PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 47

Physics

1. A magnet is suspended in such a way that it oscillates in the horizontal plane. It makes 20 oscillations per minute at a place where dip

angle is 30° and 15 oscillations minute at a place where dip angle is 60°. The ratio of total earth's magnetic field at the two places is

A. $3\sqrt{3}:8$

B. $16:9\sqrt{3}$

C. $4:9$

D. $2\sqrt{3}:9$

Answer: B

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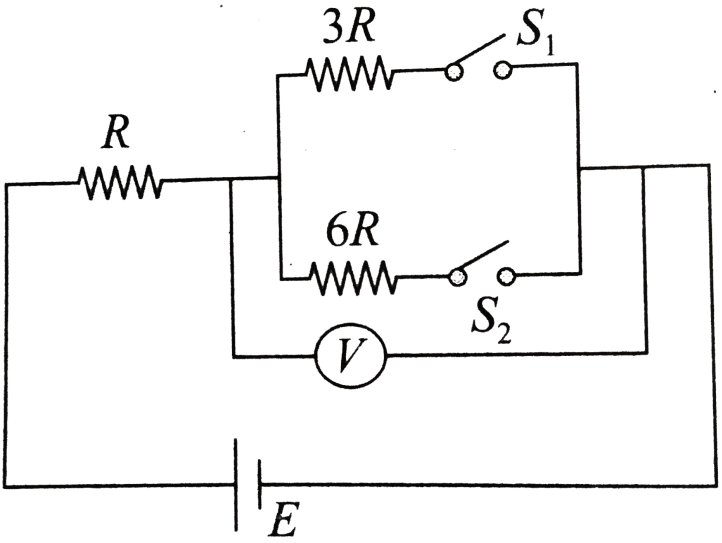
2. In the circuit shown in figure, reading of voltmeter is V_1 when only S_1 is closed, reading of voltmeter is V_2 when only S_2 is closed, and reading of voltmeter is V_3 when both S_1 and S_2 are closed. Then .



A. $V_3 > V_2 > V_3$

B. $V_2 > V_1 > V_3$

C. $V_3 > V_1 > V_2$

D. $V_1 > V_2 > V_3$

Answer: B

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3. The length of a potentiometer wire is 1m and its resistance is 4Ω A current of 5 mA is flowing in it. An unknown source of emf is

balanced on 40 cm length of this wire, then find the emf of the source.

A. 20Ω

B. 40Ω

C. 60Ω

D. 80Ω

Answer: C

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4. The magnetic flux through a coil varies with time as $\phi = 5t^2 + 6t + 9$ The ratio of emf at t = 3 s to t = 0 s will be

A. $9:1$

B. $1:6$

C. $6:1$

D. $1:9$

Answer: C

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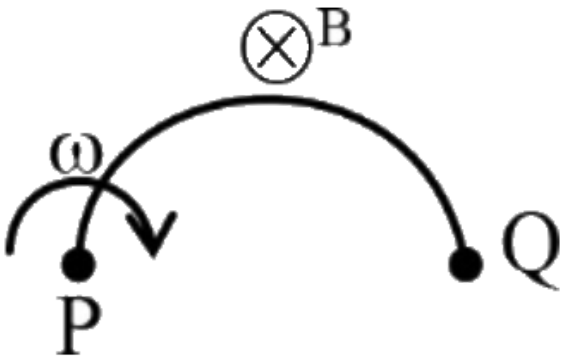
5. A wire is bent to form a semicircle of the radius a. The wire rotates about its one end with angular velocity ω . Axis of rotation is perpendicular to the plane of the semicircle . In the space , a uniform magnetic field of induction B exists along the aixs of rotation as shown in the figure . Then -



A. Potential difference between P and Q is equal to $2B\omega a^2$

B. Potential difference between P and Q is equal to $2\pi^2 B\omega a^2$

C. P is at higher potential than Q

D. none of these

Answer: A

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6. A body of mass 1g and carrying a charge 10^{-8}C passes from two points P and Q. P and Q are at electric potentials 600 V and 0 V respectively. The velocity of the body at Q is 20 cms^{-1}. It velocity in ms^{-1}at P is

