PHYSICS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2015

Physics

1. The moment of inertia of a solid cylinder of mass M, length 2 R and radius about R an axis passing through the centre of mass and perpendicular to the axis of the cylinder is I and about an axis passing through one end of the cylinder and perpendicular to the axis of cylinder is I_2,then

A. $l_1 < l_2$

B. $l_2 - l_1 = MR^2$

C. $\frac{l_2}{l_1} = \frac{19}{12}$

D. $\frac{l_2}{l_1} = \frac{7}{6}$

Answer:

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2. A body mass of 1kg. Intially at rest explodes and breaks into three parts. The masses of the parts are in the ratio 1:1:3. The two pieces of equal mass fly off perpendicular to each other with a speed of 30 m/s each. The velocity of the heavier part in m/s is

A. $10\sqrt{2}$

B. 6

C. 3

D. $6\sqrt{2}$

Answer:

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3. A particle of mass 4 kg is excuting S.H.M. Its displacement is given by the equation y=8 $\cos[100t + \pi/4]cm$. Its maximum kinetic energy is,

A. 128 j

B. 64 j

C. 16 j

D. 32 j

Answer:

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4. Infinite number of spheres , each of mass m are placed on the X- axis at distance 1,2,4,8,16, ... meter from origin . The magnitide of the gravitational field at the origin is

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

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

C. Gm

D. 6 Gm

Answer:

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5. The length og two metal wire is l_1 when the tension in it is F_1 and l_2 when the tension is F_2 .then the original length of the wire is

A. $\frac{L_1F_1 + L_2F_2}{F_1 + F_2}$

B. $\frac{L_2 - L_1}{F_1 + F_2}$

C. $\frac{F_1L_1 - F_1L_1}{F_1 - F_2}$

D. $\frac{F_1L_1 - F_2L_2}{F_1 - F_2}$

Answer:

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6. 1000 spherical drop of water each 10^-8m in diameter coalesce to form one large spherical drop the amount of energy liberated in this process in joules is (surface tension of the water is 0.075M/m)

A. $10.75\pi \times 10^{-15}$

B. $6.75\pi \times 10^{-15}$

C. $8.65\pi \times 10^{-15}$

D. $3.88\pi \times 10^{-15}$

Answer:

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7. A thermos flask contains 250 g coffee at $90^\circ C$. To this 20 g of milk at $5^\circ C$ is added. After equilibrium is established, the temperature of the liquid is

(Assume no heat loss to the thermos bottle . Take specific heat of coffee and milk as $1.00 cal/g^\circ C$)

A. $3.23^\circ C$

B. $3.15^\circ C$

C. $83.7^\circ C$

D. $37.8^\circ C$

Answer:

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8. A copper rod of length 75 cm and an iron rod of length 125cm are joined together end to end . Both are of circular cross section with diameter 2 cm . The free ends of the copper and iron are maintained at $100^\circ C$ and$0^\circ C$ respectively . The surface of the bars are insulated thermally . The temperature of the copper -iron junction is [Thermal conductivity of the copper is $386.4W/m-K$ and that of iron is $48.46W/m-K$].

A. $100^\circ C$

B. 0^(@)C`

C. 93^(@)C`

D. 50^(@)C`

Answer:

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9. 1 g of water at $100^\circ C$ is completely converted into steam at $100^\circ C$. 1 g of steam occupies a volume of 1650 cc . (Neglect the volume of 1 g of water at $100^\circ C$). At the pressure of $10^5 N/m^2$, latent heat of steam is $540 cals/g$ (1 Calorie= 4.2 Joules).The increase in the internal energy in Joules is

A. 2310

B. 2203

C. 1650

D. 2150

Answer:

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10. R.M.S. velocity of oxygen molecules at N.T.P. is 0.5 Km/s. The R.M.S. velocity of he hydrogen molecule at N.T.P. is

A. 4 km/s

B. 2km/s

C. 3 km/s

D. 1 km/s

Answer:

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11. A thin wire of length of 99 cm is fixed at both ends as shown in the figure. The wire is kept under a tansion and is divided into three

segments of lenghts $l_1 l_2$ and l_(3) $asshown \in figure. Whenthewireismade \rightarrow vibrate, thesegmentsvibrat$ l_(1),l_(2) and l_(3)` of the segments respectively are (in cm)

A. 27,54,18

B. 18,27,54

C. 54,27,18

D. 27,9,18

Answer:

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12. Three thin lenses are combined by placing them in contact with each other to get more magnification in an optical instrement. Each lens has a focal length of 3 cm. If the least distance of distinct vision is taken as 25

cm, the total magnification of the lens combination in normal adjustment is

A. 9

B. 26

C. 300

D. 3

Answer:

