SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

NEET TOT GT-3

Time: 3 Hours | Max. Marks: 720 M

PHYSICS

1. The S.I unit of moment of inertia and dimensional formula is

1) $kg/m^2, M^1L^{-2}T^0$ 2) $kgm^2, M^1L^2T^0$ 3) $N\,m^2, ML^3T^{-2}$ 4) $N/m^2, M^1L^{-1}T^{-2}$

2. Two solid spheres of radii R and 2R are made up of the same material. If they are placed in contact with each other, the gravitational force of attraction between them is proportional to

1) R^4 2) R^2 3) $R^{1/2}$ 4) $R^{3/2}$

3. A body executing S.H.M has a maximum velocity of 1m/s and a maximum acceleration of $4m/s^2$. Its amplitude in meters is

1) 1 2) 0.75 3) 0.5 4) 0.25

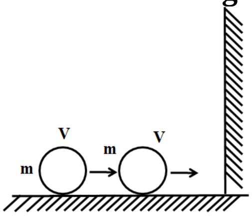
4. The pressure inside two soap bubbles are 1.01 and 1.02 atm respectively. The ratio of their respective volumes is

1) 2 2) 4 3) 8 4) 16

5. Sand is being dropped on a conveyer belt at the rate of M kg/s. The force necessary to keep the belt moving with a constant velocity of V m/s will be (in newton)

1) $\frac{MV}{2}$ 2) zero 3) MV 4) 2MV

6. Two balls of same mass each 'm' are moving with same velocities 'v' on a smooth surface as shown. If all collisions between the mass and with the wall are perfectly elastic the possible number of collisions between the bodies and wall together is



1) 1 2) 2 3) Infinity 4) 3

7. A body of mass 6kg under a force which causes displacement in it given by $S=\frac{t^2}{4}m,$ Where 't' is time. The work done by the force in 2 seconds is

1) 3J 2) 9J 3) 6J 4) 12J

8. A system consists of two identical particles one particle is at rest and the other particle has an acceleration 'a'. The centre of mass of the system has an acceleration of

1) 2a 2) a 3) a/2 4) a/4

9. A thin hallow sphere of mass 'm' is completely filled with a liquid of mass 'm'. When the sphere rolls with a velocity 'v', kinetic energy of the system is (neglect friction)

1) $\frac{1}{2}mv^2$ 2) $\frac{4}{3}mv^2$ 3) $\frac{4}{5}mv^2$ 4) mv^2

10. A monoatomic and a diatomic gas molecules have how many degree of freedom respectively

1) 3,4 2) 4,3 3) 5,3 4) 3,5

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

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

12. 2kg of ice at -20°C is mixed with 5kg of water at 20°C. Final mass of water formed is

1) 6kg 2) 7kg 3) 4kg 4) 2kg

13. **In a room, where the temperature is 30°C, a body cools from 61°C to 59°C in 4 min. The time taken by the body to cool from 51°C to 49°C will be**
1) 4 min 2) 6 min 3) 5 min 4) 8 min

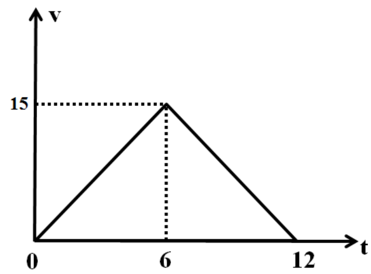
14. **Which of the following is true in the case of an adiabatic process where** $\gamma = \frac{C_P}{C_V}$
1) $P^{1-\gamma}.T^{\gamma} = constant$ 2) $P^{\gamma}.T^{1-\gamma} = constant$ 3) $PT^{\gamma} = constant$ 4) $P^{\gamma}T = constant$

15. **Work done to increase the temperature of 1 mole of an ideal gas by 30°C, if it is expanding under the condition** $V \alpha T^{2/3}$ **is** $(R = 8.314\, J/mole/°K)$
1) 116.2 J 2) 136.2J 3) 166.2 J 4) 186.2 J

