

India's Number 1 Education App

PHYSICS

NTA MOCK TESTS ENGLISH

NEET MOCK TEST 2



1. Two long straight conductors with current I_1 and I_2 are placed along X and Y axes. The equation of locus of points of zero magnetic

induction is :



A.
$$y = x$$

B.
$$y=rac{I_2x}{I_1}$$

C. $y=rac{I_1}{I_2}x$
D. $y=rac{x}{I_1I_2}$

Answer: C



2. The bob of simple pendulum is a spherical hollow ball filled with water. A plugged hole near the bottom of the oscillating bob gets suddenly unplugged. During observation, till water is coming out, the time period of oscillation would.

A. First increase and then decrease to the original value

B. First decrease and then increase to the

original value

C. Remain unchanged

D. Increase towards a saturation value

Answer: A

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3. If n, e, τ , m, are representing electron density charge, relaxation time and mass of an electron respectively then the resistance of

wire of length I and cross sectional area A is

given by

A.
$$\frac{ml}{ne^{2}\tau A}$$

B.
$$\frac{m\tau A}{ne^{2}l}$$

C.
$$\frac{ne^{2}\tau A}{m} \cdot \frac{A}{l}$$

D.
$$\frac{ne^{2}m}{\tau} \cdot \frac{l}{A}$$

Answer: A

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4. At room temperature copper has free electron density of $8.4 \times 10^{28} perm^3$. The copper conductor has a cross-section of $10^{-6}m^2$ and carries a current of 5.4 A. What is the electron drift velocity in copper?

A.
$$4ms^{-1}$$

B. $0.4ms^{-1}$
C. 4 cm s^{-1}
D. 0.4 mm s^{-1}

Answer: D



as shown in the figure. The x-component of the force on $-q_1$ is proportional to

5. Three charges- $q_1, + q_2$ and $-q_3$ are placed



A.
$$rac{q_2}{b^2}-rac{q_3}{a^2}\cos heta$$

B. $rac{q_2}{b^2}+rac{q_3}{a^2}\sin heta$

C.
$$rac{q_2}{b_2}+rac{q_3}{a^2}{\cos heta}$$

D. $rac{q_2}{b^2}-rac{q_3}{a^2}{\sin heta}$

Answer: B



6. A real inverted image in a concave mirror is

represented by (u,v, f are corrdinates)









Answer: A



7. A table fan, rotating at a speed of 2400 rpm, is switched off and the resulting variation of the rpm with time is shown in the figure. The total number of revolutions of the fan before it comes to rest is



A. 420

B. 280

C. 240

D. 380

Answer: B



8. A ball rolls off the top of a stairway with a horizontal velocity of magnitude $1.8ms^{-1}$. The steps are 0.20m high and 0.20m wide. Which step will the ball hit first ? $(g = 10ms^{-2})$.

A. First

B. Second

C. Third

D. Fourth

Answer: D



9. Consider the situation shown in figure. The wall is smooth but the surfces of A and B in contact are rough. The friction on B due to A

in equilibrium.



A. Is upward

B. Is downward

C. Is zero

D. The system cannot remain in equilibrium

for any value of F

Answer: B

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10. The electromagnetic waves travel in free

space with the velocity of

A. sound

B. Light

C. Greater than that of light

D. Greater than that of sound

Answer: B

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11. The displacement time graph of a moving

particle is shown below



The instantaneous velocity of the particle is negative at the point

A. C

B.E

C. D

D. F

Answer: B



12. A stone is thrown at 25m/s at 53° above the horizontal. At what time its velocity is at 45° below the horizontal?

A. 0.5s

B. 4s

C. 3.5s

D. 2.5s

Answer: C











Answer: A



14. The length I , breadth b, and thickness t of a block of wood were measured with the help os a measuring scale. The results with permissible errors (in cm) are

 $l = 15.12 \pm 0.01, \, b = 10.15 \pm 0.01$, and

 $t=5.28\pm0.01.$

The percentage error in volume up to proper significant figures is

A. 0.64~%

 $\mathsf{B.}\,0.26~\%$

C. 0.35~%

D. 0.48~%

Answer: C

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15. A 100V, AC source of frequency of 500Hz is connected to an L-C-R circuit with $L=8.1mH, C=12.5\mu F, R=10\Omega$ all

connected in series as shown in figure. What is

the quality factor of circuit?



A. 2.02

B. 2.54

C. 50.54

D. 200.54

Answer: B



16. Assertion (A) : The film which appears bright in reflected system will appear dark in the transmitted system and vice-versa. Reason (R) : The conditions for film to appear bright or dark in the reflected light are just reverse to those in the transmitted light

A. (A) is true and (R) is true and (R) is the correct explanation of (A).

B. (A) and (R) are true but (R) is not the

correct explanation of (A)

C. (A) is true, (R) is false

D. (A) is false, (R) is true

Answer: A

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17. Two pendulum have time period T and 5T/4

. They starts SHM at the same time from the

mean position. What will be the phase

difference between them after the bigger

pendulum completed one oscillation ?

A.
$$\pi/2$$

- B. Zero
- C. $2\pi/5$
- D. $\pi/4$

Answer: C



18. A ring shaped tube contain two ideal gases with equal masses and molar masses $M_1 = 32$ and $M_2 = 28$. The gases are separated by one fixed partition P and another movable stopper S which can move freely without friction inside the ring. The angle α as shown in the figure is

degrees.