A. $\sqrt{0.028}$

B. $\sqrt{0.056}$

C. $\sqrt{0.56}$

D. $\sqrt{5.6}$

Answer: A

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7. How much positive charge should be given to the earth so as to have the same potential as that of a positively charged sphere of $1\mu C$ and radius 1 cm . (Radius of earth = 6400km)

A. 600 C

B. 640 C

C. 340 C

D. 240 C

Answer: B

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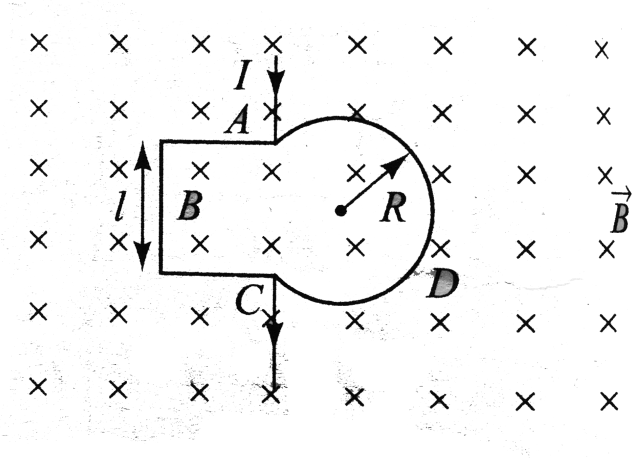
8. Figure. shows a conducting loop ABCDA placed in a uniform magnetic field (strength B) perpendicular to its plane. The part ABC is the (three-fourth) portion of the square of side length l. The part ADC is a circular arc of radius R. The points A and C are connected to a battery which supplies a current I to the circuit. The magnetic force on the loop due to

the field B is



A. zero

B. 2BIl

C. 2BIR

D. $\frac{BIlR}{I+R}$

Answer: B

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9. Choose the wrong statements

A. the radius of path of a charged particle moving in a uniform magnetic field is proportional to the momentum of the particle

B. an electron beam is moving towards east, on which a perpendicular magnetic

field is acting upwards . The beam will be deflected towards the north direction

C. a positive charge is going straight away from the observer. The magnetic line of force produced due to it are in clockwise direction.

D. while passing through a given place , the path of electron remains straight line . It can be definitely said that the magnetic field is not present at that place

Answer: D

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10. During total solar eclipse Fraunhoffer's lines appear bright because -

A. Moon totally covers both parts of sun photosphere and chromosphere .

B. Sun light is scattered by moon.

C. Moon blocks the radiations emitted by chromosphere.

D. Moon blocks the radiations emitted by photosphere and radiations emitted by chromosphere reach the earth.

Answer: D

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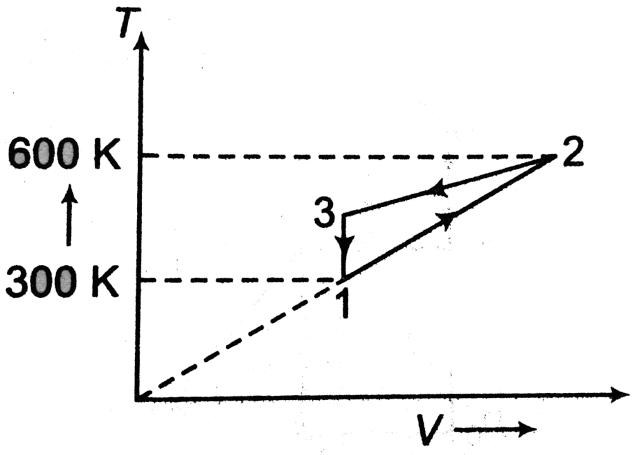
11. Two moles of an ideal gas are undergone a cyclic process 1-2-3-1. If net heat exchange in the process is 300J, the work done by the gas in the process 2-3 is



