PHYSICS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2016

Physcis

1. Electron microscope is based on the principle of

A. photoelectric effect

B. wave nature of electron

C. superconductivity

D. law's of electromagnetic induction

Answer: b

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2. Force is given by the expression F = A cos (Bx) + C cos (Dt), where x is displacement and t

is time. The dimension of $\frac{D}{R}$ is same as that of

A. velocity

B. velocity gradient

C. angular velocity

D. angular momentum

Answer: a

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3. A car accelerates from rest with $2m/s^2$ on a straight line path and then comes to rest after applying brakes. Total distance travelled by the car is 100 m in 20 seconds. Then, the maximum velocity attained by the car is

A. 10 m/s

B. 20 m/s

C. 15 m/s

D. 5 m/s

Answer: a

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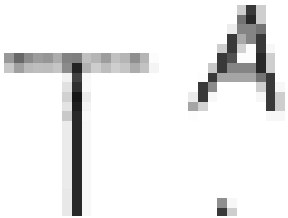
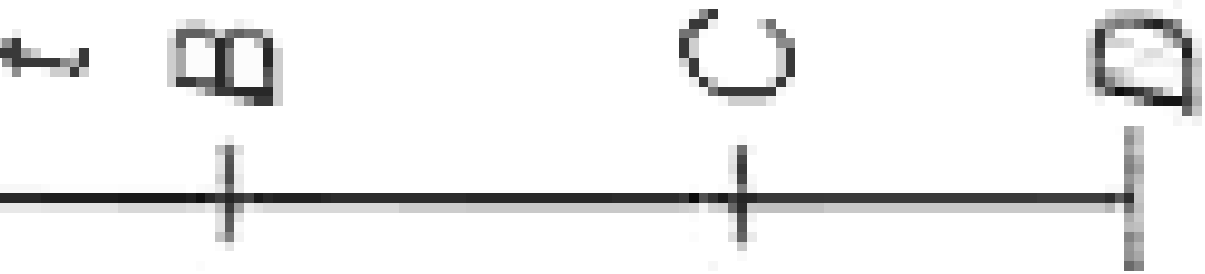
4. A body is falling freely from a point A at a certain height from the ground and passes through points B,C and D vertically as shown below so that BC = CD. The time taken by the particle to move from B to C is 2 s and from C to D is 1s. Time taken to move from A to B in seconds is





A. 0.6

B. 0.5

C. 0.2

D. 0.4

Answer: b

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5. A particle moves from (1,0,3) to the point (-3,4,5) when a force $F = \hat{i} + 5\hat{k}$ acts on it. Amount of work done in joules is

A. 14

B. 10

C. 6

D. 15

Answer: c

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6. A particle is projected with velocity $2\sqrt{gh}$ and at an agnle 60° to the horizontal so that it just clears two walls of equal height h which

are at a distance 2h from each other. The time taken by the particle to travel between these two wall is

A. $2\sqrt{\frac{2h}{g}}$

B. $\sqrt{\frac{h}{2g}}$

C. $2\sqrt{\frac{h}{g}}$

D. $\sqrt{\frac{h}{g}}$

Answer: c

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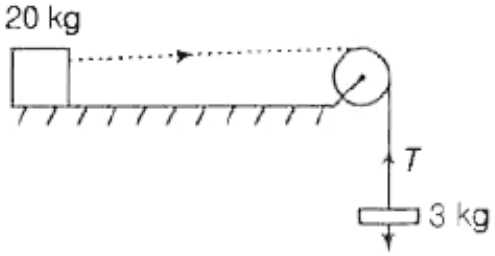
7. A body is mass 20 kg is moving on a rough horizontal plane. A block of mass 3 kg is connected to the 20 kg mass by a string of negligible mass through a smooth pulley as shown in the below figure. The tension in the string is 27 N. The coefficient of kinetic friction between the heavier mass and the surface is $(g = 10m/s^2)$



A. 0.025

B. 0.035

C. 0.35

D. 0.25

Answer: b

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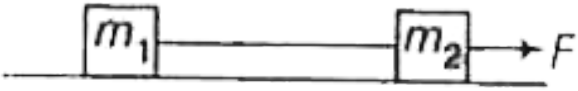
8. Two masses m_1 and m_2 are placed on a smooth horizontal surface and are connected by a string of negligible mass. A horizontal force F is applied on the mass m_2 as shown in

the figure. The tenison in the string is



A. $\left(\frac{m_1}{m_1+m_2}\right)F$

B. $\frac{m_2F}{m_1+m_2}$

C. $\left(\frac{m_1}{m_2}\right)F$

D. $\frac{m_2F}{m_1}$

Answer: a

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9. A body of mass 3kg moving with a velocity $\left(2\hat{i}+2\hat{j}+3\hat{k}\right)$ m/s collides with another body of mass 4kg moving with a velocity $\left(3\hat{i}+2\hat{j}-3\hat{k}\right)$ m/s. The two bodies stick together after collision. The velocity of the composite body is