A. $182^{\,\circ}$

- B. 170°
- C. 192°
- D. 180°

Answer: C





19. A mass M of 100 kg is suspended with the use of strings A, B 90 and C as shown in the figure, where W is the vertical wall and R is a rigid horizontal rod. The tension in the string B is



A. 100 gN

B. Zero

C.
$$100\sqrt{2}gN$$

D.
$$\frac{100}{\sqrt{2}}gN$$

Answer: A



20. An inverted vessel (ball) lying at the bottom of a lake, 47.6 m deep, has 50 c.c. of air trapped in it. The bell is brought to the

surface of the lake. The volume of the trapped

air will now be (Atmospheric pressure is 70 cm

of Hg, density of HG - 13.6 g cm^{-3})

A. $350 cm^3$

 $\mathsf{B.}\,300cm^3$

C. $250 cm^3$

D. $22cm^3$

Answer: B

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21. In the experiment to determine the focal length of a concave mirror by graphical methods the u - v graph is

A. A straight line

B. A circle

C. An ellipse

D. None of these

Answer: D

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22. A polarized light of intensity I_0 is passed through another polarizer whose pass axis makes an angle of 60° with the pass axis of the former, What is the intensity of emergent polarized light from second polarizer?

A.
$$I=I_0$$

B. $I=rac{I_0}{6}$
C. $I=rac{I_0}{5}$
D. $rac{I_0}{4}$

Answer: D



23. Electromagnetic waves propagate in the

direction parallel to the vector



Answer: C



24. A point object O is placed at a distance of 0.3 m from a convex lens of focal length 0.2 m. It is then cut into two halves each of which is displaced by 0.0005 m as shown in figure.



image will be formed from the lens at a distance of

A. 30 cm

B. 40 cm

C. 50 cm

D. 60 cm

Answer: D



25. A chain of length $l < \frac{\pi R}{2}$ is placed on a smooth surface whose some part is horizontal and some part is on quarter circular of radius R in the vertical plane as shown. Initially the whole part of chain lies in the circular part with one end at topmost point of circular surface. If the mass of chain is m, then work required to pull very slowly the whole chain on

horizontal part is -



A.
$$\frac{m}{l}gR^{2}\left[\sin\left(\frac{l}{R}\right)\right]$$

B. $\frac{m}{l}gR^{2}\left[\cos\left(\frac{l}{R}\right)\right]$
C. $\frac{m}{l}gR^{2}\left[\left(\frac{l}{R}\right) - \sin\left(\frac{l}{R}\right)\right]$
D. $\frac{m}{l}gR^{2}\left[\left(\frac{l}{R}\right) - \cos\left(\frac{l}{R}\right)\right]$

Answer: C


26. The radii of two planets are respectively R_1 and R_2 and their densities are respectively ρ_1 and ρ_2 . The ratio of the accelerations due to gravity (g_1/g_2) at their surfaces is

A.
$$g_1\!:\!g_2=rac{
ho_1}{R_1^2}\!:\!rac{
ho_2}{R_2^2}$$

B. $g_1 : g_2 = R_1 R_2 :
ho_1
ho_2$

C.
$$g_1\!:\!g_2=R_1
ho_2\!:\!R_2
ho_1$$

D. $g_1\!:\!g_2=R_1
ho_1\!:\!R_2
ho_2$





27. The efficiency of a Carnot engine working between 800 K and 500 K is -

A. 0.45

B. 0.625

C. 0.375

D. 0.5

Answer: B



28. In a resonance pipe the first and second resonance are obtained at depths 22.7 cm and 70.2 respectively. What will be the end correction?

A. 1.05 cm

B. 115.5 cm

C. 92.5 cm

D. 113.5 cm

Answer: A

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29. In an excited state of hydrogen like atom an electron has total energy of -3.4eV. If the kinetic energy of the electron is E and its de-Broglie wavelength is λ , then

A. $E=6.8 eV, \lambda=6.6 imes 10^{-10}m$

B. $3.4 eV, \lambda = 6.6 imes 10^{-10} m$

C. $E=3.4eV, \lambda=6.6 imes10^{-11}m$

D. $E=6.8eV, \lambda=6.6 imes10^{-11}m$

Answer: C

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30. What is the dimensional formula of $\frac{1}{\mu_0 \varepsilon_0}$

where the symbols have their usual meanings?

A.
$$M^0 L^2 T^{\,-2}$$

B.
$$M^0 L^{-2} T^{-2}$$

C.
$$M^0 L^{-2} T^{-2}$$

D. $M^0 L^1 T^{-2}$

Answer: A

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31. A bob of mass M is suspended by a massless string of length L. The horizontal velocity v at position A is just sufficient to make it reach the point B. The angle θ at which

the speed of the bob is half of that at A,

satisfies



A.
$$heta=rac{\pi}{4}$$

B. $rac{\pi}{4}< heta<rac{\pi}{2}$
C. $rac{\pi}{2}< heta<rac{3\pi}{4}$
D. $rac{3\pi}{4}< heta<\pi$

Answer: C



32. Velocity displacement graph of a particle moving in a straight line is as shown in figure.











Answer: A

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33. A drum of radius R and mass M, rolls down without slipping along an inclined plane of angle θ . The frictional force-

A. Converts translational energy to
rotational energy
B. Dissipates energy as heat
C. Decreases the rotational motion
D. Decreases the rotational and

translational motion

Answer: A



34. A sample of $.^{18} F$ is used internally as a medical diagnostic tool to look for the effects of the positron decay $(T_{1/2} = 110 \text{ min })$. How long does it take for 99 % of the $.^{18} F$ to decay?

