SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

Time: 3 Hours | **NEET TOT GT-2** | **Max. Marks: 720 M**

PHYSICS

1. A physical quantity 'A' is related to four observations a, b, c and d as follows, $A=\frac{a^3b^2}{\sqrt{c}d^5}$. The percentage errors of measurement in a, b, c and d are 1% , 3%, 2 % and 2% respectively . What is the percentage error in the quantity A?

1) 14 % 2) 20 % 3) 16 % 4) 18 %

2. The X and Y coordinates of a particle at any time t are given by $x=10t+6t^2$ and y = 8t, where x and y are in meter and t in seconds. The acceleration of particle at t = 5s is

1) $16ms$ 2) $10ms^{-2}$ 3) $12ms^{-2}$ 4) $16ms^{-2}$

3. A body is projected with velocity u such that is horizontal range and maximum vertical heights are same: The horizontal range is

1) $\frac{8u^2}{17g}$ 2) $\frac{16u^2}{17g}$ 3) $\frac{4u^2}{17g}$ 4) $\frac{14u^2}{16g}$

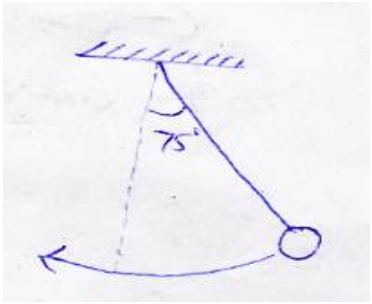
4. A ball of mass 'm' moving with a speed u undergoes a head –on elastic collision with a ball of mass 'nm' initially at rest. The fraction of the initial kinetic energy transferred to the heavier ball is

1) $\frac{4n}{(2+3n)^2}$ 2) $\frac{4n}{(1+n)^2}$ 3) $\frac{4n}{(3+n)^2}$ 4) $\frac{4n}{(5+n)^2}$

5. A body of mass 4 kg is rotating in a vertical circle of radius 1 m. What will be the difference in its kinetic energy at the top and bottom of the circle?
($g=10ms^{-2}$)

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

6 A pendulum of length $l=1m$ is released from $\theta=75^0$. The rate of change of speed of the bob at $\theta=60^0$ is ($g=10ms^{-2}$)



1) $5m/s^2$ 2) $2.5m/s^2$ 3) $5\sqrt{3}m/s^2$ 4) $2.5\sqrt{3}m/s^2$

7. Theorem of perpendicular axes is applicable for

1) Planar bodies only 2) Regular shaped bodies only
3) Three dimensional bodies only 4) Any body having mass

8. A rope is wound around a hollow cylinder of mass 6 kg and radius 50 cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30 N ?

1) $5rad/s^2$ 2) $10rad/s^2$ 3) $25\ rad/s^2$ 4) $5\ rad/s^2$

9. Let V_g and E_g denote gravitational potential and gravitational field respectively. Then the wrong statement is

1) V_g =0, $E_g=0$ 2) $V_g\neq0$, $E_g=0$ 3) $V_g\neq0, E_g\neq0$ 4) V_g =0, $E_g\neq0$

10. **A body of mass 'm' is taken from the earth's surface to the height equal to thrice the radius of theearth (R) . The change in potential energy of body will be**

1) $\frac{3}{4}MgR$ 2) $\frac{5}{4}mgR$ 3) $\frac{5}{4}MgR$ 4) $\frac{3}{4}mgR$

11. **A particle executes linear SHM with an amplitude of 5 cm . When the particle is at 3 cm from the mean position, the magnitude of the velocity is equal to that of its acceleration . Then it's time period in seconds is**

1) $\frac{3\pi}{5}$ 2) $\frac{5\pi}{3}$ 3) $\frac{2\pi}{3}$ 4) $\frac{3\pi}{2}$

12. **On increasing temperature and mixing impurities, the elasticity of a material**

1) Increases, Increases 2) Decreases, Decreases
3) Increases, Decreases 4) Decreases, Increases

13. **Water is moving with a speed of** $3.5ms^{-1}$ **through a pipe with a cross – sectional area of** $2.2cm^2$ **. The water gradually descends 9.66 m as the pipe increase in area to 7.7** cm^2 **. The speed of flow at lower level is**

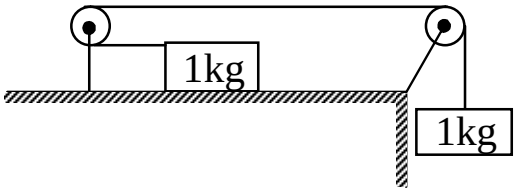
1) $4ms^{-1}$ 2) $3ms^{-1}$ 3) $2ms^{-1}$ 4) $1ms^{-1}$

