NEET PAPER -1

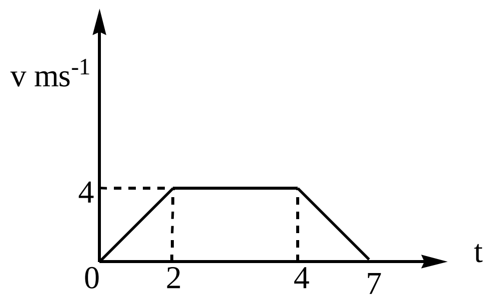
PHYSICS

Pattern of the Entrance Test:-

1) The Entrance Test shall consist of one paper containing 180 objective type questions (four options with single correct answer) from Physics, Chemistry and Biology (Botany & Zoology) to be answered on the specially designed machine-gradable sheet using Ball Point Pen only. The duration of paper **would be 03 hours**

2) Each item carries **4 marks**. For each correct response the candidate will get 4 marks. For each **incorrect response one mark** will be deducted from the total score.

1. **Figure given hare shows the variation of velocity of a particle with time. Average velocity during the motion is __________**



1) $\frac{20}{7} m/s$ 2) $\frac{18}{7} m/s$ 3) $\frac{36}{7} m/s$ 4) $\frac{12}{7} m/s$

2. **The centre of mass of a system of three particles of masses 1g ; 2g and 3 g is taken as the origin of the coordinate system. The position vector of a fourth particle of mass 4g such that the centre of mass of the four particle system lies at the point (1, 2, 3) is** $\alpha\left(\hat{i}+2\hat{j}+3\hat{k}\right)$**, where '$\alpha$' is a constant. The value of 'α' is**

1) $\frac{10}{3}$ 2) $\frac{5}{2}$ 3) $\frac{1}{2}$ 4) $\frac{2}{5}$

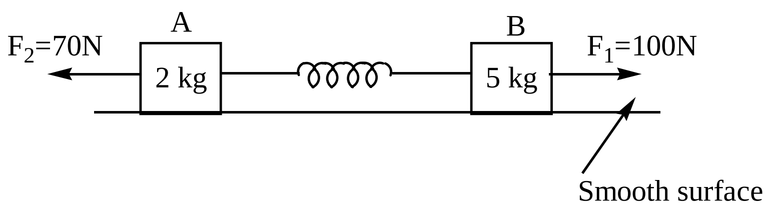
3. **A small object of uniform density rolls up a curved surface with an initial velocity 'υ'. It reaches upto a maximum height of $\frac{3\upsilon^2}{4g}$ with respect to the initial position. What is that object ?**

1) Ring 2) Solid sphere 3) Hollow sphere 4) Disc

4. **A projectile is fired on a horizontal ground. Coefficient of restitution between the projectile and the ground is e. The ratio of horizontal range $\left[\frac{R_1}{R_2}\right]$ in first two collisions with the ground is**

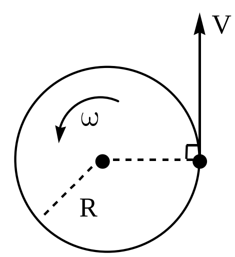
1) 1/e 2) $1/e^2$ 3) e 4) e^2

5. **Two constant horizontal forces F_1 and F_2 are acting on the blocks 'A' and 'B' as shown in the figure. At an instant acceleration of block 'B' is $4\ m/s^2$ in the direction of F_1, then the acceleration of block A with respect to block 'B' at this moment is**



1) $1\ m/s^2$
2) $2\ m/s^2$
3) $5\ m/s^2$
4) $9\ m/s^2$

6. **A child with mass 'm' is standing at the edge of a merry-go-round with moment of inertia I, radius 'R' and initial angular velocity ω, as shown in figure. The child jumps off the edge of the merry-go-round with a velocity 'υ' with respect to the ground in a direction tangent to periphery of the disc as shown. The new angular velocity of the merry-go-round is**



1) $\sqrt{\frac{I\omega^2 - m\upsilon^2}{I}}$ 2) $\sqrt{\frac{\left(I + mR^2\right)\omega^2 - m\upsilon^2}{I}}$