A. 12.4 h

B. `12.0 h

C. 12.2 h

D. 12.5 h

Answer: C



35. If the mass of neutron is $1.7 imes 10^{-27} kg$, then the de Broglie wavelength of neutron of energy 3eV is $\left(h = 6.6 imes 10^{-34} J. s\right)$

A. $1.6 imes 10^{-16}m$

B. $1.6 imes 10^{-11} m$

C. $1.4 imes 10^{-10}m$

D. $1.4 imes 10^{-11}m$

Answer: B

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36. A magnetic needle free to rotate in a vertical plane parallel to the magnetic meridian has its north tip pointing down at 22° with the horizontal. The horizontal

component of the earth's magnetic field at the place is known to be 0.35 G. Determine the magnitude of the earth's magnetic field at the place.

A. 0.38 G

B. 0.35 G

C. 0.30 G

D. 0.40 G

Answer: A



37. Four rods of equal length l and mass m each forms a square as shown in figure Moment of inertia about three axes 1,2 and 3 are say I_1 , I_2 and I_3 . Then, match the following columns



Column-I Column-II (A) I_1 (p) $\frac{4}{3}ml^2$ (B) I_2 (q) $\frac{2}{3}ml^2$ (C) I_3 (r) $\frac{1}{2}ml^2$ (s) None

A. (A)-Q, (B)-S, (C)-Q

B. (A)-S, (B)-Q, (C)-Q

C. (A)-Q, (B)-Q, (C)-S

D. (A)-R, (B)-Q, (C)-S

Answer: A



38. A room at $20^{\circ}C$ is heated by a heater of resistence 20 ohm connected to 200 V mains. The temperature is uniform throughout the room and the heati s transmitted through a glass window of area $1m^2$ and thickness 0.2 cm. Calculate the temperature outside. Thermal conductivity of glass is $0.2cal/mC^{\circ}$ s and mechanical equivalent of heat is

4.2J/cal.

A. $13.69^\circ C$

B. $15.24^{\,\circ}\,C$

- C. $17.85^{\,\circ}\,C$
- D. $19.96^{\,\circ}\,C$

Answer: B



39. A gas mixture coinsists of (2) moles of oxygen and (4) moles of argon at temperature (T). Neglecting all vibrational modes, the total internal energy of the system is (jee 1999) (a) 4 RT (b) 15 RT (c) 9 RT (d) 11 RT.

A. 4 RT

B. 15 RT

C. 9 RT

D. 11 RT

Answer: D

40. A waveform shown when applied to the following circuit will produce which of the following output waveform? [Assuming ideal diode configuration and $R_1 = R_2$]





41. The maximum energy in thermal radiation

from a source occurs at the wavelength

4000Å. The effective temperature of the

source

A. 7325K

B. 800K

 $C.\,10^4 K$

D. $10^{6} K$

Answer: A



42. A bob of mass m is tied with a thread and is made to move in a circular path on a frictionless table surface about point 'O' as shown in diagram. A hypothetical electric field in radial direction exists along the table surface. In this condition the bob is uncharged and tension in the thread is T. If bob is given

some charge-



- A. Tension is thread must increase
- B. Tension in thread may increase or

decrease

C. Tension in thread will remain unchanged

D. Tension in thread must decrease

Answer: B



43. An accurate pendulum clock is mounted on ground floor of a high building. How much time will it lose or gain in one day if its is transferred to top storey of a building which is h = 200m higher than the ground floor? Radius of earth is 6.4×10^6

A. It will lose 6.2 s

B. It will lose 2.7 s

C. It will gain 5.2 s

D. It will gain 1.6 s

Answer: B

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44. The distance of centre of mass from point O of two square plates system, as shown,(if masses of plates are 2m and m and their

edges are 'a' and '2a' respectively) is



A. $\frac{a}{2}$

B.a

C.
$$\frac{3a}{2}$$

D. $\frac{2a}{3}$





45. The field of view is maximum for

A. plane mirror

- B. concave mirror
- C. convex mirror
- D. None of these

Answer: C

46. An electric dipole of length 2 cm is placed with its axis making an angle of 60° to a uniform electric field of $10^5 NC^{-1}$ if its experiences a torque is $8\sqrt{3}$ Nm, calculate the (i). Magnitude of the charge on the dipole and (ii). potential energy of the dipole.

