleus R. At time t=0, number of P species are 4 N_0 and that of Q are N_0. Half – life of P(for conversion to R) is 1 minute where as that of Q is 2 minutes. Initially there are no nuclei of R present in the sample. When number of nuclei of P and Q are equal, the number of nuclei of R present in the sample would be

1) $2N_0$ 2) $3N_0$ 3) $\frac{9N_0}{2}$ 4) $\frac{5N_0}{2}$

44. The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by

1) $\lambda_p \alpha \sqrt{\lambda_e}$ 2) $\lambda_p \alpha \frac{1}{\sqrt{\lambda_e}}$ 3) $\lambda_p \alpha \lambda_e^2$ 4) None of these

45. The area covered by a transmitting antenna of height 50 m is

1) $320\pi km^2$ 2) $1440\pi km^2$ 3) $640\pi km^2$ 4) $120\pi km^2$

CHEMISTRY

46. The ratio of radii of first bohr orbits of He^+ and Li^{+2} is

1) 2 : 3 2) 3 : 2 3) 4 : 9 4) 9 : 4

47. Four electrons in an atom have the sets of quantum numbers as given below. Which electrons in at the highest energy level?

1) $n=4, l=0, m_l=0, m_s=+\frac{1}{2}$ 2) $n=3, l=0, m_l=0, m_s=-\frac{1}{2}$

3) $n=3, l=2, m_l=0, m_s=+\frac{1}{2}$ 4) $n=4, l=1, m_l=-1, m_s=-\frac{1}{2}$

48. If the volume of drop of water is 0.0018 ml then the number of water molecules present in two drops of water at room temperature is

1) 12.046×10^{19} 2) 1.084×10^{18} 3) 4.84×10^{17} 4) 6.023×10^{23}

49. 2.8 g of a gas at 1 atm and 273k occupies a volume of 2.24 litres. The gas can not be.

1) O_2 2) CO 3) N_2 4) C_2H_4

50. If ΔH_f^0 for H_2O_2 and H_2O are -188 kj/mole and -286 kj/mole, What will be the enthalpy change of the reaction $2H_2O_2(l) \rightarrow 2H_2O(l) + O_2(g)$

1) -196 kj/mole 2) -494 kj/mole 3) 146 kj/mole 4) -98 kj/mole

51. The equilibrium constant K_c for the following reaction at 842^0C is 7.90×10^{-3}. What is K_p at same temperature $\frac{1}{2}F_2(g) \rightleftharpoons F(g)$

1) 8.64×10^{-5} 2) 8.26×10^{-4} 3) 7.90×10^{-2} 4) 7.56×10^{-2}

52. The solubility (in mol L^{-1}) of $AgCl\left(K_{sp}=1.0\times10^{-10}\right)$ in a 0.1 M KCl solution will be

1) 1.0×10^{-10} 2) 1.0×10^{-5} 3) 1.0×10^{-11} 4) 1.0×10^{-9}

53. 6g of urea is dissolved in 90g of boiling water. The vapour pressure of the solution is

1) 745 mm 2) 758 mm 3) 761 mm 4) 760 mm

54. Passage of current in amperes for 548 seconds through a silver coulometer results in the deposition of 0.746 g of silver.

1) 1.22 2) 1.16 3) 1.07 4) 1.00

55. Pure water does not conduct electricity because it

1) Is neutral 2) Is readily decomposed
3) Is almost totally unionized 4) Has a low boiling point

56. Which of the following is correct for a first order reaction

1) $t_{1/2} \alpha a$ 2) $t_{1/2} \alpha \frac{1}{a}$ 3) $t_{1/2} \alpha a^0$ 4) $t_{1/2} \alpha a^2$