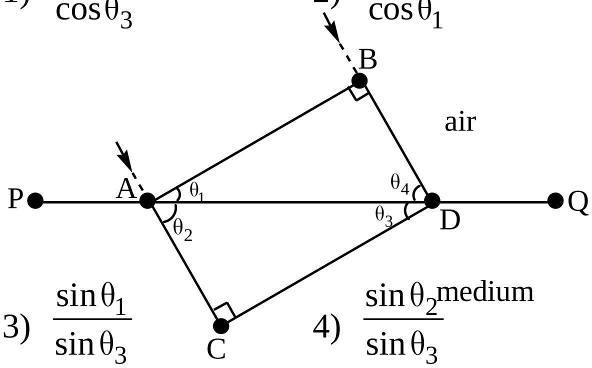
3) $\frac{I\omega - m\upsilon R}{I}$ 4) $\frac{\left(I + mR^2\right)\omega - m\upsilon R}{I}$

7. **When a proton is released from rest in a room, it starts with an initial acceleration a_0 towards west. When it is projected towards north with a speed v_0, it moves with an initial acceleration $3a_0$ towards west. The electric and magnetic fields in the room are respectively.**

1) $\frac{ma_0}{e}$ west ; $\frac{2ma_0}{ev_0}$ upwards
2) $\frac{ma_0}{e}$ west ; $\frac{2ma_0}{ev_0}$ downwards
3) $\frac{ma_0}{e}$ east ; $\frac{3ma_0}{ev_0}$ upwards
4) $\frac{ma_0}{e}$ east ; $\frac{3ma_0}{ev_0}$ downwards

8. **The adjoining figure represents a wavefront 'AB' which passes from air to another transparent medium and produces a new wavefront 'CD' after refraction. 'PQ' is the boundary between air and the medium. The refractive index (μ) of the transparent medium is**

1) $\frac{\cos\theta_1}{\cos\theta_3}$
2) $\frac{\cos\theta_4}{\cos\theta_1}$



3) $\frac{\sin\theta_1}{\sin\theta_3}$
4) $\frac{\sin\theta_2}{\sin\theta_3}$

9. **A convex lens of refractive index 1.5 has a radius of curvature of magnitude 20 cm. Which one of the following options describe best about the image formed, whose object is of height 2 cm placed 30 cm from the lens ?**

1) Virtual ; upright ; height = 0.5 cm
2) Real ; inverted ; height = 4 cm
3) Real ; inverted ; height = 1 cm
4) Virtual ; upright ; height = 1 cm

10. **The half-life of a radioactive isotope 'X' is 20 years. It decays to another element 'Y' which is stable. The two elements X and Y were found to be in the ratio 1 : 7 in a sample of a given rock. The age of the rock is estimated to be**

1) 40 years
2) 60 years
3) 80 years
4) 100 years

11. **A piece of iron is heated in a flame. It first becomes dull red, then becomes reddish yellow and finally turns to white hot. The correct explanation for the above observation is possible by using**

1) Stefan's law
2) Wein's displacement law
3) Kirchoff's law in thermal radiation
4) Newton's law of cooling

12. **Assertion (A) : In the case of projectile motion, the rate of change in magnitude of potential energy of the particle first decreases and then increasing during motion.**

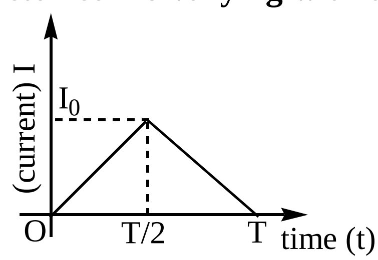
Reason (R) : In the case of projectile motion, the rate of change of linear momentum of a particle remains constant during motion.

1) A and R are true and R is the correct explanation of A.
2) A and R are true and R is not the correct explanation of A.
3) A is true, R is false.
4) A is false, R is true.

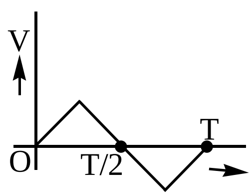
13. **A car of mass 'm' is accelerating on a level smooth road under the action of a single force F. The power delivered to the car is constant and equal to 'P'. If the velocity of the car at an instant is v, then after travelling how much distance its velocity becomes double ?**

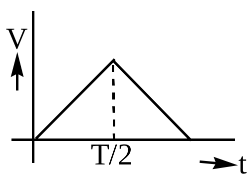
1) $\frac{7mv^3}{3P}$
2) $\frac{4mv^3}{3P}$
3) $\frac{mv^3}{P}$
4) $\frac{18mv^3}{7P}$

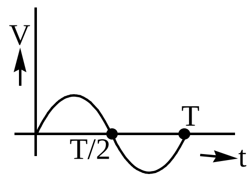
14. **The current (I) in the inductor coil is varying with time according to the plot shown in figure.**