A. $\frac{1}{7}\left(4\hat{j}+6\hat{j}-3\hat{k}\right)$

B. $\frac{1}{7}\left(18\hat{i}+14\hat{j}-3\hat{k}\right)$

C. $\frac{1}{7}\left(6\hat{i}+4\hat{j}-6\hat{k}\right)$

D. $\frac{1}{7}\left(9\hat{i}+8\hat{j}-6\hat{k}\right)$

Answer: b

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10. A simple pendulum of length L carries a bob of mass m. when the bob is at its lowest position, it is given that the monimum horizontal speed necessary for it to mvoe in a vertical circle about the point of suspension. When the string in horizontal, the net force on the bob is

A. $\sqrt{10}mg$

B. $\sqrt{5}mg$

C. 4 mg

D. 1 mg

Answer: a

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11. A system of two particles is having masses m_1 and m_2. If the particle of mass m_1 is pushed towards the centre of mass of

particles through a distance d, by what distance the particle of mass m_2 should be moved so as to keep the centre of mass of particles at the original position ?

A. $\left(\frac{m_1}{m_1}+m_2\right)\Big)d$

B. d

C. $\left(\frac{m_1}{m_2}\right)d$

D. $\left(\frac{m_2}{m_1}\right)d$

Answer: c

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12. A thin uniform circular disc of mass M and radius R is rotating in a horizonatl plane about an axis passing through its centre and perpendicular to its plane with an angular velocity ω. Another disc of same thickness and radius but of mass $\frac{1}{8}$ M is placed gently on the first disc coaxially. The anuglar velocity of the system is now

A. $\frac{8}{9}\omega$

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

C. $\frac{1}{3}\omega$

D. $\frac{2}{9}\omega$

Answer: a

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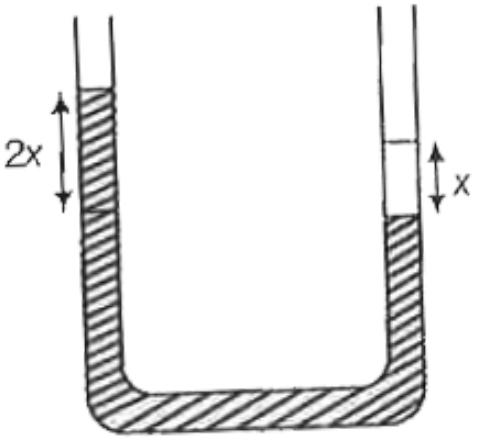
13. 9 kg solution is poured into a glass U-tube as shown in the figure below. The tube's inner diameter is $2\sqrt{\frac{\pi}{5}}$ m and the solution oscillates freely up and down about its positon of equilibrium (x - 0). The period of

oscillation in seconds is (1 m^3 of solution has a mass $\mu = 900kg, g = 10m/s^2$ ignor friction and surface tension effects



A. 0

B. 10

C. $\sqrt{\pi}$

D. 1

Answer: a

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14. The boides of masses 100 kg and 8100 kg are held at a distance of 1 m. The gravitational field at a point on the line joining at them is zero. The gravitational potential at the point in J/kg is $\left(G = 6.67 \times 10^{-11} Nm^{2/kg^2}\right.$

A. -6.67×10^{-7}

B. -6.67×10^{10}

C. -13.34×10^{7}

D. -6.67×10^{-9}

Answer: a

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15. An elastic spring of unstretched length L and force constant k is stretched by a small length x. It is further stretched by another small length y. Work done during the second stretching is

A. $\frac{ky}{2}(x+2y)$

B. $\frac{k}{2}(2x+y)$

C. $ky(x+2y)$

D. $\frac{ky}{2}(2x+y)$

Answer: d

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16. A soap bubble of radius 1.0 cm is formed inside another soap bubble of radius 2.0 cm The radius of an another soap bubble which

has the same pressure difference as that between the inside of the smallar and outside of large snap bubble, in metres is