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13. A convex lens of glass $(\mu_g = 1.45)$ has a focal length f in air. The lens is immerseJ in a liquid Of refractive index (μ_I) 1.3. The ratio of the $\frac{F_{\text{“liquid”}}}{F_a}$ is is

A. 3.9

B. 0.23

C. 0.43

D. 0.39

Answer:

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14. Through a narrow slit of width 2 mm, diffraction pattern is formed on a screen kept at a distance 2 m from the slit. The wavelength of the light used is 6330 A and falls normal to the slit and screen. Then, the distance between the two minima on either side of the central maximum is

A. 12.6 mm

B. 1.27 mm

C. 2.532 mm

D. 25.3 mm

Answer:

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15. Charges Q are placed at the ends of a diagonal of a square and charges q are placed at the other two corners. The condition for the net electric force on Q to be zero is

A. $Q = -2\sqrt{2q}$, q being negative

B. $Q = -\frac{q}{\sqrt{2}}$, q being negative

C. $Q = 2\sqrt{2q}$, q being negative

D. Q = 2q ,q being negative

Answer:

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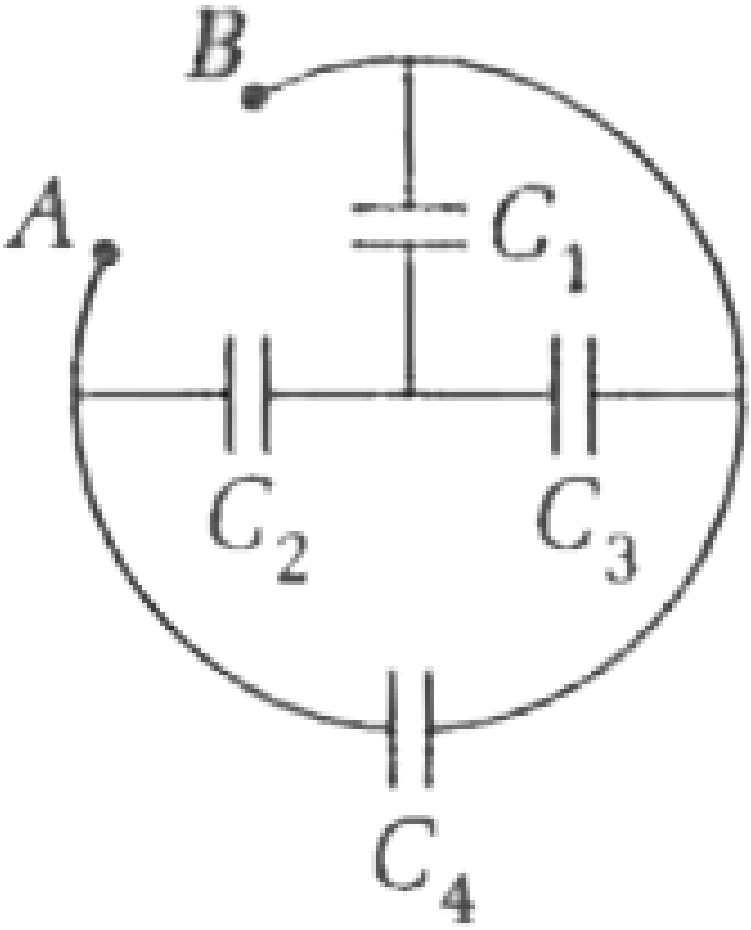
16. In the arrangement of capactiors shown in the figure, if each capacitor is 9 pF, then the effective capacitances between the points A and B is



A. 10 pF

B. 15 pF

C. 20 pF

D. 5 pF

Answer:

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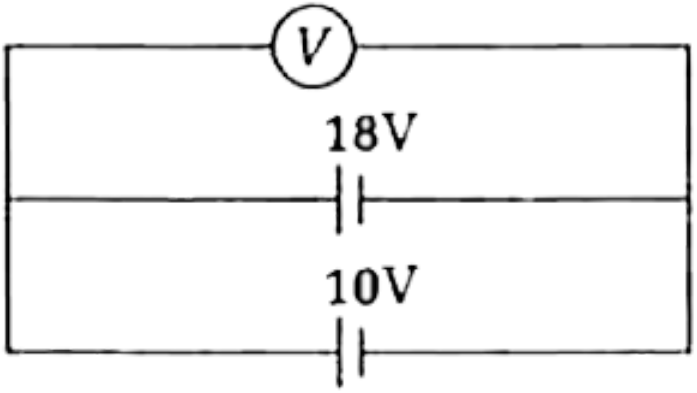
17. A battery of the emf 18 V and internal resistance of 1ω are connected as shown in figure. Then, the voltmeter reading is



A. 10 V

B. 12 V

C. 16 V

D. 8 V

Answer:

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18. A wire of Aluminium and a wire of Germanium are cooled to a temperature of 77° K.

