NEET PAPER -2
PHYSICS

Pattern of the Entrance Test:-

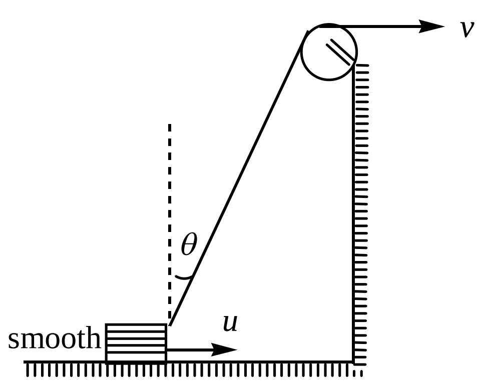
1) The Entrance Test shall consist of one paper containing 180 objective type questions (four options with single correct answer) from Physics, Chemistry and Biology (Botany & Zoology) to be answered on the specially designed machine-gradable sheet using Ball Point Pen only. The duration of paper **would 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. The dimensions of $\frac{h}{e}$ are same as that of (where h = planck's constant and e = charge)

1) Magnetic field induction
2) Magnetic flux
3) Electric field strength
4) Elctric flux

2. A block A is pulled on a smooth horizontal plane with a rope which moves with velocity υ as shown in figure. The velocity of the block on the plane 'u' is



1) $\upsilon \operatorname{cosec}\theta$
2) $\upsilon \sin \theta$
3) $\upsilon \cos\theta$
4) $\upsilon \sec\theta$

ROUGH

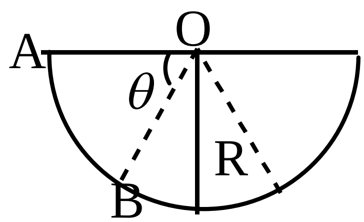
3. **Find the value of p so that $\left(2\hat{i}-\hat{j}+\hat{k}\right),\left(\hat{i}+2\hat{j}-3\hat{k}\right)$ and $\left(3\hat{i}+p\hat{j}+5\hat{k}\right)$ may be coplanar**

1) -8 2) -4 3) 2 4) 4

4. **A stationary body of mass 3kg explodes into three equal pieces. Two of the pieces fly off at at right angles to each other, one with a velocity $2\hat{i}$ ms^{-1} and the other with a velocity $3\hat{j}$ ms^{-1}. If the explosion takes plece in 10^{-5}s, the average force acting on the third piece in newton is**

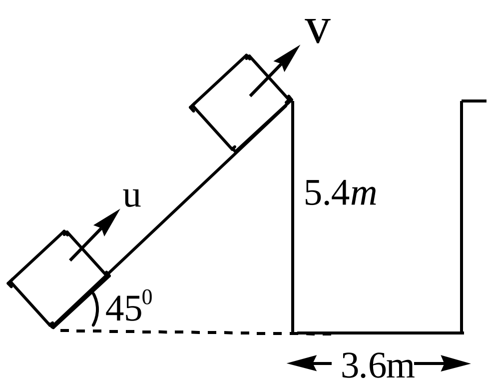
1) $\left(2\hat{i}+3\hat{j}\right)\times10^{-5}$ 2) $-\left(2\hat{i}+3\hat{j}\right)\times10^{5}$ 3) $\left(3\hat{j}+2\hat{i}\right)\times10^{5}$ 4) $\left(2\hat{i}-3\hat{j}\right)\times10^{-5}$

5. **A small particle of mass m is released from rest from point A on frictionless hemispherical bowl as shown in figure. The ratio of magnitude of centripetal force and normal reaciton on the particle at any point B is**



1) 2/3 2) 1/2 3) 2/3 4) 4/5

6. **A body is projected up a smooth inclined plane with velocity u from the point A as shown in fig. The height of the inclined plane is 5.4m and the top of the inclind plane is connected to a well of diameter 3.6m. the body just manages to cross the well. The value of u is (g= 10ms^{-2})**