A. -10J

 $\mathrm{B.}-20J$

C. - 30J

$\mathsf{D.}-40J$

Answer: C

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47. A proton and an electron are released from an infinite distance apart and they get attracted towars each other. Which of the following statement about their kinetic energy is true? A. Kinetic energy of electron is more than that of proton B. Kinetic energy of electron is less than that of proton C. Kinetic energy of electron = kinetic energy of proton

D. None of the above is true as it depends

on the distance between the particles

Answer: A

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48. The ratio of potential differences between $1\mu F$ and $5\mu F$ capacitors is



A. 1:2

B. 3:1

C. 1:5

D. 10:1

Answer: C



49. In a meter bridge circuit as shown in the figure, the bridge is balanced when AJ=20 cm. On interchanging P and Q the balance

length shifts by



A. zero

B. 80 cm

C. 40 cm

D. 60 cm

Answer: D



50. The ratio of the resistances of a conductor at a temperature of $15^{\circ}C$ to its resistance at a temperature of $37.5^{\circ}C$ is 4:5. The temperature coefficient of resistance of the conductor is

A.
$$\frac{1}{25}$$
. $^{\circ}$ C^{-1}
B. $\frac{1}{50}$. $^{\circ}$ C^{-1}

C.
$$\frac{1}{80}$$
. $^{\circ}$ C^{-1}
D. $\frac{1}{75}$. $^{\circ}$ C^{-1}

Answer: D



51. When a material is inserted inside the inductor the current in the circuit increases,
then the nature of the material is



A. ferromagnetic

- B. paramagnetic
- C. diamagnetic
- D. all of the above

Answer: C



52. A flux of $10^{-3}Wb$ passes through a strip having an area $A = 0.02m^2$. The plane of the strip is at an angle of 60° to be direction of a uniform field B. The value of B is

A. 0.1 T

B. 0.058 T

C. 4.0 mT

D. none of the above.

Answer: B



53. Consider the situation shown in figure. If the current I in the long straight wire xy is increased at a steady rate the induced current

in loop A and B will be



A. clockwise in A, anticlockwise in B

B. anticlockwise in A, clockwise in B

C. clockwise in both A and B

D. anticlockwise in both A and B

Answer: A

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54. Magnetic susceptibility of a diamagnetic

substances

A. decreases with temperature					
B. is not affected by temperature					
C. increases with temperature					
D. first	increases,	then	decreases	with	
temperature					

Answer: B

55. De Broglie wavelength of 0.05 eV thermal

neutron is

A. 1.3Å

 $\mathsf{B.}\,2\text{\AA}$

 $\mathsf{C.}\,5.4\mathrm{\AA}$

D. 8Å

Answer: A

56. The maximum velocity of electrons emitted from a metal surface is v when the frequecny of light falling on it is f. The maximum velocity when the frequency becomes 4f is

A. 2v

- B. > 2v
- $\mathsf{C}.\ < 2v$
- D. between 2v and 4v

Answer: B



57. Choose the wrong statement

A. The nuclear force becomes weak if the nucleus contains too many protons compared to the number of neutrons B. The nuclear force becomes weak if the nucleus contains too many neutrons compared to the number of protons C. Nuclei with atomic number greater than 82 show a tendency to disintegrate

D. The nuclear force becomes very strong if

the nucleus contains a large number of

nucleons

Answer: D

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58. Number jof nuclei of radioactive substance at time t=0 are 1000 and 9000 at time t=2 s. Then number of nuclie at time t=4 s will be A. 800

B. 810

C. 790

D. 700

Answer: B

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59. Which of the following is wheat fruit?

A. Water

B. Alcohol

C. Glycerine

D. Oil

Answer: A

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60. When p calories of heat is given to a body,

it absorbs q calories, then the absorbtion

power of body will be :-

A.
$$\frac{p}{q}$$

B. $\frac{q}{p}$
C. $\frac{p^2}{q^2}$
D. $\frac{p^2}{p^2}$

Answer: B

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61. One likes to sit under sunshine in winter

seasons, because

A. we get heat from the sun by conduction

B. we get heat from the sun by convection

C. we get heat from the sun by radiation

D. none of the above

Answer: C

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62. A piece of glass is heated to a high temperature and then allowed to cool. If it

cracks, a probable reason for this is the following property of glass

A. low thermal conductivity of glass

B. high thermal conductivity of glass

C. high specific heat of glass

D. high melting point ot glass

Answer: A

63. The velocity of kerosene oil in a horizontal pipe is 5m/s. If $g = 10m/s^2$ then the velocity head of oil wlill be

A. 1.25 m

B. 12.5 m

C. 0.125 m

D. 125 m

Answer: A



64. A force of 100 dynes acts on mass of 5 gm

for 10 sec . The velocity produced is

- A. $2cms^{-1}$
- B. $20 cm s^{-1}$
- C. $200 cm s^{-1}$
- D. $2000 cm s^{-1}$

Answer: C

65. if temperature of an object is $140^{\circ} F$, then

its temperature in centigrade is

A. $105\,^\circ C$

- B. $32^\circ C$
- C. $140^{\circ}C$
- D. $60^{\,\circ}\,C$

Answer: D

66. If specific heat of a substance is infinite it means

A. heat is given out

B. heat is taken in

C. no change in temperature takes place

whether heat is taken in or given out

D. all of the above

Answer: C

67. A tuning fork sounded together with a tuning fork of frequency 256 emits two beats. On loading the tuning fork of frequency 256, the number of beats heard are 1 per second. The frequency of tuning fork is

A. 257

B. 258

C. 256

D. 254

Answer: D



68. If the phase difference between the two wave is 2π during superposition, then the resultant amplitude is

A. maximum

B. minimum

C. maximum or minimum

D. none of the above

Answer: A



69. When a sound wave of frequency 300 Hz passes through a medium the maximum displacement of a particle of the medium is 0.1 cm . The maximum velocity of the particle is equal to

A. (a) $60\pi cm s^{-1}$

B. (b) $30\pi cms^{-1}$

C. (c)
$$30 cm s^{-1}$$

D. (d) $60cms^{-1}$

Answer: A



70. A particle executing SHM of amplitude 4 cm and T=4 s . The time taken by it to move from positive extreme position to half the amplitude is A. 1s