A. resistance of each of them decreases

B. resistance of each of them increases

C. resistance of aluminium wire increases and that of germanium wire decreases

D. resistance of aluminium wire decreases and that of germanium wire increases

Answer:

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19. A volmeter of 250 mV range having resistance of 10ω is converted into an ammeter of 250 mA range. The value of necessary shunt is (nearly)

A. 2ω

B. 0.1ω

C. 1ω

D. 10ω

Answer:

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20. A circular loop and a square loop are formed from two wires of same length and cross section. Same current is passed through them. Then the ratio of their dipole moments is

A. 4

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

C. 2

D. $\frac{4}{\pi}$

Answer:

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21. At a certain place a magnet makes 30 oscillations per minute. At another place where the magnetic field is doubled, its time period will be

A. $\sqrt{2}s$

B. 2s

C. 4s

D. 1//2s

Answer:

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22. Match the following :

(A)	Rocket proplusiosn	(P)	Bernoulli's principle in fluid dynamics
(B)	Aeroplane	(Q)	To
(C)	Fungus	(R)	abscisic acidII
(D)	Herring maize grains	(S)	Kinetin
		(T)	Photoelectri effect

A. $\begin{matrix} A & B & C & D \\ R & Q & P & S \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ R & P & Q & T \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ T & P & Q & R \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ R & P & Q & S \end{matrix}$

Answer:

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23. Force F is given by the equation $F = \dfrac{X}{\text{Linear density}}$. Then dimesions of X are

A. $\left[M^2L^0T^{-2}\right]$

B. $\left[M^2L^0T^{-1}\right]$

C. $\left[L^2T^{-2}\right]$

D. $\left[M^0L^0T^{-2}\right]$

Answer:

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24. The displacement of a particle moving in a straight line is given by the expression $x = At^3 + Bt^2 + Ct + D$ in metres, where t is in seconds and A,B,C and D are constant. The ratio between the initial acceleration and initial velocity is

A. $\frac{2C}{B}$

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

C. 2C

D. $\frac{C}{2B}$

Answer:

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25. A, B, C are points in a vertical line such that AB = BC. If a body falls freely from rest at A and t_1 and t_2 are times taken to travel distances AB and BC, then ratio (t_2/t_1) is

A. $\sqrt{2}+1$

B. `sqrt(2)-1

C. $2\sqrt{2}$

D. $\frac{1}{\sqrt{2}+1}$

Answer:

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26. Sum of magnitude of two forces is 25 N. The resultant of these forces is normal to the smaller force and has a magnitude of 10 N. Then the two forces are

A. 14.5 N,10.5N

B. 16N,9N

C. 13 N,12 N

D. 20 N, 5 N

Answer:

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27. A body of mass in thrown up vertically with velocity v_(1) $reaches a \max i\mu m height$h_(1) $\in$ t_(1) $\sec onds. A \neg herbody of mass 2m is projected with a velocity$v_(2)$at an \angle$ theta. $The \sec ondbody reaches a \max i\mu m height$h_(2) $\in time$t_(2) $\sec onds. If$t_(1) = 2t_(2), $then ratio$((h_(1))/(h_(2))` is

A. 0.043055555555556

B. 0.16736111111111

C. 0.042361111111111

D. 0.12638888888889

Answer:

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28. Hammer of mass N strikes a nail of mass m with a velocity 20 m/s into a fixed wall. The nail penetrates into the wall to a depth of 1 cm. The average resistance of the wall of the pentration of the nail is

A. $\left(\frac{M^2}{M+m}\right) \times 10^3$

B. $\frac{2M^2}{M+m} \times 10^4$

C. $\frac{M+m}{M^2} \times 10^2$

D. $\frac{M^2}{M+m} \times 10^2$

Answer:

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29. A body of mass 10 kg is acted upon by a force given by equation $F = \left(3t^2 - 30\right)$ Newtons. The initial velocity of the body is 10 m/s. The velocity of the body after 5 secs. is

A. 4.5 m/s

B. 6 m/s

C. 7.5 m/s

D. 5 m/s

Answer:

