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PHYSICS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2017



1. A force F is applied in a square plate of length L . If the percentage error in the

determination of L is 3% and in F in 4% then permissible error in the calculation of pressure is A. 13%**B**. 10 % C. 7 % D. 12 %

Answer: B

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2. A Positive charge Q is placed on a conducting spherical shell with inner radius R_1 and outer radius R_2 . A particle with charge q is placed at the center of the spherical cavity. The magnitude of the electric field at a point in the cavity, a distance r from center is

A. zero

B.
$$rac{Q}{4\piarepsilon_0 r^2}$$

C. $rac{q}{4\piarepsilon_0 r^2}$
D. $rac{(q+Q)}{4\piarepsilon_0 r^2}$

Answer: B



3. A swimmer wants to cross a 200 m wide river which is flowing at a speed of 2 m/s. the velocity of the swimmer with respect to the river is 1 m/s. how far from the point directly opposite to the starting point does the swimmer reach the opposite bank ?

A. 200m

B. 400m

C. 600m

D. 800m

Answer: B

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4. A coil having n trurns and resistance $R\Omega$ is connected with a galvanometer of resistance $4R\Omega$ this combination is moved in time t seconds from a magnetic flux ϕ_1 weber to ϕ_2

weber The induced current in the circult is

A.
$$rac{\phi_2 - \phi_1}{5RnT}$$

B. $-rac{n(\phi_2 - \phi_1)}{5Rt}$
C. $-rac{(\phi_2 - \phi_1)}{Rnt}$
D. $-rac{n(\phi_2 - \phi_1)}{Rt}$

Answer: B

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5. A simple pendulum of length 1 m is freely suspended from the ceiling of an elevator the time period of small oscollations as the elevator moves up with an acceleration of $2m/s^2$ is (use $g = 10m/s^2$)

A.
$$\frac{\pi}{\sqrt{5}}s$$

B. $\sqrt{\frac{2}{5}}\pi s$
C. $\frac{\pi}{\sqrt{2}}s$
D. $\frac{\pi}{\sqrt{3}}s$

Answer: D

6. Consider a metal ball of radius r moving at a constant velocity v in a uniform magnetic field of induction of velocity forms an angle α with the direction of \overline{B} , the maximum potential difference between points on the ball is

- A. $rig|\overline{B}ig||ar{c}|{\sinlpha}$
- B. $\left|\overline{B}\right| \left|\overline{v}\right| \sin lpha$

 $\mathsf{C.}\,2r\big|\overline{B}\big|\big|\overline{V}\big|\!\sin\alpha$

D. $2r |ar{b}| |\overline{V}| \cos lpha$

Answer: C

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7. Each of the six ideal batteries of emf 20 v is connected to an external resistance of 4Ω as shown in the figure . The current through the

resistance is



A. 6A

- B. 3A
- C. 4A
- D. 5A

Answer:



8. The energy that should be added to an electron to reduce its de - broglie wavelength from 1 nm to 0.5 nm is

A. Four -0 times the initial energy

B. equal to the initial energy

C. Two - times the initial energy

D. Three - times the initial energy

Answer: D



9. In the given circult , a charge of + $89\mu C$ is given to upper plate of a $4\mu F$ capacitor . At steady state , the charge on the upper plate of the $3\mu F$ capacitor is



A. $60 \mu C$

B. $48\mu C$

C. $80\mu C$

D. $0\mu C$

Answer: B

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10. The young's modulus of a material is $2 imes 10^{11}N/m^2$ and its elastic limit is $1 imes 10^8N/m^2$ for a wire of 1m length of this

material, the maximum elongation achievable

is

A. 0.2mm

B.0.3mm

C.0.4mm

 $\mathsf{D}.\,0.5mm$

Answer: D



11. A wooden box lying at rest on an inclined surface of a wet wood is held at static equilibrium by a constant force F applied perpendicular to the angle of inclination is 30° and the box and the inclined plane is 0.2, the minimum magnitude of F is

(Use $g=10m\,/\,s^2$)

A. O N as 30° is less than angle of repose

B. $\leq 1N$

C. $\leq 3.3N$

D. $\leq 16.3N$

Answer: D

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12. A meter scale made of steel , reads accirately at $25^{\circ}C$ Suppose in an experiment an accuracy of 0.06 mm in 1 m is required , the range of temperature in which the experiment can be performed with this meter scale is (

Coefficient of linear expansion of steel is $11 imes 10^{-6} / {}^{\circ}C$) A. $19^{\circ}C$ to $31^{\circ}C$ B. $25^{\circ}C$ to $32^{\circ}C$ C. $18^\circ C o 25^\circ C$ D. $18^{\,\circ}\,C
ightarrow 32^{\,\circ}\,C$

Answer: A



13. Consider a solenoid carrying current supplied k by a DC source with a constant emf containing iron core inside it when the core is pulled out of the solenoid the change in current will

A. remain same

B. decrease

C. increase

D. modulate

Answer: A

14. A parallel beam of light of intensity I_0 is incident on a coated glass plate . IF 25% of the incident light is reflected from the upper surface and 50 % of light if reflected from the glass plate , the ratio of maximum to minimum intensity in the interference region of the reflected light is