1) 20ms^{-1} 2) 12ms^{-1} 3) 30ms^{-1} 4)54ms^{-1}

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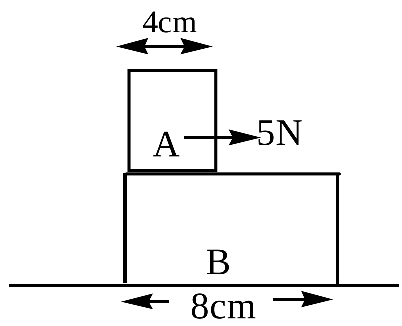
7. Two blocks, A of mass 1kg and another B of mass 2kg are shown in figure. A force of 5N is applied on A. Coefficient of friction between A and B is 0.2 and that between B and horizontal surface is zero. Find the time taken for the front face of A to coincide with that of B:



1) 2s 2) $\sqrt{\frac{8}{3}}s$ 3) $\sqrt{\frac{3}{8}}s$ 4) 0.2s

8. When a body is moving vertically up with constant velocity, then match the following

Column-I	Column -II
1) Work done by lifting force is	**A) Negative**
2) Total work done byall the forces is	**B) Positive**
3) Work done by gravity	**C) Zero**
4) Work done by lifting force + work done by gravity	**D) Higher positive values**

1) 1 - B, 2 - C, 3 - A, 4 - C 2) 1 - B, 2 - D, 3 - C, 4 - A
3) 1 - B, 2 - A, 3 - C, 4 - D 4) 1 - A, 2 - A, 3 - C, 4 - D

9. A ladder of length 6m and mass 40kg rests with its upper end against a smooth wall and lower end on rough ground. Find the minimum coefficient of friction between the ground and the ladder so that the ladder does not slip if the ladder makes an angel of 60^0 with the horizontal (take g =$10ms^{-2}$)

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

10. During the vapourization of some amount of water at 373K at atmospheric pressure which of the following statements is correct ?

a) Work is done by the steam – water system on the atmosphere
b) Work is done on the steam – water system by the atmosphere
c) The internal energy of the steam – water system increases
d) The internal energy of the steam – water system decreases

1. a, c only 2. b, d only 3. b, c only 4. a, d only

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11. Which of the following is not correct about the centre of mass?

1) It depends on the frame of reference

2) The angular momentum of a system about the centre of mass is always zero

3) Internal forces do not affect the motion of centre of mass

4) Centre of mass may or may not coincide with centre of gravity

12. Two billiard balls of the same size (radius r) and same mass are in contact on a billiard table. A third ball also of the same size and mass strikes them symmetrically and remains at rest after the impact. The coefficient of restitution between the balls is

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

13. Find the ratio of energy required to raise a satellite upto a height R (radius of earth) from the surface of earth to that required to put it into an orbit at that height.

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

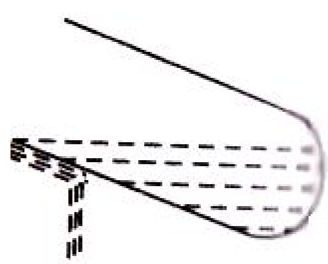
14. A wire is suspended vertically from a rigid support. When a weight W is hanged from its lower end, in air, the wire extends by 16cm. When the weigth is completely immersed in water, the extension reduces to 12cm. Then the relative density of the material of the weigth is

1) $5gcm^{-3}$ 2) $8gcm^{-3}$ 3) $4gcm^{-3}$ 4) $6gcm^{-3}$

15. A small block of wood of specific gravity 0.4 is submerged at a depth of 1.6m in a container containing water. The container is accelerated upward with an aceleration $\frac{g}{3}$. Then the time taken by the block to reach the surface when released with zero initial velocity is

1) 0.4s 2) 0.5s 3) 0.1s 4) 0.2s

16. When a liquid is poured, it insists to runs down the side of the can instead of falling straight down from the tip as shown in fig. This can be explained by



1) Viscosity 2) Surface tension

3) Bernoulli's principle 4) Newton's third law of motion

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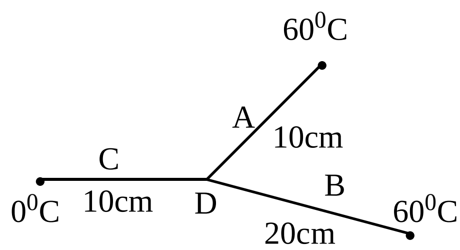
17. A flask with open mouth contains air at 27^0C. Find the temperature at which $\frac{2}{5}th$ mass of the air escapes the flask.