B.
$$\frac{1}{3}s$$

C. $\frac{2}{3}s$
D. $\sqrt{\frac{3}{2}s}$

Answer: C

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71. The thermal conductivity of a material in CGS system os 0.4. In steady state, the rate of

flow of heat is $10 cal/sec - cm^2$. Then the

thermal gradient will be

A.
$$10^{\,\circ} C cm^{\,-1}$$

B. $12^\circ Ccm^{-1}$

- C. 25° Ccm^{-1}
- D. $20^\circ Ccm^{-1}$

Answer: C



72. If 150 J of heat is added to a system and the work done by the system is 110 j. then change in internal energy wil be

A. 260 J

B. 150 J

C. 110 J

D. 40 J

Answer: D



73. The volume of a gas at $20^{\circ}C$ is 200 ml. If the temperature is reduced to $-20^{\circ}C$ at constant pressure, its volume will be :-

A. (a)172.6 ml

B. (b)17.26 ml

C. (c)192.7 ml

D. (d)19.27 ml

Answer: A

74. The apparent coefficient of expansion of liquid, when heated in a copper vessel is Cand when heated in a silver vessel is S. If A is the linear coefficient of expansion of Copper, linear expansion coefficient of silver is

A.
$$rac{C+S-3A}{3}$$

B. $rac{C+3A-S}{3}$
C. $rac{S+3A-C}{3}$
D. $rac{C+S+3A}{3}$

Answer: B



75. In the glass capillary tube, the shape of the surface of the liquid depends upon

A. only on the cohesive force of liquid molecules

B. only on the abhesive force between the

molecules of glass and liquid

C. only on relative cohesive and adhesive

force between the atoms

D. neither on cohesive nor on adhesive

force

Answer: C



76. A beam of metal supported at the two ends

is loaded at the centre. The depression at the

centre is proportional to

A.
$$Y^2$$

B. Y

C.
$$\frac{1}{Y}$$

D. $\frac{1}{Y^2}$

Answer: C

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77. IF the earth stops rotating, the value of 'g'

at the equator will

A. increase

B. remain same

C. decrease

D. none of the above

Answer: A

78. A force
$$\overrightarrow{F} = \left(5\hat{i} + 3\hat{j}\right)N$$
 is applied over a particle which displaces it from its original position to the point $\overrightarrow{s} = S\left(2\hat{i} - 1\hat{j}\right)m$. The work done on the particle is

A. -7J

B. + 13J

C. + 7J

 $\mathsf{D.}+11J$

Answer: C

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79. One account of the earth rotating about its

axis :

A. the linear velocity of objects at equatoris greater than at other placesB. the angular velocity of objects atequator is more than that of objects at

poles

C. the linear velocity of objects at all places

at the earth is equal, but angular velocity is different

D. at all places the angular velocity and

linear velocity are uniform

Answer: A



80. A particle A suffers an oblique elastic collision particle B that is at rest initially. If their masses with a are the same, then after the collision

A. they will move in opposite directions

B.A continues to move in the original

direction while B remains at rest

C. they will move in mutually perpendicular

directions

D. A comes to rest and B starts moving in

the direction of the original motion of A

Answer: C

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81. A circular disc A of radius r is made from an iron plate of thickness t and another circular disc B of radius 4r is made from an iron plate
of thickness t/4. The relation between the moments of inertia I_A and I_B is (about an axis passing through centre and perpendicular to the disc)

A.
$$I_A > I_B$$

$$\mathsf{B.}\,I_A=I_B$$

$$\mathsf{C}.\,I_A < I_B$$

D. depends on the actual values of t and r.

Answer: C



82. If one sphere collides head - on with another sphere of the same mass at rest inelastically. The ratio of their speeds $\left(\frac{v_2}{v_1}\right)$ after collision shall be

A.
$$rac{(1-e)}{(1+e)}$$

B. $rac{2e}{(1+e)}$
C. $rac{(1+e)}{(1-e)}$

D.e

Answer: C



83. The tube AC forms a quarter circule in a vertical plane. The ball B has an area of cross - section slightly smaller than that of the tube and can move without friction through it. B is

placed at A and displaced slightly. It will



A. always be in contact with the inner wall

of the tube

B. always be in contact with the outer wall

of the tube

C. initially be in contact with the inner wall

and later with the outer wall

D. initially be in contact with the outer wall

and later with the inner wall

Answer: C

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84. Statement-1: There are two spheres made of same amount of material, one of them is hollow and other is solid. They are heated to

same temperature and left in identical surroundigs. The initial rate of cooling will be greater for hollow sphere. Statement-2: The rate of heat loss depends on surface area and temperature.