A.
$$\left(\frac{\frac{1}{2} + \sqrt{\frac{3}{8}}}{\frac{1}{2} - \sqrt{\frac{3}{8}}}\right)^2$$



Answer: A



15. A thermocal box has a total wall area (including the lid) of 1.0 m^2 and well thickness of 3 cm . It is filled with ice at $0^\circ C$. If the average temperature outside the box is $30^{\circ}C$ throughout the day , the amount of ice that melts in one day is [Use $K_{
m themocal}~=0.03$ W/mk ,

L _{Fusion (ice)}= $3.00 imes 10^5 j/KG$]

A. 1kg

 $\mathsf{B.}\,2.88kg$

 $\mathsf{C.}\,25.92kg$

 $\mathsf{D.}\,8.64kg$

Answer: D





16. Which of the following is emitted , when $^{239}_{94}Pu$ decays into $^{235}_{92}U$?

A. Gamma ray

B. Neutron

C. Electron

D. Alpha particle

Answer: D

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17. An AC generator 10 V (rms) at (Rms) at 200 rad //s is connected in series with a 50 Ω Resistor , a 400mH inductor and a $200\mu F$ capacitor . The rms voltage across the inductor is

A. 2.5V

 $\mathsf{B.}\,3.4V$

 $\mathsf{C.}\,6.7V$

D. 10.8V

Answer: D



18. A wire has resistance of 3.1 Ω at 30° C and 4.5Ω at $100^\circ C$. The temperature coefficient of resistance of the wire is

A.
$$0.0012^{\,\circ}\,C^{\,-1}$$

B. $0.0024^{\,\circ}\,C^{\,-1}$

C. $0.0032^{\,\circ}\,C^{\,-1}$

D. $0.0064^{\,\circ}\,C^{\,-1}$

Answer:



19. An Object is thrown vertically upward with a speed of 30 m/s . The velocity of the object half -a - second before it reaches the maximum height is

A. 4.9 m/s

B. 9.8 m/s

C. 19.6 m/s

D. 25.1 m/s

Answer: A

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20. An electron colliodes with a hydrogen atom in its ground state and excites it to n=3 state . The energy given to the hydrogen atom in this inelastic collision (neglecting the recoil of hydrogen atom) is

A. 10.2eV

 $\mathsf{B}.\,12.1eV$

${\rm C.}\,12.5 eV$

D. 13.6eV

Answer: B

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21. Consider the motion of a particle described

by $x = a \cos t, y = a \sin t$ and z = t . The

trajectory traced by the particle as a function

of time is

A. helix

B. circular

C. elliptical

D. straight line

Answer: A

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22. Consider a reversible engine of efficiency $rac{1}{6}$ when the temperature of the sink is reduced by $62^{\circ}C$, its efficiency gets doubled.

The temperature of the source and sink

respectively are

A. 372 k and 310 K

B. 273 K and 300 K

C. 99 $^{\circ}C$ and 10 $^{\circ}C$

D. $200^{\circ}C$ and $37^{\circ}C$

Answer: A

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23. Consider a light source placed at a distance of 1.5 m along the axis facing the convex side of a spherical mirror of radius of curvature 1m . The position (s') nature and magnification (m) of the image are

A. s' = 0.375 m virtual upright ,m=025

B. s'=0.375 m real inverted m=025

C. s'=3.75 m, virtual inverted m=2.5

D. s'= 3.75 m, real uplight ,m=2.5

Answer: A

24. An office room contains about 2000 moles of air . The change in the internal energy of this much air when it is cooled from $34^{\circ}C$ to $24^{\circ}C$ at constant pressure of 1.0 atm is [Use $gamm_{air} = 1.4$ and universal gas constant = 8.314J/mol - K]

A. $-19 imes10^5 J$

 ${\sf B.+19 imes10^5}J$

 $\mathsf{C.}-42 imes10^5 J$

D. $+0.7 imes10^5 J$

Answer: C

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25. A ball is thrown at a speed of 20 m/s at an angle of 30° with the horizontal . The maximum height reached by the ball is

(Use $g=10m\,/\,s^2$)

A. 2m

B. 3m

C. 4m

D. 5m

Answer: D

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26. A horizonta pipeline carrying gasoline has a cross -sectional diameter of 2 mm. If the viscosity and density of the gasoline are 6×10^{-3} poise and 720 kg //m ^3` respectively, the velocity after which the flow

becomes turbulent is

A. > 1.66m/s

B. > 3.33m/s

C. $> 1.6 imes 10^{-3} m/s$

D. > 0.33m/s

Answer: C

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27. A piece of copper and a piece of germanium are cooled from temperature to 80 K . Then which one of the following is correct ?