A. 6.67×10^{-3}

B. 3.34×10^{-3}

C. 2.23×10^{-3}

D. 4.5×10^{-3}

Answer: a

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17. A slab of stone of area 3600 cm^2 and thickness 10 cm is exposed on the lower surface to steam at $100^\circ C$. A block of ice at $0^\circ C$ rests on upper surface of the slab. In one hour 4.8 kg of ice is melted. The thermal conductivity of the stone In $js^{-1}m^{-1}k^{-1}$ is (latent heat of ice $= 3.36 \times 10^5 j/kg$)

A. 12

B. 10.5

C. 1.02

D. 1.24

Answer: d

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18. The surface of a black body is at a temperature $727^\circ C$ and its cross-section is $1m^2$. Heat radiated from this surface in one minute in joules is (Stefan's constant = $5.7 \times 10^{-8} W/m^2/k^4$)

A. 34.2×10^5

B. 2.5×10^5

C. 3.42×10^5

D. 2.5×10^4

Answer: a

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19. Two moles of a gas is expanded to double its volume by two different processes. One is isobaric and the other is isothermal. If W_1 and W_2 are the works done respectively them

A. $W_2 = \frac{W_1}{\log e^2}$

B. $W_2 = W_1$

C. $W_2 = w_1 \log e^2$

D. $W_2 = W_1 \log e(2)$

Answer: d

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20. Uranium has two isotopes of masses 235 and 238 units. If both of them are present in uranium hexafluoride gas, find the percentage

ratio of difference in rms velocities of two isotopes to the rms velocity of heavier isotope.

A. 1.64

B. 0.064

C. 0.64

D. 6.4

Answer: c

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21. A source of frequency 340 Hz is kept above a vertical cylindrical tube closed at lower end. The length of the tube is 120 cm. Water is slowly poured in just enough to produce resonance. Then, the minimum height (velocity of sound = 340 m/s) of the water level in the tube for that resonance is

A. 0.75 cm

B. 0.25 cm

C. 0.95 cm

D. 0.45 cm

Answer: d

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22. A thin convex lens of focal length f made of crown glass is immersed in a liquid of refreactive index $\mu_1(\mu_1 > \mu_C)$ where μ_c is the refractive index of the crown glass.

The convex lens now is

A. a convex lens of longer focal length

B. a convex lens of shorter focal length

C. a divergent lens

D. a convex lens of the focal length

$(\mu_c - \mu_t)$ t

Answer: c

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23. Two convex lenses of focal lengths f_1 and f_2 form imgaes with magnification m_1 and m_2 when used individually for an object kept at

the same distance from the lenses. Them f_1 / f_2 is

A. $\frac{m_1(1-m_2)}{m_2(1-m_2)}$

B. $\frac{m_1(1-m_2)}{m_2(1-m_1)}$

C. $\frac{m_2(1-m_1)}{m_1(1-m_2)}$

D. $\frac{m_2(1-m_2)}{m_1(1-m_1)}$

Answer: b

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24. With the help of telescope that has an objective of diameter 200 cm. it is proved that ligh of wavelengths of the order of 6400 $\mathring{A}$ coming from a star can be easily resolved. Then, the limit of resolution is

A. 39×10^{-8} deg

B. 39×10^{-8} rad

C. 19.5×10^{-8} rad

D. 19.5×10^{-8} deg

Answer: b

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25. Two charged identical metal spheres A and B repel each other with a force of $3 \times 10^{-8} N$ Another idenitcal uncharged sphere C is touhced with sphere A and then it is placed mid way between A and B. Then the magnitude of net force on C is

A. $1 \times 10^{-5} N$

B. $3 \times 10^{-5} N$

C. $2 \times 10^{-5} N$

D. $5 \times 10^{-5} N$

Answer: b

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26. The electrostatic potential inside a charged sphere is given as $V = Ar^2 + B$, where r is the disatance from the centre of the sphere, A and B are constant. Then, the charge density in the sphere is

A. $16A\varepsilon_0$

B. $6A\varepsilon_0$

C. $20A\varepsilon_0$

D. $-15A\varepsilon_0$

Answer: b

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27. Three unequal resistor in parallel are equivalent to a resistance 1Ω If two of them are in the ratio 1:2 and if no resistance value is

fractional the largest of the three resistance in ohm is

A. 10Ω

B. 8Ω

C. 15Ω

D. 6Ω

Answer: d

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28. Two electric resistors have equal values of resistance R. Each can be operated with a power of 320 walts [w] at 220 volts. If the two resistors are connected in series to a 110 volts electric supply, then the power generated in each resistor is