A. both will expand equally

B. hollow sphere will expand more

C. solid sphere will expand more

D. the relative expansion of solid and

hollow sphere depends on the material

of sphere

Answer: A



85. A TV tower has a height of 100m. How much population is covered by TV broadcast. If the average population density around the tower is $1000km^{-2}$? (radius of earth = $6.4 \times 10^6 m$)

A. $2 imes 10^6$

 $\text{B.}\,4\times\,10^6$

 ${\sf C.3} imes 10^8$

 $\text{D.}\,9\times10^4$

Answer: B



86. A horizontal wid is blowing with a velocity v towards north-east. A man starts running towards north with acceleration a. The after which man will feel the wind blowing towards east is



Answer: C

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87. At time t second, a particle of mass 3 kg

has position vector r metre, where

 $r=3t\hat{i}-4\cos t\hat{j}.$ Find the impulse of the force during the time interval $0\leq t\leq rac{\pi}{2}$

A. (a) $12\hat{j}Ns$

B. (b) $9\hat{j}Ns$

C. (c) $\hat{4jNs}$

D. (d) $14\hat{j}Ns$

Answer: A



88. IF an electron enters into a space between the plates of a parallel plate capacitor at an an angle α with the plates an leaves at an angle β to the plates find the ratio of its kinetic energy while entering the capacitor of that while leaving.

A.
$$\left(\frac{\sin\beta}{\sin\alpha}\right)^2$$

B. $\left(\frac{\cos\beta}{\cos\alpha}\right)^2$
C. $\left(\frac{\cos\alpha}{\cos\beta}\right)^2$
D. $\left(\frac{\sin\alpha}{\sin\beta}\right)^2$

Answer: B



89. Four rods each of length l have been hinged to from a rhombus. Vertex A is fixed to a rigid support vertex C is being moved along the x-axis with a constant velocity v as shown in the figure. The rate at which vertex B is approaching the x-axis at the moment the

rhombus is in the form of a square is



A.
$$\frac{v}{4}$$

B. $\frac{v}{3}$
C. $\frac{v}{2}$
D. $\frac{v}{\sqrt{2}}$

Answer: C





90. The angular velocity of a body is $\vec{\omega} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ and a torque $\vec{\tau} = \hat{i} + 2\hat{j} + 3\hat{k}$ acts on it. Calculate the rotational power?

A. 20 W

B. 15 W

 $\mathsf{C}.\,\sqrt{17}W$

D. $\sqrt{14}W$

Answer: A



91. The potential energy of a particle of mass 5 kg moving in the x - y plane is given by U = (-7x + 24y)J, where x and y are given in metre. If the particle starts from rest, from the origin, then the speed of the particle at t = 2s is

A. 5 m/s

B. 10 m/s

C. 14 m/s

D. 17.5 m/s

Answer: B

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92. If the friction is sufficient to prevent the block from sliding, then the minimum value of F for which the cube begins to topple about



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

B.
$$\frac{3}{4}mg$$

C. $\frac{1}{2}mg$

D. *mg*

Answer: B

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93. A uniform cylinder rolls down from rest, on a track whose vertical cross - section is a parabola given by the equation $y = kx^2$. If the surface is rough from A to B due to which the cylinder doesn't slip but it is frictionless from B to C, then the height of ascent of cylinder towards C is



A.
$$rac{y_1}{3}$$

B.
$$rac{2y_1}{3}$$

C. $rac{3y_1}{2}$

D. y_1

Answer: B

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94. A magnet of magnetic moment M is situated with its axis along the direction of a magnetic field of strength B. The work done in rotating it by an angle of 180° will be

A. MB

B. 2 MB

 ${\rm C.}-2~{\rm MB}$

D. zero

Answer: D



95. A projectile is thrown with a velocity of 20 m/s, at an angle of 60° with the horizontal. After how much time the velocity vector will

make an angle of $45\,^\circ\,$ with the horizontal (in upward direction) is (take g= $10m\,/\,s^2ig)\,-\,$



D.
$$\left(\sqrt{3}-1
ight)s$$

Answer: D

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96. A sample contains large number of nuclei. The probability that a nucleus in sample will decay after four half lives is

A. (a)
$$\frac{1}{4}$$

B. (b) $\frac{3}{4}$
C. (c) $\frac{15}{16}$
D. (d) $\frac{7}{16}$

Answer: C

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97. Photoelectric emission is observed from a metallic surface for frequencies v_1 and v_2 of the incident light rays $(v_1 > v_2)$. If the maximum values of kinetic energy of the photoelectrons emitted in the two cases are in the ratio of 1: k, then the threshold frequency of the metallic surface is

A.
$$\displaystyle rac{n_1-n_2}{k-1}$$

B. $\displaystyle rac{kn_1-n_2}{k-1}$
C. $\displaystyle rac{kn_2-n_1}{k-1}$

D.
$$rac{n_2-n_1}{k}$$

Answer: B

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98. In a compound microscope, the focal length of two lenses are 1.5cm and 6.25cm. If an object is placed is 2cm from objective and the final image is formed at 25cm from eye len., the distance between the two lensese is

A. 6.00 cm

B. 7.75 cm

C. 9.25 cm

D. 11.00 cm

Answer: D

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99. When a ray is reflected from one medium to another, the wavelength changes from 6000Å to 4000Å. The critical anlge for the interfance will be:

A.
$$\cos^{-1}\left(\frac{2}{3}\right)$$

B. $\sin^{-1}\left(\frac{2}{3}\right)$
C. $\tan^{-1}\left(\frac{3}{2}\right)$
D. $\sin^{-1}\left(\frac{2}{\sqrt{13}}\right)$

Answer: B



100. A 100 V ac source of frequency 500 Hz is

connected to an LCR circuit with

 $L=8.1mH,\,C=12.5\mu F$ and $R=10\Omega$, all connected in series, the potential difference across the resistance is