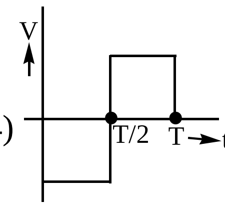


Which of the following is the correct variation of voltage with time in the inductor coil

1) 

2) 

3) 

4) 

15. **The upper half of an inclined plane of inclination 'θ' is perfectly smooth, while lower half is rough. A block starting from rest at the top of the plane will again came to rest at the bottom, the coefficient of friction between the block and lower half of the plane is**

1) $\mu = \frac{1}{\tan\theta}$ 2) $\mu = \frac{2}{\tan\theta}$ 3) $\mu = 2\tan\theta$ 4) $\mu = \tan\theta$

16. **A uniform ring of mass m is lying at a distance $\sqrt{3}\,a$ from the centre of a sphere of mass 'M', where 'a' is the radius of the ring as well as that of sphere. Then magnitude of gravitational force between them is**

1) $\frac{GMm}{8a^2}$ 2) $\frac{GMm}{\sqrt{3}\,a^2}$ 3) $\frac{\sqrt{3}\,GMm}{a^2}$ 4) $\frac{\sqrt{3}\,GMm}{8a^2}$

17. **By what percent the energy of a earth's satellite has to be increased to shift the satellite from an orbit of radius r to (3/2) r ?**

1) 15% 2) 20.3% 3) 66.7% 4) 33.33%

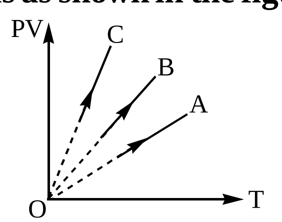
18. **A particle of mass 'm' is located in a one-dimensional conservative field, where the potential energy can be represented by U(x) = A(1 + cos Px) where A and P are constants. The period of small oscillations of the particle is**

1) $2\pi\sqrt{\frac{m}{AP}}$ 2) $2\pi\sqrt{\frac{m}{AP^2}}$ 3) $2\pi\sqrt{\frac{m}{A}}$ 4) $2\pi\sqrt{\frac{m}{A^2P}}$

19. **If the length of seconds pendulum is increased by 2%, then in a day the pendulum**

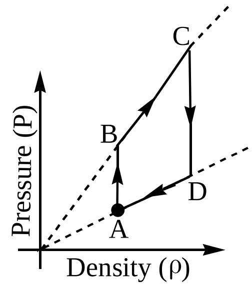
1) Loses 764 s 2) Loses 924 s 3) Gains 432 s 4) Loses 864 s

20. **PV versus T graph of equal masses of three different gases namely Hydrogen (H_2) ; Helium (He) and Oxygen (O_2) is as shown in the figure. Choose the correct alternative.**



1) A corresponds to O_2 ; B corresponds to He and C corresponds to H_2
2) A corresponds to He ; B corresponds to H_2 and C corresponds to O_2
3) A corresponds to He ; B corresponds to O_2 and C corresponds to H_2
4) A corresponds to O_2 ; B corresponds to H_2 and C corresponds to He

21. Pressure versus density graph of an ideal gas is as shown in the figure. Choose the correct option.

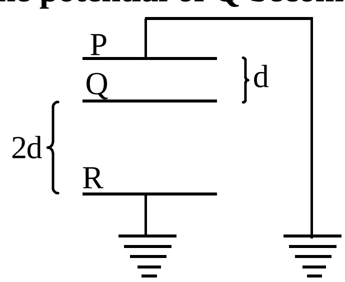


1) During the process AB workdone by the gas is positive
2) During the process AB workdone by the gas is negative
3) During the process BC internal energy of the gas is increasing
4) During the process DA internal energy of the gas remains constant

22. Three identical metallic uncharged spheres A, B and C of radius 'a' are kept at the corners of an equilateral triangle of side d(d >>> a). A fourth sphere of radius 'a' which has charge Q touches 'A' and then removed to a position faraway. 'B' is earthed and then the earth connection is removed. Now 'C' is earthed. The charge on the 'C' is

1) $\frac{Qa}{2d}\left(\frac{2d-a}{2d}\right)$ 2) $\frac{Qa}{2d}\left(\frac{2d-a}{d}\right)$ 3) $\frac{Qa}{2d}\left(\frac{a-d}{d}\right)$ 4) $\frac{2Qa}{d}\left(\frac{d-a}{2d}\right)$

23. From the diagram shown, area of each plate is $2m^2$ and $d = 2\times10^{-3}m$. A charge of $8.85\times10^{-8}C$ is given to the plate Q. Then the potential of Q becomes