A. $-5000J$

B. 5000 J

C. $-3000J$

D. none of these

Answer: D

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12. 70 calories of heat required to raise the temperature of 2 moles of an ideal gas at constant pressure from $30^\circ C \rightarrow 35^\circ C$. The amount of heat required (in calories) to raise the temperature of the same gas through the

same range $(30^{\circ}C \rightarrow 35^{\circ}C)$ at constant volume is:

A. 30

B. 50

C. 70

D. 90

Answer: B

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13. Two strings of copper are stretched to the same tension. If their cross-section area are in the ratio $1:4$, then the respective wave velocities will be

A. $4:1$

B. $2:1$

C. $1:2$

D. $1:4$

Answer: B

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14. The temperature of a body on Kelvin scale is found to be x K . When it is measured by Fahrenheit thermometer, it is found to be $x^{\circ} F$, then the value of x is

A. 301.25

B. 574.25

C. 313

D. 40

Answer: B

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15. Which of the following statements is correct for any thermodynamic system

A. The internal energy changes in all processes

B. Internal energy and entropy are state functions

C. The change in entropy can never be zero

D. The work done in an adiabatic process is always zero

Answer: B

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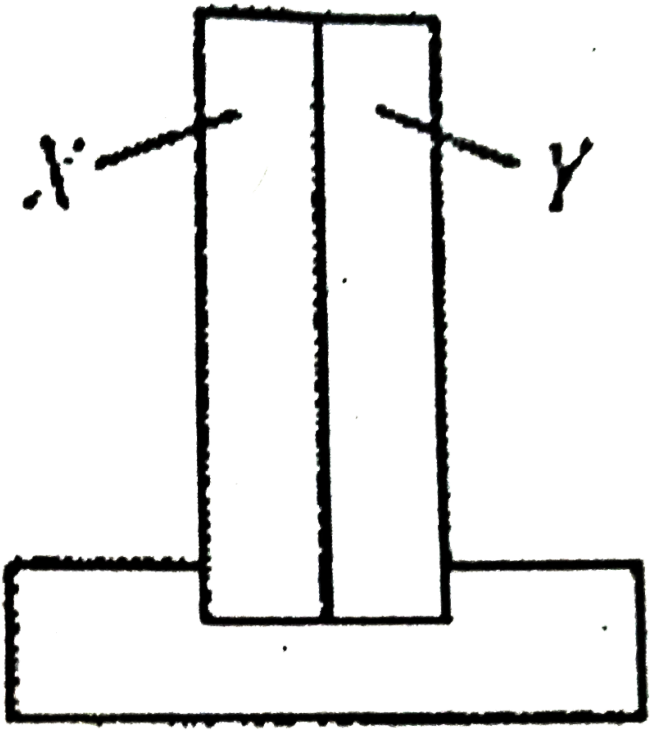
16. A bimetallic strip consists of metals X and Y. It mounted rigidly at the base as shown. The metal X has a higher coefficient of expansion compared to that for metal Y. When the

bimetallic strip is placed in a cold bath



A. it will bend towards the right

B. it will bend towards the left

C. it will not bend but shrink

D. it will neither bend nor shrink

Answer: B

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17. The average velocity of a body moving with uniform acceleration after travelling a distance of $3.06m$ is $0.34ms^{-1}$. If the change in velocity of the body is $0.18ms^{-1}$ during this time, its uniform acceleration is .