A. 100 V

B. 200 V

C. 300 V

D. 400 V

Answer: A

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101. A rod of length I rotates with a small but uniform angular velocity ω about its perpendicular bisector. A uniform magnetic field B exists parallel to the axis of rotation. The potential difference between the centre of the rod and an end is

A. zero
B.
$$\frac{1}{2}\omega Bl^2$$

C. ωBl^2

D. $2\omega Bl^2$





102. In the figure, which of the diode is in reverse bias





Answer: B



103. In the figure shown below each battery has emf = 5 V. Then the magnetic field at P is



A. (a)zero

B. (b)
$$rac{10\mu_0}{R_1(4\pi)(.2)}$$

C. (c) $rac{20\mu_0}{R_1+R_2(.8\pi)}$

D. (d)none of these

Answer: A

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104. Two long parallel wires are 30 cm apart carrying currents 10 A and 15 A respectively in the same direction. The force acting over a length of 5 m of the wires is

A. $5 \times 10^{-4} N$, (attraction)

B. $1 \times 10^{-4} N$, (attraction)

 $\mathsf{C.5} imes 10^{-4} N, \hspace{0.2cm} ext{(repulsion)}$

 $\mathsf{D}.\,1 imes10^{-4}N,~~\mathrm{(repulsion)}$

Answer: A



105. The resistance of a moving coil galvanometer is 20Ω . It requires 0.01 A current for full - scale deflection. The value of resistance to convert it into a voltmeter of the range 20 V will be

A. 198Ω

 $\mathsf{B}.\,1980\Omega$

 $\mathsf{C}.\,20\Omega$

D. 0Ω

Answer: B



106. Consider the situation shown in . The wire AB is slid on the fixed rails rails with a constant velocity. If the wire AB is replaced by a semicircular wire, the magnitude of the induced current will

(##HCV_VOL2_C38_E01_021_Q01##)

A. increase

B. remain the same

C. decrease

D. increase of decrease depending on

whether the semicircle bulges towards

the resistance or away from it

Answer: B

Watch Video Solution
107. The coefficient of friction between two surface is 0.2. The maximum angle of friction is

- A. (a) $\sin^{-1}(0.2)$
- B. (b) $\cos^{-1}(0.2)$
- C. (c) $\tan^{-1}(0.1)$
- D. (d) $\cot^{-1}(5)$

Answer: D

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108. The ratio of thermal conductivity of two rods of different material is 5:4. The two rods of same area of cross-section and same thermal resistance will have the lengths in the ratio

A. 4:5 B. 9:1

C. 1:9

D. 5:4

Answer: D



109. When a dielectric slab is gradually inserted between the plates of an isolated parallel-plate capacitor , the energy of the system decreases.What can you conclude about the force on the slab exerted by the electric field?

A. increase

B. decrease

C. remain unchanged

D. become zero

Answer: C

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110. The effective capacitance of two capacitors of capacitances C_1 and $C_2(C_2 > C_1)$ connected in parallel is $\frac{25}{6}$ times the effective capacitance when they are connected in series. The ratio $\frac{C_2}{C_1}$ is

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

B.
$$\frac{4}{3}$$

C. $\frac{5}{3}$
D. $\frac{25}{6}$

Answer: A

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111. A particale moves under the effect of a force F = Cx from x = 0 to $x = x_1$. The work down in the process is

A. cx_1^2 B. $\frac{1}{2}cx_1^2$

- $\mathsf{C.}\, cx_1^3$
- D. zero

Answer: B

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112. Root mean square speed of an ideal gas at 300 K is 500 m/s. Temperature is increased

four times then root mean square speed will

become

A. (a)1000 m/s

B. (b)560 m/s

C. (c)2000 m/s

D. (d)none of these

Answer: A

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113. When a laser beam returns after reflection from an aeroplane, the observed change in frequency is 1%, then the speed of the aeroplane is (c is the velocity of light)

A.
$$\frac{c}{50}$$

B. $\frac{c}{100}$
C. $\frac{c}{200}$
D. $\frac{c}{2}$

Answer: C



114. A ring consisting of two parts ADB and ACB of same conductivity k carries an amount of heat H The ADB part is now replaced with another metal keeping the temperature T_{91}) and T_2 constant The heat carried increases to 2H What should be the conductivity of the new ADB Given



A.
$$\frac{7}{3}K$$

 $\mathsf{B.}\,2K$

 $\mathsf{C}.\,\frac{5}{2}K$

D. 3K

Answer: A



115. the period of oscillation of a simple pendulum of length L suspended from the roof of a vehicle which moves without friction down an inclined plane of inclination ∞ , is given by.

A.
$$2\pi \sqrt{\frac{L}{g \cos \alpha}}$$

B. $2\pi \sqrt{\frac{L}{g \sin \alpha}}$

C.
$$2\pi \sqrt{\frac{L}{g}}$$

D. $2\pi \sqrt{\frac{L}{g \tan \alpha}}$

Answer: A



116. Potential energy of a 3kg body at the surface of a planet is -54J, then escape velocity will be :

A. (a)
$$18ms^{-1}$$

B. (b) $162ms^{-1}$

C. (c)
$$36ms^{-1}$$

D. (d) $6ms^{-1}$

Answer: D

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117. A projectile is fired vertically upwards from the surface of earth with a velocity of kv_e where v_e is the escape velocity and k < 1. Neglecting air resistance, the maximum height to which it will rise, measured from the centre

of the earth, is (R_E =radius earth)

A.
$$\displaystyle rac{R}{k^2+1}$$

B. $\displaystyle rac{k^2R}{1-k^2}$
C. $\displaystyle rac{R}{1-k^2}$
D. $\displaystyle rac{k^2R}{k^2+1}$

Answer: C

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118. A uniform rod of length 6a and mass 8m lies on a smooth horizontal table. Two particle of masses m and 2m, moving in the same horizontal plane but in opposite directions with speeds 2v and v respectively strike and rod normally as shown in figure and stick to the rod. Denoting angular velocity (about the centre of mass), total energy and transnational velocity of centre of mass by ω , E

and v_c respectively after the collision.