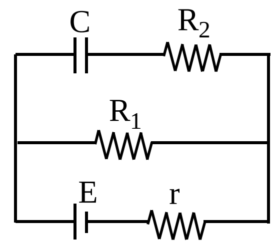
1) 13V 2) 10V

3) $\frac{20}{3}V$ 4) 8.85 V

24. Three conductors individually draw currents of 1A, 2A and 3A respectively, when connected across a battery. If they are joined in series and the combination is connected across the same battery, the current drawn will be

1) $\frac{6}{11}A$ 2) $\frac{1}{6}A$ 3) $\frac{4}{7}$ 4) $\frac{2}{7}$

25. For the circuit shown the charge on the capacitor will be



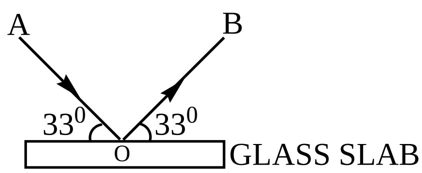
1) CE

2) $\dfrac{CE R_1}{R_1 + r}$

3) $\dfrac{CE R_2}{R_1 + r}$

4) $\dfrac{CE R_1}{R_2 + r}$

26. A beam of light is incident on a glass slab of refractive index, $\mu = 1.54$ in a direction as shown in the figure. The reflected light is analysed by a polaroid prism. On rotating the polaroid, (tan 57^0 = 1.54)



1) The intensity remains unchanged

2) The intensity is reduced to zero and remains at zero

3) The intensity gradually reduced to zero and then again increases

4) The intensity increase gradually

27. In feedback amplifier, feedback can be achieved by

A) Inductive coupling B) LC network C) RC network

1) Only A is correct
2) Only B is correct
3) Only C is correct
4) A, B and C are correct

28. Pick out the correct statements from the following.

I) Electron emission during $\beta-$ decay is always accompanied by neutrino

II) Nuclear force is charge independent

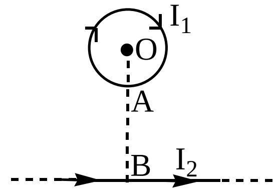
III) Fusion is cheif source of stellar energy

1) I, II are correct
2) I, III are correct
3) Only I is correct
4) II, III are correct

29. The increasing order of the frequency bands used for various communication services is

1) Space waves, sky waves, ground waves
2) Space waves, ground waves, sky waves
3) Sky waves, ground waves, space waves
4) Ground waves, sky waves, space waves

30. **In the diagram shown, I_1, I_2 are the strength of the currents in the loop and straight conductors respectively. OA = AB = R. The net magnetic field at the centre 'O' is zero. Then, the ratio of the currents in the loop and the straight conductor is**

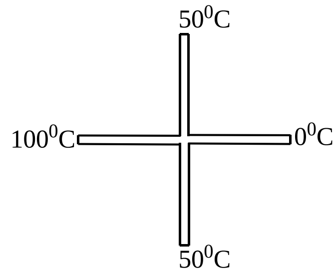


1) π 2) 2π 3) $\frac{1}{\pi}$ 4) $\frac{1}{2\pi}$

31. **A closed organ pipe of length L and an open organ pipe contain gases of densities ρ_1 and ρ_2 respectively. The compressibility of gases are equal in both the pipes. Both the pipes are vibrating in their first overtone with same frequency. The length of the open organ pipe is**

1) $\frac{L}{3}$ 2) $\frac{4L}{3}$ 3) $\frac{4L}{3}\sqrt{\frac{\rho_1}{\rho_2}}$ 4) $\frac{4L}{3}\sqrt{\frac{\rho_2}{\rho_1}}$

32. **Two similar rods are joined as shown in figure. Assume that no heat loss through lateral surface of rod and temperatures at the ends are shown in steady state. Then temperature of the junction is**



1) 50^0C
2) 75^0C
3) 66.6^0C
4) 33.3^0C

33. **A tap supplies water at 10^0C and another tap at 100^0C. How much hot water must be taken so that we get 20 kg of water at 35^0C.**

1) $\frac{40}{9}$ kg 2) $\frac{50}{9}$ kg 3) $\frac{20}{9}$ kg 4) $\frac{60}{9}$ kg

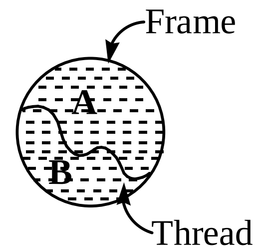
34. **In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows $P = \frac{a^3b^2}{cd}$; The percentage error in 'P' is**