A. $0.01ms^{-2}$

B. $0.02ms^{-2}$

C. $0.03ms^{-2}$

D. $0.04ms^{-2}$

Answer: B

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18. The x and y coordinates of a particle at any time t are given by $x = 2t + 4t^2$ and $y = 5t$, where x and y are in metre and t in second. The acceleration of the particle at t = 5 s is

A. $40ms^{-2}$

B. $20ms^{-2}$

C. $8ms^{-2}$

D. zero

Answer: C

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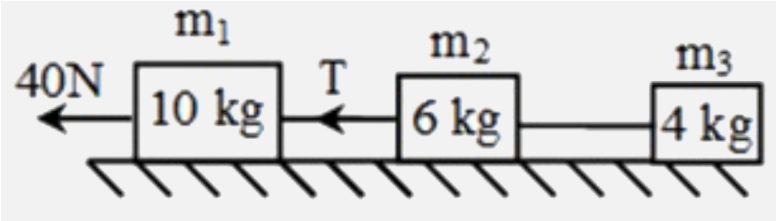
19. Three blocks of massage m_1, m_2 and m_3 are placed on a horizontal frictionless surface . A force of 40 N pulls the system then calculate

the value of T , if

$m_1 = 10kg, m_2 = 6kg, m_3 = 4kg$



A. 40 N

B. 20 N

C. 10 N

D. 5 N

Answer: B

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20. A smooth sphere of mass m is moving on a horizontal plane with a velocity $\left(3\hat{i}+\hat{j}\right)$. It collides with smooth a vertical wall which is parallel to the vector $\hat{j}$. If coefficient of restitution $e=\frac{1}{2}$ then impulse that acts on the sphere is

A. $-\frac{9}{2}m\hat{i}$

B. $\left(-\frac{3}{2}\hat{i}+\hat{j}\right)$

C. $\frac{3}{2}m\hat{j}$

D. $\left(\frac{3}{2}m\hat{j}+\frac{1}{2}m\hat{i}\right)$

Answer: A

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21. Internal forces can change

A. the linear momentum but not the kinetic energy of the system

B. the kinetic energy but not the linear momentum of the system

C. linear momentum as well as kinetic energy of the system

D. neither the linear momentum nor the kinetic energy of the system

Answer: B

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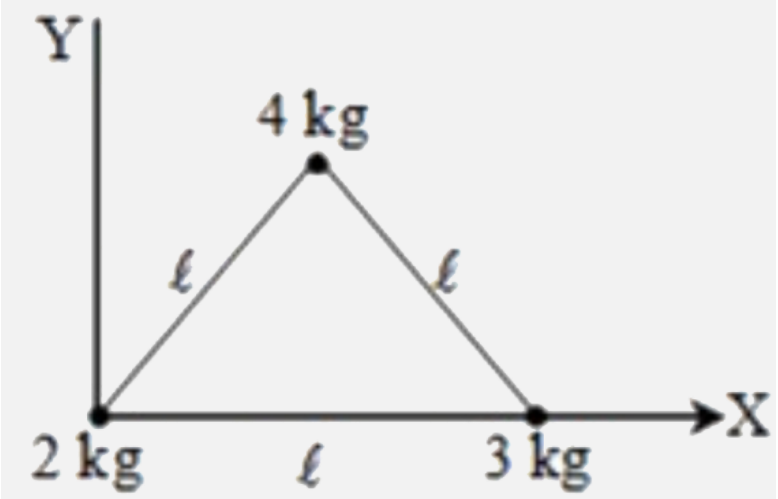
22. Three masses 2 kg , 3kg and 4kg are lying at the corners of an equilateral triangle of side