A. 90 watts

B. 80 watts

C. 60 watts

D. 20 watts

Answer: d

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29. A current of 1 A is flowing along the side of an equilateral triangle of side 4.5×10^{-2} m. the magnetic field at the centroid of the triangle is $\left(\mu_0 = 4\pi \times 10^{-7} H/m\right)$

A. $4 \times 10^{-6} T$

B. $2 \times 10^{-8} T$

C. $4 \times 10^{-4} T$

D. $2 \times 10^{-4} T$

Answer: b

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30. A charged particle (charges = q, mass = m) is rotating in a circle of radius R with uniform speed V ratio of its magnetic moment (μ) to the angular momentum (L) is

A. $\frac{q}{2m}$

B. $\frac{q}{m}$

C. $\frac{q}{4m}$

D. $\frac{2q}{m}$

Answer: a

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31. Two small magnets have their masses and lengths in the ratio 1 : 2. the maximum torques experienced by them in a uniform magnetic

field are the same. For small oscillations, the ratio of their time periods is

A. $\frac{1}{2\sqrt{2}}$

B. $\frac{1}{\sqrt{2}}$

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

D. $2\sqrt{2}$

Answer: a

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32. Two coils have mutual inductance 0.005 H. The current changes in the first coil according to equation $I = I_0 \sin \omega t$, where $I_0 = 10A$ and $\omega = 100\pi$ rad s^{-1}. The maximum value of induced emf in the second coil is

A. 5

B. 5π

C. 0.5π

D. π

Answer: b

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33. A capacitance of $\left(\frac{10^{-3}}{2\pi}\right)$ F and an inductance of $\left(\frac{100}{\pi}\right)$ mH and a resistance of 10Ω are connected in series with an AC voltage source of 220 V, 50 Hz. The phase angle of the circuit is 60^(@)`

A. 60°

B. 30°

C. 45°

D. 90°

Answer: c

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34. Two equations are given below:

(A) $\int E.\, dA = \frac{Q}{\varepsilon_0}$

(B) $\int B.\, dA = 0$

They are

A. (A) ampere's law

(B) Gauss law for electricity

B. Gauss law for electric fields

(B) Gauss law for magnetic fields

C. (A) Faraday's law

(B) Gauss law for electric fields

D. Both (A) and (B) represents faraday's law

Answer: b

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35. A charged particle is accelerated from rest through a certain potenetial difference. The de-Broglie wavelength is λ_1 when it is acceleated through V_1 and is λ_2 when accelerated through V_2. Then ratio λ_1 / λ_2 is

A. $V_1^{3/2} : V_2^{3/2}$

B. $V_2^{1/2} : V_1^{1/2}$

C. $V_1^{1/2} : V_2^{1/2}$

D. $V_1^2 : V_2^2$

Answer: b

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36. If the first line of Lyman series has a wavelengths 1215.4 $\mathring{A}$, the first line of Balmer series is appproximately

A. $4864\mathring{A}$

B. $1025.5\mathring{A}$

C. $6563\mathring{A}$

D. $6400\mathring{A}$

Answer: c

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37. A certain radioactive element disintegrates with a decay constant of $7.9 \times 10^{-10}/s$ At a given instant of time, if the activity of the sample is equal to 55.3×10^{11} disintegration/second then number of nuclei at that instant of time ia

A. 7.0×10^{21}

B. 4.27×10^{13}

C. 4.27×10^{3}

D. 6×10^{23}

Answer: a

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38. The change in current through a junction diode is 12mA when the forward bias voltage is changed by 0.6 V. The dynamic resistance is

A. 500Ω

B. 300Ω

C. 150Ω

D. 250Ω

Answer: a

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39. A semiconductor has equal electron and hole concentration of $2 \times 10^8 m^{-3}$. On doping with a certain impurity, the eletron concendration increases to $4 \times 10^{10} m^{-3}$,

then the new hole concentration of the semiconductor is

A. $10^6 m^{-3}$

B. $10^8 m^{-3}$

C. $10^{10} m^{-3}$

D. $10^{12} m^{-3}$

Answer: a

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40. A message signal of 12 kHz and peak voltage 20 V is used to modulate a carrier wave frequency 12 MHz and peak voltage 30 V. then, the modulation index is

A. 0.32

B. 6.7

C. 0.67

D. 67

Answer: c

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