A. zero

B.
$$\frac{2v}{3a}$$

C. $\frac{v}{5a}$
D. $\frac{3v}{5a}$

Answer: C

119. When induced emf in inductor coil is 50% of its maximum value then stored energy in inductor coil in the given circuit at that instant will be:-



A. 2.5 mJ

B. 5 mJ

C. 15 mJ

D. 20 mJ

Answer: A

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120. The magnetic flux through a coil varies with time as $\phi = 5t^2 - 6t + 9$. The ratio of E.M.F. at t = 0s to t = 0.5s will be

A. (a)9:1

B.(b)1:6

C. (c)6:1

D. (d)1:9

Answer: C

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121. Specific resistance of a wire depends on its

A. length of the wire

B. area of cross - section of the wire

C. resistance of the wire

D. material of the wire

Answer: D

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122. What is the ratio of the electrostatic potential at the corner and the centre point of a charged conducting cube? (The potential is considered 0 at infinity)

A. 2:1

B. 4:1

C. 1: 2

D. 1:1

Answer: D

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123. The work done by all the forces (external and internal) on a system equals the change in

A. (a)total energy

B. (b)kinetic energy

C. (c)potential energy

D. (d)none of these

Answer: B

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124. The potential energy of an object of mass m moving in xy plane in a conservative field is given by U = ax + by , where x and y are position coordinates of the object. Find

magnitude of its acceleration :-

A.
$$\frac{ab}{m}$$

B. $\left(\frac{a+b}{m}\right)$
C. $\frac{\sqrt{a^2+b^2}}{m}$

D.
$$rac{a^2+b^2}{m}$$

Answer: C

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125. A ball of mass 1 kg moving with a velocity of 0.4 ms^{-1} collides with another stationary ball. After the collision, the first ball moves with a velocity of $0.3ms^1$ in a direction making an angle of 90° with its initial direction. The momentum of the second ball after the collision will be (in kg ms^{-1})

A. 0.1

B. 0.3

C. 0.5

D. 0.7

Answer: C

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126. An interference is observed due to two coherent sources separated by a distance 5λ along Y-axis, where λ is the wavelength of light A detector D is moved along the positive X -axis The number of point on the X-axis

excluding the points x=0 and $x = \infty$ at which

resultant intensity will be maximum are

A. three

B. four

C. two

D. infinite

Answer: A



127. A convex lens A of focal length 20cm and a concave lens G of focal length 5cm are kept along the same axis with the distance d between them. If a parallel beam of light falling on A leaves B as a parallel beam, then distance d in cm will be

A. 20

B. 15

C. 30

D. 50

Answer: B



128. A variable force F acts along the x - axis given by $F = (3x^2) - 2x + 1N$. The work done by the force when a particle of mass 100 g moves from x = 50 cm to x = 100 cm is

A. (a) 0.625 J

B. (b)6.25 J

C. (c) 0.0625 J

D. (d)62.5 J

Answer: A

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129. Two blocks of masses m and 2 m are placed one over the other as shown in figure. The coefficient of friction between m and 2m is μ and between 2m and ground is $\frac{\mu}{3}$. If a horizontal force F is applied on upper block and T is tension developed in string,

then choose the incorrect alternative.



A. If
$$F=rac{\mu}{2}mg, T=0$$

B. If
$$F=\mu m g, T=0$$

C. If
$$F=2\mu mg, T=rac{\mu mg}{3}$$

D. If
$$F=3\mu mg, T=0$$

Answer: C

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130. According to Bohr's theory, the time averaged magnetic field at the centre (i.e. nucleus) of a hydrogen atom due to the motion of electrons in the n^{th} orbit is proportional to :

(n = principal quantum number)

A.
$$\frac{1}{n^3}$$

B. $\frac{1}{n^5}$
C. n^5

D. n^3

Answer: B

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131. The half - life of a radioactive substance is50 days. The substance will disintegrate

completely in

A. 50 days

B. 500 days

C. 5000 days

D. infinite time

Answer: D



132. Which of the following curves is correct?





D. None of these

Answer: A



133. A simple telescope consisting of an objective of focal length 60 cm and a single

eye lens of focal length 5 cm is focused on a distant object in such a way that parallel rays emerge from eye lens. If the object subtends an angle of 2° at the objective, the angular width of the image is (Let $\tan \theta \Box \theta$ assuming small).

A. 50° B. $\left(\frac{1}{6}\right)^{\circ}$ C. 10° D. 24°

Answer: D



134. An equilateral prism produces a minimum

deviation of $30^{\,\circ}$. The angle of incidence is

A. (a) $120^{\,\circ}$

B. (b) $60^{\,\circ}$

C. (c) 90°

D. (d)none of these

Answer: B