I. The X coordinate of center of mass is



A. $\frac{7}{12}l$

B. $\frac{5}{9}l$

C. $\frac{7\sqrt{2}}{9}l$

D. $\frac{\sqrt{5}}{9}l$

Answer: B

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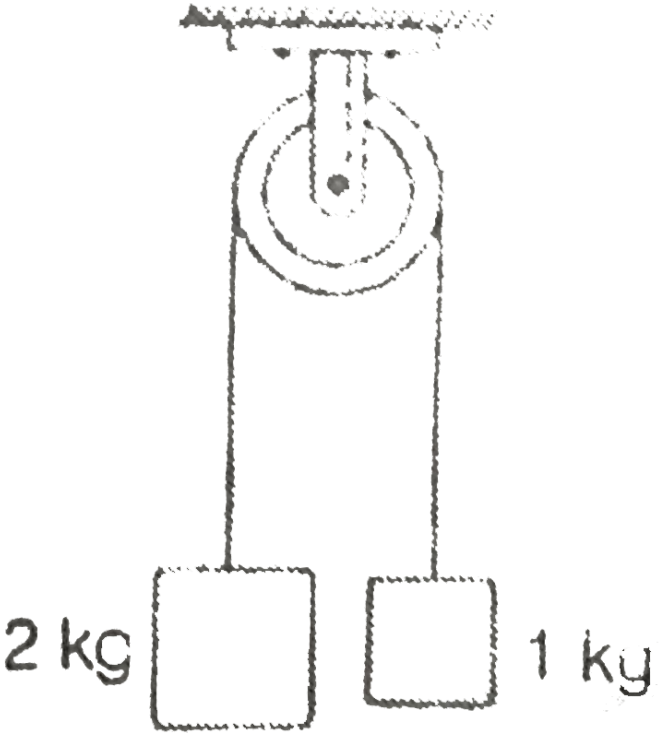
23. Two blocks of masses 2 kg and 1 kg respectively are tied to the ends of a string which passes over a light frictionless pulley . The masses are held at rest at the same horizontal level and then released . The distance traversed by centre of mass in 2 s is (

g = 10 m / s^2)



A. 1.42 m

B. 2.22 m

C. 3.12 m

D. 3.33 m

Answer: B

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24. A point on the periphery of a rotating disc has its acceleration vector making angle of 30° with the velocity . The ratio $(a_c / a_t (a_c$ "is centripetal acceleration and a_1 is tangential acceleration ") equals

A. $\sin 30^\circ$

B. $\cos 30^\circ$

C. $\tan 30^\circ$

D. none of these

Answer: C

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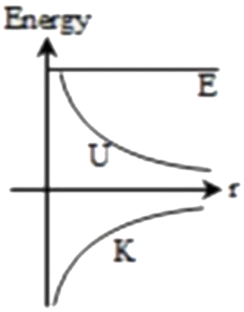
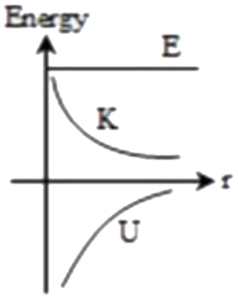
25. The correct graph representing the variation of total energy (E_t), kinetic energy (E_k) and potential energy (U) of a satellite with its distance form the centre of earth is

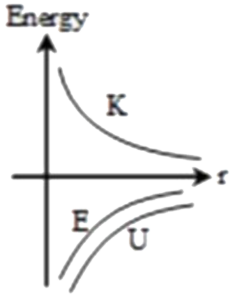
A.



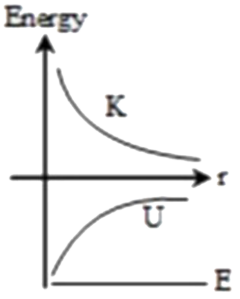
B.



C.



D.



Answer: C

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26. The time period of a satellite of earth is 5 hours. If the separation between the centre of earth and the satellite is increased to 4 times the previous value, the new time period will become-

A. 40 hr

B. 20 hr

C. 10 hr

D. 8 hr

Answer: A

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27. The displacement of two identical particles executing SHM are represented by equations $x_1 = 4\sin\left(10t + \frac{\pi}{6}\right) \& x_2 = 5\cos(\omega t)$ For what value of ω, energy of both the particles is same.

A. 16 unit

B. 6 unit

C. 4 unit

D. 8 unit

Answer: D

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28. The amplitude and time period in SHM are 0.8 cm and 0.2 sec respectively. If the initial

phase is $\pi/2$ radian, then the equation representing SHM is -

A. $y = 0.8 \cos 10\pi t$

B. $y = 0.8 \sin \pi t$

C. $y = 3 \times 0.8 \sin \pi t$

D. $y = 0.8 \sin 10\pi t$

Answer: A

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29. Equal mass of three liquids are kept in three identical cuylindrical vessels A, B and C. the densities are ρ_A, ρ_B, ρ_C with $\rho_A < \rho_B < \rho_C$. The force on the base will be