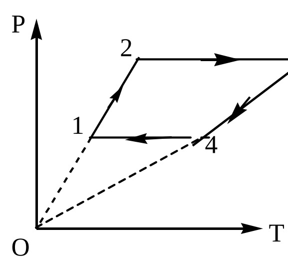
1) 227^0C 2) 300^0C 3) 246^0C 4) 273^0C

18. Three rods A, B and C made of the same material and having the same cross-section have lengths 10cm, 20cm and 10cm respectively. Their ends are at temperatures 60^0C, 60^0C and 0^0C as shown. Then the temperature of the junction D is



1) 30^0C 2) 36^0C 3) 50^0C 4) 40^0C

19. Three moles of an ideal monoatomic gas perform on cycle as shown. The gas temperatures in different states are T_1= 400K, T_2= 800K, T_3= 2400K & T_4=1200K. The work done by the gas during the cycles is approximately.



1) 10kJ 2) 20kJ 3) 30kJ 4) 15kJ

20. Assertion (A): Mean free path of the molecule of a gas varies inversely as the density of the gas

Reason (R): Mean free path varies inversely as pressure of the gas.

1) A and R are true and R is the correct explanation of A

2) A and R are true but R is not the correct explanation of A

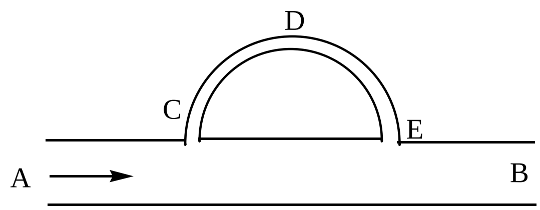
3) A is true but R is false 4) A is flase but R is true

21. A particle performs SHM with a period of 16s. At time t=2s, the particle passes through origin (MP), while at t=4s, its velocity is $4ms^{-1}$. Its amplitude is ______

1) $\left[\frac{32\sqrt{2}}{\pi}\right]$ **2)** $\left[\frac{16\sqrt{3}}{\pi}\right]$ **3)** $\left[\frac{24\sqrt{2}}{\pi^2}\right]$ **4)** $\left[\frac{16}{\sqrt{2}\pi}\right]$

ROUGH

22. **Speed of sound is 320m/s and frequency of sound wave entering at A is 500Hz. No sound is heard at B as shown in fig. Then the length of the curved path curved path CDE may be**



1) 16cm 2) 32cm 3) 48cm 4) 88cm

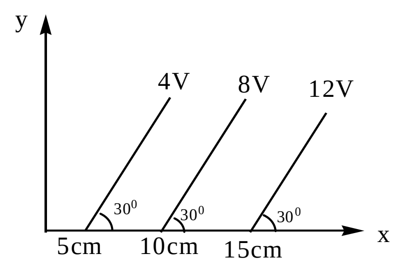
23. **A radar sends a radio signal of frequency** 9×10^{9} **Hz towards an aircraft approaching the radar. If the reflected wave shows a frequency shift of** 3×10^{3} **Hz, the speed with which the aircraft is approaching the radar in** ms^{-1} **[Velocity of the radio signal =** $3X10^{8}ms^{-1}$**]**

1) 150 2) 100 3) 50 4) 25

24. **Two similar charged spheres are suspended by strings of equal lengths. The strings make an angle of** 30^{0} **with each other. When suspended in a liquid of density 0.8gm/cc, the angle remains the same. What is the dielectric constant of the liquid ? Given density of material of the spheres =1.6gm/cc.**

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

25. **The equipotential lines and their positions in x –y plane are shown in figure. Find electric field internsity in this region**



1) 140 V/m 2) 160 V/m 3) 120 V/m 4) 180 V/m

26. **An electrical dipole is placed at the origin and is directed along the x-axis At a point P, far away from the dipole, the electric field is parallel to the y- axis. OP makes an angle** θ **with the x- axis then**