16. **Sum of magnitude of two forces is 25N. The resultant of these forces is normal to the smaller force and has a magnitude of 10N. Then the forces are**
1) 14.5N, 10.5N 2) 16N, 9N 3) 13N, 12N 4) 20N, 5N

17. **An electric field is expressed as** $\vec{E} = 2\hat{i} + 3\hat{j}$. **The potential difference** $(V_A - V_B)$ **between two points A and B whose positions vectors are given by** $r_A = \hat{i} + 2\hat{j}$ and $r_B = 2\hat{i} + \hat{j} + 3\hat{k}$ **is**
1) -1 V 2) 1 V 3) 2 V 4) 3 V

18. **The velocity and time graph for a particle moving line is shown, then the average velocity between t=4s and t=6s is**



1) 10.5 m/s 2) 12.5 m/s 3) 7.5 m/s 4) 9.5 m/s

19. **A rod of mass 2kg and length 2m is rotating about its one end O with an angular velocity** $\omega = 4$ **rad/s. Find angular momentum of the rod about the axis rotation**

1) $\frac{42}{3} kg - m^2/s$ 2) $\frac{32}{3} kg - m^2/s$ 3) $\frac{22}{3} kg - m^2/s$ 4) $\frac{10}{3} kg - m^2/s$

20. **A disc of moment of inertia I_1 is rotating freely with angular velocity ω_1 when a second, non-rotating disc with moment of inertia I_2 is dropped on it gently the two then rotate as a unit. Then the total angular speed is :**
(1) $\frac{I_1\omega_1}{I_2}$ (2) $\frac{I_2\omega_1}{I_1}$ (3) $\frac{I_1\omega_1}{I_2 + I_1}$ (4) $\frac{(I_1 + I_2)\omega_1}{I_2}$

21. **A body of mass 10kg is acted upon by a given equation** $F = 3t^2 - 30N.$ **The initial velocity of the body is 10m/s. The velocity of the body after 5s is**
1) 4.5 m/s 2) 6 m/s 3) 7.5 m/s 4) 5 m/s

22. **Two particles of equal mass move in a circle of radius *r* under the action of their mutual gravitational attraction. If the mass of each particle is *M*, the speed of each particle is**
1) $\sqrt{\frac{GM}{r}}$ 2) $\sqrt{\frac{GM}{2r}}$ 3) $\sqrt{\frac{GM}{4r}}$ 4) $\sqrt{\frac{2GM}{r}}$

23. A certain organ pipe, three successive resonance frequencies are observed at 425, 595 and 765Hz respectively. The length of the pipe is (velocity of sound 340m/s)

1) 2m 2) 1.5m 3) 1m 4) 0.5m

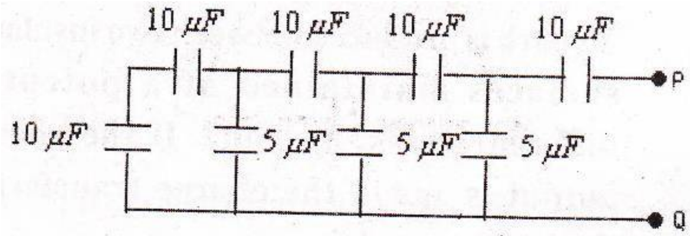
24. Two stationary sources A and B are sounding notes of frequency 680 Hz. A listener moves from A to B with a constant speed 'u'. If the speed of sound in air is 340 m/s. What must be the value of 'u' so that he hears 5 beats per second.