A. maximum in vessel A

B. maximum in vessel B

C. maximum in vessel C

D. equal in all the vessels

Answer: D

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30. The radii of the two columns is U-tube are r_1 and $r_2(>r_1)$. When a liquid of density ρ (angle of contact is 0°)) is filled in it, the level different of liquid in two arms is h. The surface tension of liquid is

$(g =$ acceleration due to gravity)

A. $\frac{\rho g h r_1 r_2}{2(r_2 - r_1)}$

B. $h\rho g(r_2 - r_1)$

C. $\frac{h\rho g(r_2 - r_1)}{2}$

D. $\frac{h\rho g}{2(r_2 - r_1)}$

Answer: A

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31. Three point masses, each of mass m, are placed at the corners of an equilateral triangle of side L. The moment of inertia of this system about an axis along one side of the triangle is

A. ml^2

B. $3ml^2$

C. $\frac{3}{4}ml^2$

D. $\frac{2}{3}ml^2$

Answer: C

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32. A particle strikes elastically with another particle with velocity V after collision its move with half the velocity in the same direction

find the velocity of the second particle if it is initially at rest

A. $\frac{3V}{2}$

B. $\frac{V}{2}$

C. V

D. none of these

Answer: A

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33. A 60 W bulb is placed at a distance of 4 m from you. The bulb is emtting light of wavelength 600 nm uniformly in all directions. In 0.1 s, how many photons enter your eye if the pupil of the eye is having a diameter of 2mm? [take $hc = 1240eV - nm$]

A. 2.84×10^{12}

B. 2.84×10^{11}

C. 9.37×10^{11}

D. 6.84×10^{11}

Answer: B

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34. The ionization energy of hydrogen atom is 13.6 eV. Hydrogen atoms in the ground state are excited by electromagnetic radiation of energy 12.1 eV. How many spectral lines will be emitted by the hydrogen atoms

A. 1

B. 2

C. 3

D. 4

Answer: C

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35. There are two radioactive substance A and B. Decay consant of B is two times that of A. Initially, both have equal number of nuceli. After n half-lives of A,rates of disintegaration of both are equal. The value of n is .

A. 1

B. 2

C. 4

D. all of these

Answer: A

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36. If the rate of emission of energy from a star is 2.7×10^{36} J/ sec, the rate of loss of mass in the star will be

A. $3 \times 10^{18} kg/\sec$

B. $3 \times 10^{19} kg/\sec$

C. $3 \times 10^{20} kg/\sec$

D. $3 \times 10^{21} kg/\sec$

Answer: B

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37. In an experiment tungsten cathode which has a threshold 2300Å is irradiated by ultraviolet light of wavelength 1800Å.

Calculate

(i) Maximum energy of emitted photoelectron

and

(ii) Work function for tungsten.

(Mention both the results in electron-volts)

Given Planck's constant $h = 6.6 \times 10^{-34} J - \sec$,

$1eV = 1.6 \times 10^{-19} J$ and velocity of light $c = 3 \times 10^{8} m/\sec$

A. 1.2 eV

B. 1.5 eV

C. 1.6 eV

D. 1.8 eV

Answer: B

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38. A transistor is used as an amplifier in CB mode with a load resistance of $5k\Omega$ the current gain of amplifier is 0.98 and the input resistance is 70Ω, the voltage gain and power gain respectively are