1) $\tan\theta=\sqrt{3}$ 2) $\tan\theta=\sqrt{2}$ 3) $\theta=45^{0}$ 4) $\tan\theta=\frac{1}{\sqrt{2}}$

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27. The LED, i.e., light emitting diode

a) is made from Ge or Si **b) is made from Ga As P**

c) is forward biased **d) is reverse biased**

1) a and b are correct 2) b and c are correct

3) a, b and c are correct 4) a, b and d are correct

28. Two radioactive materials X_1 and X_2 have decay constants 10λ and λ respectively. If initially they have the same number of nuclei, then the ratio of the number of nuclei of X_1 to that of X_2 will be 1/e after a time of

1) $\frac{1}{10\lambda}$ 2) $\frac{1}{11\lambda}$ 3) $\frac{11}{10\lambda}$ 4) $\frac{1}{9\lambda}$

29. Assertion (A): Free electrons in conductors do not acquire infinite velocity even after infinite time though acceleration is $a = \frac{eE}{m}$.

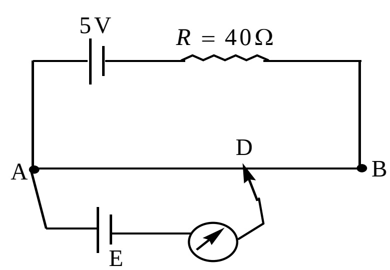
Reason (R): The velocity acquired by them becomes zero after every collision with the lattice sites

1) A and R are true and R is the correct explanation of A

2) A and R are true but R is not the correct explanation of A

3) A is true but R is false 4) A is flase but R is true

30. Resistance of potentiometer wire AB is 10Ω. This is in series with a battery of 5V and a resistance $R = 40\Omega$. The length of the potentiometer wire is 5m. The null point is obtained at 2m from the end A . Find emf 'E'.



1) 2V 2) 0.2V 3) 20mV 4) 0.4V

31. A tightly wound long solenoid of the radius r metre and number of turns per metre equal to n, carries a current of i amp. A paticle of mass m and charge q projected from a point on its axis in a direction at right angle to its axis. Find the maximum velocity of the particle so that it may not touch the solenoid

1) $\frac{\mu_0 nqri}{m}$ 2) $\frac{\mu_0 nqri}{4m}$ 3) $\frac{\mu_0 mnri}{2}$ 4) $\frac{\mu_0 riq}{2mn}$

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32. A galvanometer of 25Ω resistance can read a maximum currect of 6mA. It can be used as a voltmeter to measure maximum of 6V by connecting a resistance to the galvanometer. Identify the correct choice in the given answers.

1) 1025Ω in series 2) 1025Ω in parallel 3) 975Ω in series 4) 975Ω in parallel

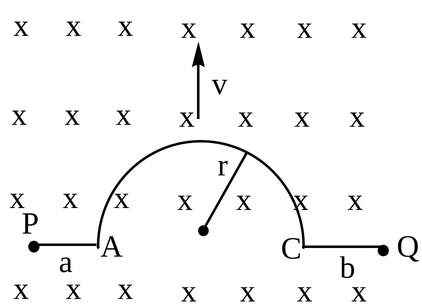
33. When a current is passed in a circular coil, neutral point is found to be at its centre and B_H at that place is $0.32\times10^{-4}T$. What will be the resultant magnetic field at the centre when the plane of the coil is turned though 90^0 ?

1) $0.32\times10^{-4}T$ 2) $0.64\times10^{-4}T$ 3) $0.45\times10^{-4}T$ 4) $0.16\times10^{-4}T$

34. The material suitable for making electromagnets should have:

1) High retentivity and high coercivity 2) Low retentivity and high coercivity
3) High retentivity and low coercivity 4) Low retentivity and low coercivity

35. The loop PQ, as shwon in figure moves with a velocity υ. Both loop and velocity are in the plane of paper and a magnetic field $\vec{B}$ exists in the region perpendicular to plane and directed inward. Find the emf induced between P and Q.