A. Resistance of each will increase

B. Resistance of each will decrease

C. Resistance of copper will decrease

D. Resistance of copper will increase while

that of germanium will decrease

Answer: C



28. A beam of light propagation at an angle α_1 from a medium 1 through to another medium 2 at an angle α_2 if the wavelength of light in medium 1 is λ_1 , then the wavelength of light in medium 2, (λ_2) is

A.
$$\frac{\sin \alpha_2}{\sin \alpha_1} \lambda_1$$

B. $\frac{\sin \alpha_1}{\sin \alpha_2} \lambda_2$

$$\mathsf{C}.\left(\frac{\alpha_1}{\alpha_2}\right)\lambda_1$$

D. λ_1

Answer: A



29. An amplitude moduated signal consists of a message singnal of frequency 1 KHz and peak voltage of 5 V , moduating a carrier frequency of 1 MHz and peak voltage of 15 V . The correct description of this singnal is

A.
$$5[1 + 3\sin(2\pi 10^6 t)]\sin(2\pi 10^3 t)$$

B. $15\left[1 + \frac{1}{3}\sin(2\pi 10^3 t)\right]\sin(2\pi 10^6 t)$
C. $[5 + 15\sin(2\sin(2\pi 10^3 t))]\sin(2\pi 10^6 t)$
D. $[15 + 5\sin(2\pi 10^6 t)]\sin(2\pi 10^3 t)$

Answer: B

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30. Which of the following principles is being

used in sonar technology?

A. Newton's laws of motion

B. Reflection of electromagnetic waves

C. law's of thermodynamics

D. Reflection of ultrasonic waves

Answer: D

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31. A particle of mass M is moving in a horizontal circle of radius R with uniform

speed v. When the particle moves from one point to a diametrically opposite point , its A. momentum does not change

B. momentum changes by 2 Mv

C. Kinetic energy changes by $rac{Mv^2}{4}$

D. Kinetic energy changes by Mv^2

Answer: B

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32. A billiard ball of mass M , moving with velocity v_1 collides with another ball of the same mass but at rest . If the collision is elastic , the angle of divergence after the collision is

- A. 0°
- B. 30°
- C. 90°
- D. 45°

Answer: A

33. A planet of mass m moves in a elliptical orbit around an unknown star of mass M such that its maximum an minimum distances from the star are equal to r_1 and R_2 respectively. The angular momentum of the planet relative to the centre of the star is

A.
$$m\sqrt{rac{2GMr_1r_2}{r_1+r_2}}$$

B. 0

C.
$$m\sqrt{rac{2GM(r_1+r_2)}{r_1r_2}}$$

D. $\sqrt{rac{2GMmr_1}{(r_1+r_2)r_2}}$

Answer: A



34. Consider a frictionless rampp on which a smooth object is made to slide down from an initial height h . The distance d necessary to stop the object on a flat track (of coefficient of friction μ), kept at the ramp end is

A. h/μ

 $\mathsf{B.}\,\mu h$

 $\mathsf{C}.\,\mu^2 h$

D. $h^2 \mu$

Answer: A



35. A generator with a circular coil of 100 turns of area $2 \times 10^{-2} m^2$ is immersed in a 0.01 T magnetic field and rotated at a frequency of

50 Hz. The maximum emf which is prodiuced

during a cycle is

A. 6.28 V

B. 3.44 V

C. 10V

D. 1.32 V

Answer: A



36. A sound wave of frequency v Hz initially travels a distance of 1 km in air , then , it gets reflected into a water reservoir of depth 600 m . The frequency of the wave at the bottom of the reservoir is

 $V_{
m air} ~= 340 m \, / \, s V_{
m \, water} ~= 1484 m \, / \, s)$

A. < vHz

B. > vHz

 $\mathsf{C.}\,vHz$

D. O (the sound wave gets attenuated by

water completely)

Answer: C

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37. Which of the following statement is not true ?

A. the resistance of an intrinsic semiconductor decreases with increase

in temperature

B. Doping pure SI with trivalent impurities gives p-type semicondductor C. The majority carriers n - type semiconductors are holes D. a p-n junction can act as a semiconducotor diose

Answer: C

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38. The deceleration of a car traveling on a straight highway is a function of its instantaneous velocity v given by $\omega = a\sqrt{v}$ where a is a constant. If the initial velocity of the car is 60 km/h, the distance of the car will travel and the time it takes before it stopes are

A.
$$\frac{2}{3}m$$
, $\frac{1}{2}s$
B. $\frac{3}{2a}m$, $\frac{1}{2a}s$
C. $\frac{3a}{2}m$, $\frac{a}{2}s$
D. $\frac{2}{3a}m$, $\frac{2}{a}s$

Answer: D



39. A current carrying wire in its neighbourhood produces

A. electric field

- B. electric and magnetic fields
- C. magnetuic field

D. no field

Answer: C

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40. Consider a particle on which constant forces $F_1 = \hat{i} + 2\hat{j} + 3\hat{k}$ N and $F_2 = 4\hat{i} - 5\hat{j} - 2\hat{k}$ act together resulting in a displacement from position $r_1 = 20\hat{i} + 15\hat{j}$ cm \rightarrow r_2 = 7 hatk`cm. the total work done on the particle is

A. -0.48J

 $\mathsf{B.}+0.48J$

C. - 4.8J

D. + 4.8J

Answer: A

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