14. **The capacity of a vessel is 3 liters. It contains 16 gmoxygen, 14 gm nitrogen and 44 gm mixture** (N_2O) **at** 27^0 **C . If R= 8.3 J/moleK Then pressure in the vesselwill be**

1) $8.3X10^5\,Pa$ 2) $16.6X10^5\,Pa$ 3) $24.9X10^5\,Pa$ 4) $33.2X10^5\,Pa$

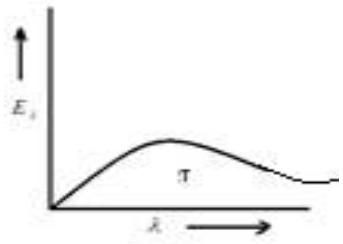
15.

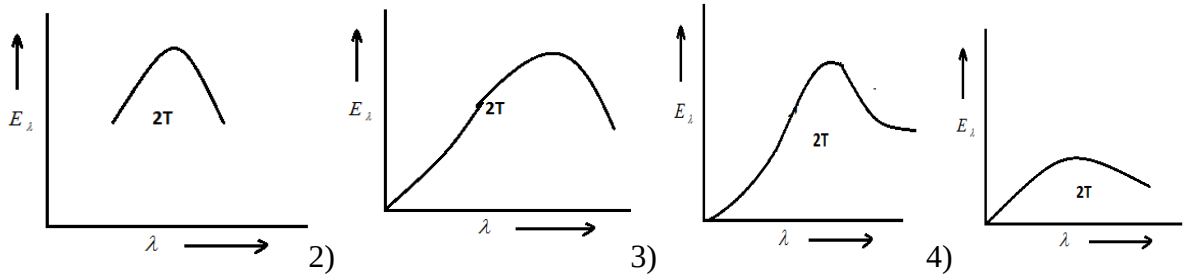
A block of mass 1 kg is placed on a rough horizontal surface connected by a light string passing over two smooth pulleys as shown. Another block of 1 kg is connected to the other end of the string. The acceleration of the system is (coefficient of friction μ = 0.2)



1) $0.8\,g$ 2) $0.4\,g$ 3) $0.5\,g$ 4) zero

16. **If the curve for a black body at temperature T is as shown in the figure , then the curve at temperature 2T will be**





1) 2) 3) 4)

17. **The coefficient of performance of a refrigerator is 6. If the temperature inside freezer is-** 20^0C **, the temperature of the surroundings to which it rejects heat is (app)**

1) 12^0C 2) 22^0C 3) 32^0C 4) 42^0C

18. **The internal energy in a system that has absorbed 2kal of heat and done 1400 J of work is**

1) $6000J$ 2) $7000J$ 3) $8000J$ 4) $9000J$

19. **A rocket is moving at a speed of $220ms^{-1}$ towards a stationary target, emits a sound of frequency 1000 Hz . Some of the sound reaching the target gets reflected back to the rocket asan echo. The frequency of the echo as detected by the rocket is (velocity of sound=$330ms^{-1}$)**

1) 3500 HZ 2) 4000 HZ 3) 4500 HZ 4) 5000 Hz

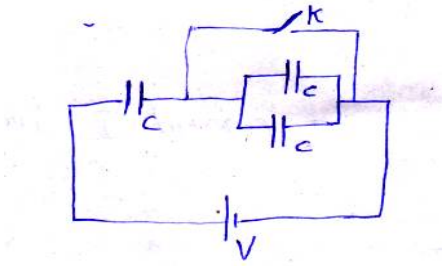
20. **A string of length l is fixed at both ends and is vibratingin second harmonic. The tension in string is T and linear mass density of string is μ. The ratio of magnitude of maximum velocity of particle and the magnitude of maximum acceleration is**

1) $\frac{1}{2\pi}\sqrt{\frac{\mu l^2}{T}}$ 2) $2\pi\sqrt{\frac{\mu l^2}{T}}$ 3) $\frac{1}{2\pi}\sqrt{\frac{T}{\mu l^2}}$ 4) $2\pi\sqrt{\frac{T}{\mu l^2}}$

21. **An $\alpha-$ particle of mass $6.4X10^{-27}$ kg is situated in a uniform electric field of $1.6X10^5Vm^{-1}$ The velocity of the particle at the end of 10^{-2}m path when it starts from rest is**

1) $2\sqrt{2}X10^5ms^{-1}$ 2) $4\sqrt{2}X10^5m/s$ 3) $2X10^5ms^{-1}$ 4) $4X10^5ms^{-1}$

22. **The charge following through the cell on closing the key K is equal to**



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

23. **The electric potentials at a point (x, y, z) is given by $v=-x^3y-xz^3+4y+10$. The electric field $\overline{E}$ at that point is**