A. 70,68.6

B. 80,75.6

C. 60,66.6

D. 90,96.6

Answer: A

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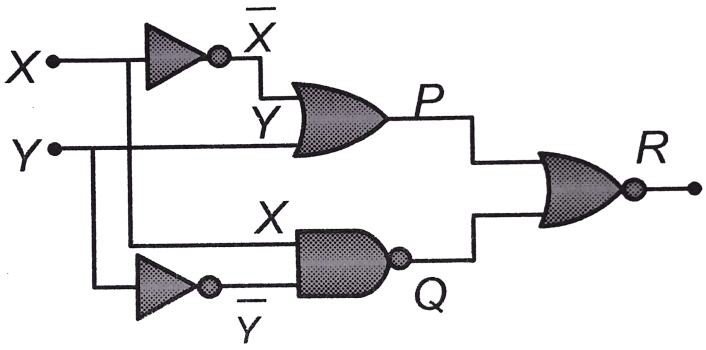
39. Figure gives a system of logic gates. From the study of truth table it can be found that no produce a high output (1) at R, we must

have



A. $X = 0, Y = 1$

B. $X = 1, Y = 1$

C. $X = 1, Y = 0$

D. $X = 0, Y = 0$

Answer: C

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40. For a transistor working as common base amplifier, the emitter current is 0.72 mA. The. Current gain is 0.96. The collector current is

A. $0.96 \times 0.72mA$

B. $\frac{0.96}{0.72}mA$

C. $0.96 - 0.72mA$

D. $7.2A - 2 \times 0.96mA$

Answer: A

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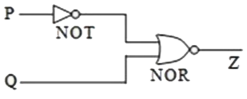
41. A combination of logic gates has the truth table below

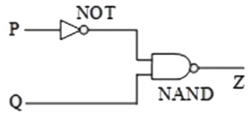
P	Q	Z
0	0	0
0	1	1
1	0	1
1	1	1

Which combination has this table?

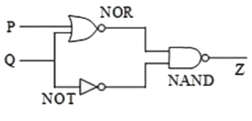
A.



B.



C.



D. None of these

Answer: C

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42. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $4/3$ and the fish is $12cm$ below the surface, the radius of this circle in cm is

A. $36\sqrt{7}$

B. $\frac{36}{\sqrt{7}}$

C. $36\sqrt{5}$

D. $4\sqrt{5}$

Answer: B

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43. An image is formed at a distance of 100 cm from the glass surface with refractive index 1.5, when a point object is placed in the air at a

distance of 100 cm from the glass surface. The radius of curvature is of the surface is

A. 20 cm

B. 40 cm

C. 30 cm

D. 50 cm

Answer: A

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44. A slit of width a is illuminiated by white light. The first diffraction minimum for light of $\lambda = 6500Å$ is formed at $\theta = 30^\circ$, then the width (a) of the slit is

A. $3250Å$

B. $6.5 \times 10^{-4} cm$

C. $1.3 \mu m$

D. $2.6 \times 10^{-4} cm$

Answer: C

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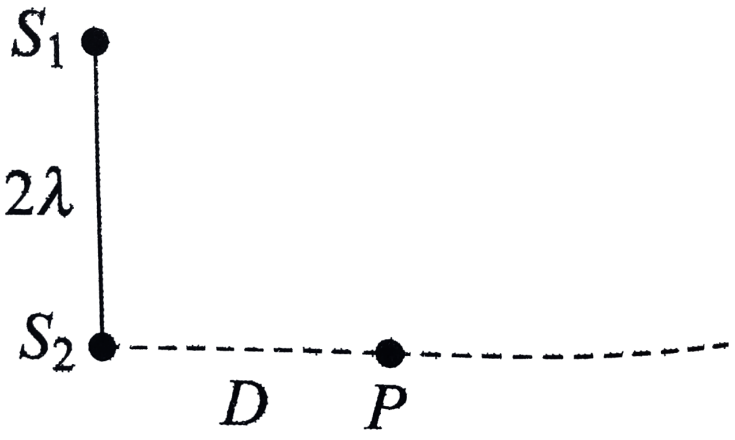
45. Two coherent point sources S_1 and S_2 vibrating in phase emit light of wavelength λ. The separation between the sources is 2λ. Consider a line passing through S_2 and perpendicular to line S_1S_2. Find the position of farthest and nearest minima.



A. $\frac{7\lambda}{12}$

B. $\frac{15\lambda}{4}$

C. $\frac{\lambda}{2}$

D. $\frac{3\lambda}{4}$

Answer: A

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