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30. A ball (intially at rest) is released from the top of a tower. The ratio of work done by the force of gravity, in the first, second and third seconds is

A. 0.04380787037037

B. 0.04462962962963

C. 0.048206018518519

D. 0.043090277777778

Answer:

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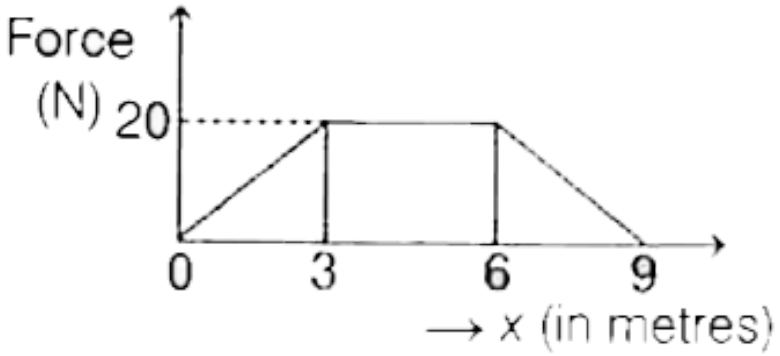
31. A body of mass 2.4 kg is subjected to a force which with distance as shown in figure. The starts from rest aat x = 0. Its velocity at x = 9 m is



A. $5\sqrt{3}m/s$

B. $20\sqrt{3}m/s$

C. 10 m/s

D. 40 m/s

Answer:

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32. A carrier wave of peak voltage 12 V is used to transmit a message signal . What should be the peak voltage of the modulating signal in order to have a modulation index of 75% ?

A. 18 V

B. 22 V

C. 16 V

D. 28 V

Answer:

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33. If n_c and n_h are electron and hole concentralious in an extrinsic semiconductor and n_i is electron concentrations in an intrinsic semiconductor, then

A. $\left(\frac{n_e}{n_h}\right) = n_i$

B. $(n_e + n_h) = n_i$

C. $(n_e - n_h)s = n_i$

D. $n_e n_h = n_i^2$

Answer:

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34. In a half wave rectifier, the AC input source of frequency 50 Hz is used. The fundamental frequency of the output is

A. 50 Hz

B. 150 Hz

C. 200 Hz

D. 75 Hz

Answer:

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35. A radioactive nucleus can decay by two different processes. The half lives of the first and second decay processes are 5×10^3 and 10^5 years

respectively, Then, the effective half-life of the nucleus is,

A. $105 \times 10^5 yr$

B. 4762 yr

C. $10^4 yr$

D. 47.6 yr

Answer:

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36. The following statements are given about hydrozen atom

(A) The wavelength of the spectral lines of lyman series are greater than the wavelength of the second spectral line of Balmer series.

(B) The orbits correspond to circular standing waves in which circumference of the orbit equas a whole numbers of wavelengths.

A. A is flase, B is true

B. A is true, B is false

C. A is false, B is false

D. A is true, B is true

Answer:

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37. If an electron has an energy such that its de - Broglie wavelenghts is 5500 Å, then the energy value of that electron is $\left(h = 6.6 \times 10^{-34} js, m_c = 9.1 \times 10^{-31} kg\right)$

A. $8 \times 10^{-20} j$

B. $8 \times 10^{-10} j$

C. 8j

D. $8 \times 10^{-25} j$

Answer:

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38. Suppose that the electric flux inside a parallel plate capacitor changes at a rate of 7×10^{14} units/sec, then the magnetic induction field density at any points inside the capacitor is,

[Area of the plate of the capacitor=$1m^2$

Permittivity of free space =$8.8 \times 10^{-12} Nm^2c^{-2}$

Permeability of free space =$4\pi \times 10^{-7}$Teslam/Amp]

A. 7.79×10^{-3} T

B. 0.779×10^{-5} T

C. 8.85×10^{-4} T

D. 8.85×10^{-12} T

Answer:

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39. In a circuit L,C and R are connected in series with an alternating voltage source of frequency f. When current in the circuit leads the voltage by 45°, the value of C is

A. $\frac{1}{2\pi(2\pi fL+R)}$

B. $\frac{1}{2\pi(2\pi R+L)}$

C. $\frac{2}{2\pi(R+L)}$

D. $\frac{2}{2\pi\left(R+\frac{1}{L}\right)}$

Answer:

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40. A small square loop of wire of side 'I' is placed inside a large square loop of side L (L > I). If the loops are coplanar and their centres coincide, the mutual inducation of the system is directly proportional to

A. I//L

B. l^2 / L

C. l / L^2

D. l^2 / L^2

Answer:

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