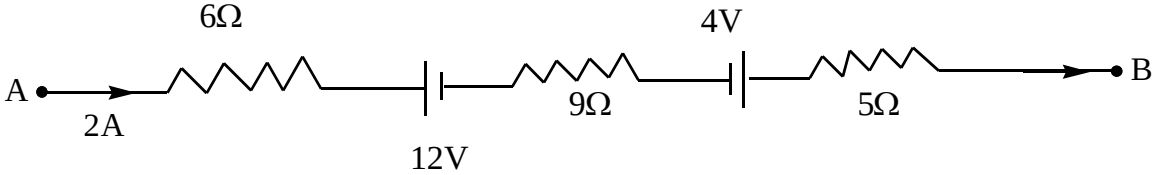
1) $\left(3x^2y+z^3\right)i+\left(x^3+4\right)j+\left(3xz^2\right)k$ 2) $\left(3x^2y-z^3\right)i+\left(x^3+4\right)j+\left(3xz^2\right)k$

3) $\left(3x^2y+z^3\right)i+\left(x^3-4\right)j+\left(3xz^2\right)k$ 4) $\left(3x^2y-z^3\right)i+\left(x^3-4\right)j+\left(3xz^2\right)k$

24. **A particle describes a horizontal circle on the smooth surface of an inverted cone. The plane of the circle is at a height of h m above the vertex, Then the speed of the particle is**

1) $\sqrt{\frac{h}{g}}$ 2) $\sqrt{gh}$ 3) $\sqrt{\frac{gh^2}{R}}$ 4) $\sqrt{\frac{gR^2}{h}}$

25. **The potential difference between A and B in the following figure is**



1) 32 V 2) 48 V 3) 24 V 4) 14 V

26. **A bulb rated 200 V- 100 W is in series with another bulb rated 200 V – 50 W. If the voltage across the combination is 240 V. Then power consumed by 100 W bulb is**

1) 8 W 2) 12W 3) 16 W 4) 20 W

27. **A man runs towards a plane mirror at a rate of $6ms^{-1}$. If the mirror is at rest, his image will have a velocity (with respect to man)**

1) +12 ms^{-1} 2) -6ms^{-1} 3) 6ms^{-1} 4) -12ms^{-1}

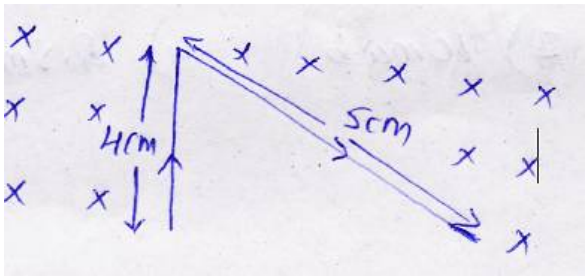
28. The permeability of a substance is $3.14X10^{-4}$ wb/Am. Find its relative permeability and susceptibility

1) 500, 499 2) 300, 299 3) 200, 199 4) 250, 249

29. Unpolarised light falls on two polarizing sheets placed one on top of the other. What must be the angle between the characteristic directions of the sheets if the intensity of the final transmitted light is one-third the maximum intensity of the first transmitted beam?

1) $\cos^{-1}\left(\frac{1}{4}\right)$ 2) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ 3) $\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)$ 4) $\cos^{-1}\left(\sqrt{\frac{2}{3}}\right)$

30. A uniform conducting wire ABC has mass 10g. A current of 2 A flows through it. The wire is kept in a magnetic field of 4T. Neglecting gravity, acceleration of wire will be



1) Zero 2) $0.6ms^{-2}$ along y –axis

3) $1.2ms^{-2}$ along y –axis 4) $24\ ms^{-2}$ along y –axis

31. A galvanometer gives a full scale deflection when a current of 2 mA flows through it and the potential difference across its terminals is 4 mV. Which of the following resistors would be most suitable to convert it to give a full scale deflection for a current of 2 A ?

1) 0.002Ω in parallel 2) 0.002Ω in series 3) 0.004Ω in parallel 4) 0.004Ω in series

32. There are two coils A and B separated by some distance. If a current of 4 A flows through A, a magnetic flux of $10^{-2}Wb$ passes through B (no current through B). If no current passes through A and a current of 3A passes through B, what is the flux through A?