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

35. **A material has poission's ratio 0.5. If a uniform rod of it suffers a longitudnal strain of 2×10^{-3}. Then the percentage change in the volume is**

1) 0.6 2) 0.4 3) 0.2 4) Zero

36. A thread is tied slightly loose to a wire frame as shown in figure and the frame is dipped into a soap solution and taken out. The frame is completely covered with the film. When 'A' is pricked



1) Thread will become concave on seeing from side 'A'

2) Thread will become concave on seeing from side 'B'

3) Thread will become straight

4) Thread will remain as it is

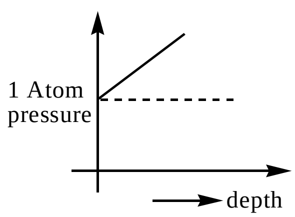
37. The end correction of a resonance column is 1cm. If the shortest length resonating with the tunnnig fork is 15cm. The next resonating length will be

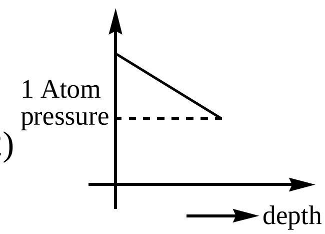
1) 31 cm 3) 45 cm 3) 46 cm 4) 47 cm

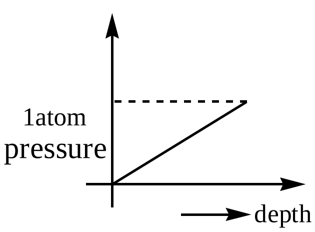
38. The root-mean-square (rms) speed of oxygen molecule at a certain absolute temperature is v. If the temperature is doubled and the oxygen gas dissociates into atomic oxygen, then the rms speed would be

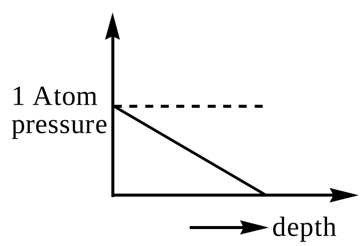
1) v 2) $\sqrt{2}$v 3) 2v 4) $2\sqrt{2}$v

39. A body submerged in the sea. Which of the following graphs represents correctly the variation of the pressure on the body with the depth?

1) 

2) 

3) 

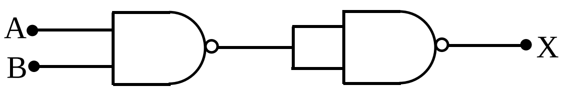
4) 

40. The Davisson-Germer experiment is the direct evidence of

1) Particle nature of electrons 2) Wave nature of electrons

3) Wave nature of light 4) Particle nature of light

41. The output (X) of the logic circuit shown in figure will be

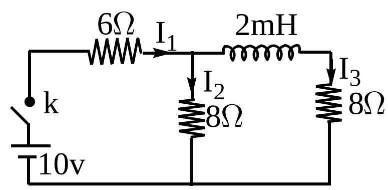


1) $X = \overline{\overline{A}}.\overline{\overline{B}}$ 2) $X = \overline{A.B}$ 3) $X = A.B$ 4) $X = \overline{A + B}$

42. The TV transmission tower in VIJAYAWADA has a height 150m. What is the total population covered by the TV tower, if the population density around the TV tower is $10^3(km)^{-2}$? (Radius of the earth is 6.4×10^6 m)

1) 60.288 lakh 2) 40.192 lakh 3) 100 lakh 4) 20.22 lakh

43. In the circuit shown in the figure, what is the value of I_1 just after pressing the key k ?



1) $\frac{5}{7}$A 2) $\frac{5}{11}$A

3) 1A 4) $\frac{5}{4}$A

44. de-Broglie wavelength of an electron in the nth Bohr orbit of hydrogen atom is λ_n and the angular momentum is J_n then

1) $\lambda_n \propto J_n$ 2) $\lambda_n \propto \frac{1}{J_n}$ 3) $\lambda_n \propto J_n^2$ 4) $\lambda_n \propto \sqrt{J_n}$

45. In a spring - block system force constant of the spring is k = 16 N/m, mass of the block is 1kg. Maximum kinetic energy of the block is 8J. Then pickout the wrong statement

1) Amplitude of oscillation is 1m

2) At half the amplitude potential energy stored in the spring is 2J

3) At half the amplitude kinetic energy is 6J

4) Angular frequency of oscillation is 16 rad/s

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