1) 1.0 m/s 2) 1.25 m/s 3) 1.5 m/s 4) 1.75 m/s

25. Two point charges +8μC and +12μC repel each other with a force of 48N. When an additional charge of -10μC is given to each of these charges then the new force is (the distance between charges are same)

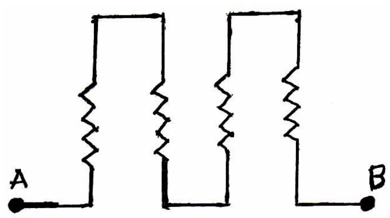
1) 24N (Repulsive) 2) 24N (Attractive) 3) 2N (Repulsive) 4) 2N (Attractive)

26. The equivalent capacitance between P and Q is



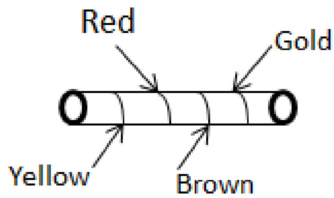
1) 10μF 2) 5μF 3) 20μF 4) 15μF

27. Four identical wires each having resistance R are connected as shown equivalent resistance between A and B is



1) R/4 2) R/2 3) R 4) 4R

28. Figure shows a colour coded resistor what is the resistance of the resistor



1) $420\Omega \pm 5\%$ 2) $340\Omega \pm 10\%$ 3) $270\Omega \pm 20\%$ 4) $240\Omega \pm 10\%$

29. A magnetized straight wire has a magnetic moment M. If it is bent in to a semi circular arc, its magnetic moment becomes

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

30. Two straight long parallel conductors 10cm apart, carry equal currents of magnitude 3A in the same direction. Then the magnetic induction at a point midway between them is

1) $2\times10^{-5}T$ 2) $3\times10^{-5}T$ 3) zero 4) $4\times10^{-5}T$

31. The magnetic flux linked with a closed coil is increased to a maximum value in 2s and its relation with time is $\phi = at^2 + bt + c$ then relation between a, b and c is

1) $a = -b$ 2) $a = -\frac{b}{4}$ 3) $a + b = c$ 4) $ac = \frac{b}{2}$

32. The number of turns in primary and secondary coils of a transformer is 50 and 200. If the current in the primary coil is 4A, then the current in the secondary coil is

1) 1A 2) 2A 3) 4A 4) 5A

33. During the propagation of electromagnetic waves in a medium

1) Electric energy density is double of the magnetic energy density
2) Electric energy density is half of the magnetic energy density
3) Electric energy density is equal to the magnetic energy density
4) Both electric and magnetic energy densities are zero

34. The energy that should be added to an electron to reduce its de-Broglie wavelength from 1nm to 0.5nm is

1) 4 times to the initial energy
2) equal to the initial energy
3) 2 times to the initial energy
4) 3 times to the initial energy

35. A galvanometer with a shunt in parallel is used in series in a circuit. Then it is called

1) ammeter
2) voltmeter
3) ohmmeter
4) multimeter

36. The stopping potentials were v_1 and v_2 volts with the incident light of wavelength λ and $\frac{\lambda}{2}$ respectively then

1) $v_1 < v_2 < 2v_1$
2) $v_2 > 2v_1$
3) $v_2 = 2v_1$
4) $v_2 < v_1$

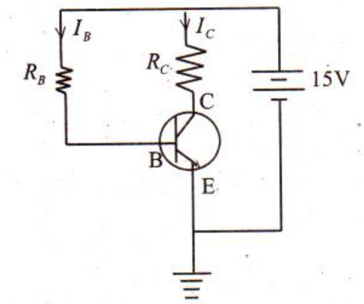
37. In the lowest energy level of hydrogen atom, electron has the angular momentum

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

38. Which of the following is emitted when $_{94}Pu^{239}$ decay in to $_{92}U^{235}$

1) Gamma ray
2) Neutron
3) Electron
4) Alpha particle

39. In the following common emitter circuit if
$\beta = 100,\ V_{CE} = 7V,\ V_{BE} = \text{Neglegible},\ R_C = 2k\Omega$, then $I_B = ?$