1) 5mWb 2) 7.5 m Wb 3) 10 mWb 4) 2.5m Wb

33. In a coil of area 20 cm^2 and 5 turns with a magnetic field directed perpendicular to the plane and is changing at the rate of 10^8 gauss/second. The resistance of the coil is 50Ω. The current in the coil will be

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

34. In a circuit the frequency is $f = \frac{25}{\pi} Hz$ and the inductance is 2H, then the reactance and admittance will be

1) 1,1 2) 10, 0.1 3) 100, 0.01 4) 1000, 0.001

35. In a step – down transformer having primary to secondary turn ratio 10:1, the input voltage applied is 250V and output current is 10 A. Assuming 100% efficiency, calculate the voltage acrosssecondary coil current in primary coil and power output.

1) $V_s = 2500V\ I_p = IA \quad P_0 = 250W$ 2) $V_s = 125V\ I_p = IA \quad P_0 = 25W$

3) $V_s = 2500V\ I_p = IA \quad P_0 = 250W$ 4) $V_s = 25V\ I_p = IA\ P_0 = 250W$

36. The electric field strength in an electromagnetic wave is 600 Vm^{-1} the magnitude of magnetic field strength will be

1) 200 T 2) 200 mT 3) 2 μT 4) 2 Mt

37. **In a plane electromagnetic wave, the electric field oscillates sinusoidally at a frequency of $2X10^{10}\,Hz$ and amplitude 48 Vm^{-1}. The total energy density of the electromagnetic wave is**

1) $7805X10^{-8}\,J/m^3$ 2) $1X10^{-8}\,J/m^3$ 3) $7805X10^{-10}\,J/m^3$ 4) $1X10^{-12}\,J/m^3$

38. **The de- Broglie wavelength associated with an electron moving with a speed of $3.3X10^{6}\,ms^{-1}$ ($h = 6.6X10^{-34}\,Js$)**

1) 0.22nm 2) $0.22\,\mu$m 3) 0.44mm 4) 0.44nm

39. **A charged particle is moving in a uniform magnetic field in a circular path. The energy of the particle is tripled. If the initial radius of the circular path was R, the radius of the circular path after the energy is tripled will be**

1) 3 R 2) 9 R 3) 27 R 4) $\sqrt{3}$ R

40. **When $_{92}U^{238}$ transforms to $_{85}U^{210}$, then the numbers of the emitted α and β particles are respectively**

1) $7\alpha, 8\beta$ 2) $8\alpha, 7\beta$ 3) $7\alpha, 7\beta$ 4) $8\alpha, 8\beta$

41. **The output Y of the logic circuit shown in figure is**

1) $\overline{A.\overline{B}+C}$ 2) $\overline{A+\overline{B}.C}$ 3) $\overline{A}.\overline{B.C}$ 4) $\overline{A}+\overline{B.C}$

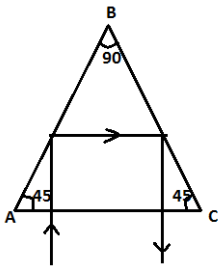
42. **In a full wave rectifier, input as frequency 'υ'. The output frequency of current is**

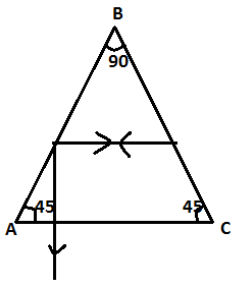
1) $\frac{\vartheta}{2}$ 2) ϑ 3) 2ϑ 4) 3ϑ

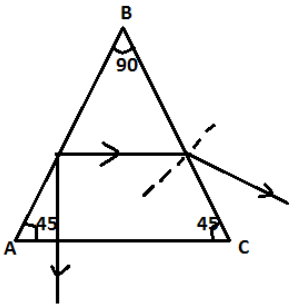
43. **With a concave mirror, an object is placed at a distance y_1 from the principal focus, on the principal axis. The image is formed at a distance y_2 from the principal focus. The focal length of the mirror is**

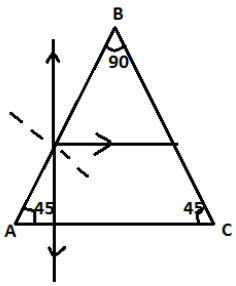
1) $y_{1,}y_2$ 2) $\sqrt{y_{1,}y_2}$ 3) $\frac{y_1+y_2}{2}$ 4) $\frac{y_1}{y_2}$

44. **The refractive index of a material of a prism of angles 45^0 -45^0-90^0 is $\frac{3}{2}$. The path of the ray of light incident normally on the hypotenuse side is shown as**

1) 

2) 

3) 

4) 

45. **In YDSE, the two slits are separated by 0.1mm and they are 0.5 m from the screen. The wavelength of light used in 5000A . Find distance between 7^{th} maxima and 11^{th} minima on the screen**

1) 8.75 m 2) 8.75 mm 3) $8.75\,\mu$m 4) 8.75 nm