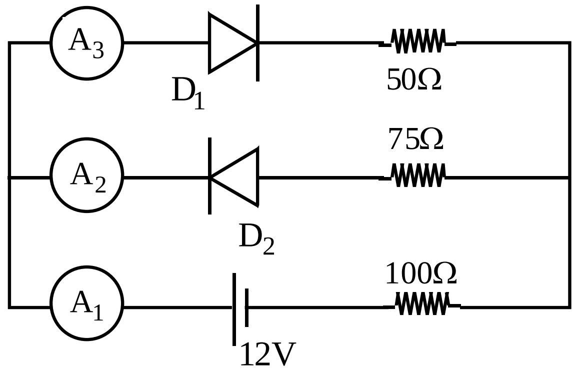
1) $B\upsilon 2r$ 2) $B(a+b+2r)\upsilon$ 3) $B(a+b+\pi r)\upsilon$ 4) $B\pi r\upsilon$

36. In ac a.c circuit, the current flowing is $i=5\sin(100t-\pi/2)$ A and the potential difference is $V=200\sin(100t)V$. The power consumption is equal to

1) 100W 2) 40W 3) 20W 4) 0W

ROUGH

37. In the given circuit each one of the diodes D_1 and D_2 has forward resistance of 40 ohm and infinite backward resistance. Each one of the ammeters A_1, A_2 and A_3 has internal resistance 5ohm. The readings of A_1A_2 and A_3 are respectively

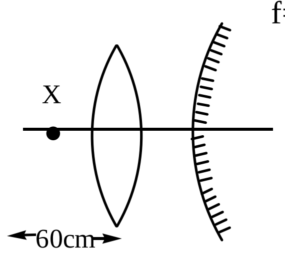


1) 0.06A, Zero, 0.04A
2) Zero, 0.08A, 0.03A
3) 0.06A, Zero, 0.06A
4) 0.03A, 0.08A, Zero

38. The electric field of an electromagnetic wave in a medium is given by $E_x = 0$, $E_y = 2.5\frac{V}{m}[\cos\left(2\pi\times10^{6}\,rads^{-1}\right)t-\left(\pi\times10^{-2}\,m^{-1}\right)x]$**, $E_z = 0$, The wave is**

1) Moving along x-direction with frequency 10^6 Hz and wavelength 100m
2) Moving along x-direction with frequency 10^6 Hz and wavelength 200m
3) Moving along -x-direction with frequency 10^6 Hz and wavelength 200m
4) Moving along y-direction with frequency 10^6 Hz and wavelength 200m

39. An object is placed at a distance of 60cm from the lens. A convex mirror is placed as shown. The image thus formed coincides with the object. The focal length of the lens and mirror are 20cm and 12cm respectively. Find the distance between the lens and the convex mirror



1) 6cm
2) 12cm
3) 24cm
4) 30cm

40. A driver uses a lens of power –1.25D for driving a car . The distance of far point of his eye is:

1) 125cm
2) 62.5cm
3) 80cm
4) 150cm

ROUGH

41. Modulation is required to

a) Distinguish different transmissions

b) Ensure that the information may be transmitted over long distances

c) Allow the information accessible for different people

1) a and b are true 2) b and c are true 3) c and a are true 4) a, b and c are true

42. A source emits electromagnetic waves of wavelength 3m. One beam reaches the observer directly and other after reflection from a water surface, travelling 1.5m extra distance and with intensity reduced to 1/4 as compared to intensity due to the direct beam alone. The resultant intensity will be

1) (1/4) fold 2) (3/4) fold 3) (5/4) fold 4) (9/4) fold

43. A particle of mass m at rest decays into two particles of masses m_1 and m_2 having non–zero velocities. The ratio of de broglie wavelengths of the particles $\frac{\lambda_1}{\lambda_2}$ is

1) $\frac{m_1}{m_2}$ 2) $\frac{m_2}{m_1}$ 3) 1 4) $\sqrt{\frac{m_2}{m_1}}$

44. What is the force exerted by a photon of intensity $1.4kWm^{-2}$, if it falls on a perfect absorber of radius 2 metre?

1) $5.88\times10^{-5}N$ 2) $10^{8}N$ 3) $8.35\times10^{4}N$ 4) $8.8\times10^{-8}N$

45. If the series limit of lymen series for hydrogen atom is equal to the series limit of Balmer series for a hydrogen like atom, then atomic number of this hydrogen like atom is

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

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