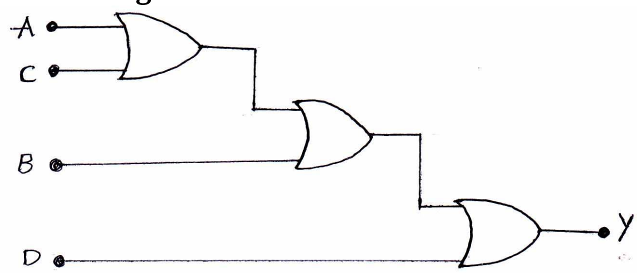


1) 0.01 mA
2) 0.04 mA
3) 0.02 mA
4) 0.03 mA

40. In a n-type semiconductor, the fermi energy level lies

1) In the forbidden energy gap nearer to the conduction band
2) In the forbidden energy gap nearer to the valence band
3) In the middle of forbidden energy gap
4) Outside the forbidden energy gap

41. The expression of Y in following circuit is



1) ABCD
2) A+BCD
3) A+B+C+D
4) AB+CD

42. The distance between an object and its real image formed by a lens is 'D'. If the magnification is 'm', the focal length of the lens is

1) $\left[\frac{m-1}{m}\right]D$ 2) $\frac{mD}{m+1}$ 3) $\frac{(m-1)D}{m^2}$ 4) $\frac{mD}{(m+1)^2}$

43. When an object is placed between two plane mirrors, then the number of images formed is

1) 2 2) 4 3) 8 4) infinite

44. The monochromatic light beams of intensity 16 and 9 units are interfering. The ratio of intensities of bright and dark parts of the resultant pattern

1) 16/9 2) 49/1 3) 7/1 4) 4/3

45. In YDSE for producing interference pattern, the fringe width depends on

a) wavelength **b) distance between the two slits**

c) distance between screen and the slits **d) distance between source and the slits**

1) a only 2) a and b 3) a, b and c 4) a, b and d

CHEMISTRY

46. The maximum number of electrons that can be present in an orbital with $S=+\frac{1}{2}$ and $l=2$

1) 1 2) 3 3) 5 4) 7

47. Which statement is wrong about Bohr's theory

1) Orbit is a three dimensional area where probability of finding electron is maximum

2) Orbit is a two dimensional track on which electron moves

3) Atom has definite boundary

4) Energies and angular momentum of orbits are quantized

48. Give the name of the inert gas atom in which the total number of d-electrons is equal to the difference in numbers of total p & s – electrons

1) Ar 2) Kr 3) Xe 4) Rn

49. In which of the following pairs the two species are not isostructural?

1) CO_3^{-2} and NO_3^- 2) PCl_4^+ and $SiCl_4$ 3) PF_5 and BrF_5 4) AlF_6^{3-} and SF_6

50. What is the dominant intermolecular force or bond that must be overcome in converting liquid CH_3OH to a gas?

1) Covalent bonds 2) Dipole-dipole interaction

3) London dispersion forces 4) Hydrogen bonding

51. Volume occupied by one molecule of water (density = 1gm cm^{-3})

1) $3.0\times10^{-23}cm^3$ 2) $5.5\times10^{-23}cm^3$ 30 $6.023\times10^{-23}cm^3$ 4) $9.0\times10^{-23}cm^3$

52. When N_2 is converted into NH_3, the equivalent weight of nitrogen will be

1) 1.67 2) 2.67 3) 3.67 4) 4.67

53. Which is not a property of H_2O_2

1) Conc. H_2O_2 solution is acidic in nature 2) H_2O_2 is a planar molecule

3) H_2O_2 is an excellent solvent for electrolysis 4) H_2O_2 is a diamagnetic

54. Read the following statements

I) Cs^+ is highly hydrated

II) Li has highest melting point among Li, Na, K & Rb

III) In alkali metals only Li forms nitride

The correct statements are

1) I & II 2) II & III 3) I & III 4) I, II & III

55. Solution of azeotropic nitric acid contain

1) 32% HNO_3, 68% H_2O by mass 2) 50% HNO_3, 50% H_2O by mass

3) 68% HNO_3, 32% H_2O by mass 4) 30% HNO_3, 70% H_2O by mass