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## PHYSICS

## BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

## AP EAMCET ENGINEERING ENTRANCE EXAM ONLINE QUESTION PAPER 2019 (SOLVED)

## Physics

1. N divisions on the main scale of a vernier calipers coincide with ( N
$+1)$ division of the vernier scale. If each division of main scale is a units, then the least count of the calipers is :
A. $\frac{a}{N}$
B. $a$
C. $\frac{a}{N+1}$
D. $\frac{N a}{N+1}$

## Answer: C

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2. When a body is in SHM, then match the following .
List - I

List- II
$A$. Vlecity is maximum
I. At extreme position
$B$. KEis $\left(\frac{3}{4}\right)^{t h}$ oh the total energy $I I$. At mean position C. PE is $\left(\frac{3}{4}\right)^{\text {th }}$ of total energy $\quad$ III. At half of the amplitude
$D$. Acceleration is maximum $I V . A t \frac{\sqrt{3}}{2}$ times of the amplitude
A. $\begin{array}{llll}A & B & C & D \\ I I I & I & I V & I I\end{array}$
B. $\begin{array}{llll}A & B & C & D \\ I & I I I & I V & I I\end{array}$
${ }_{c}^{A} \quad B \quad C \quad D$
C. $\begin{array}{llll}\text { II } & I I I & I V & I\end{array}$
D. $\begin{array}{llll}A & B & C & D \\ I I & I & I V & I I I\end{array}$

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3. Ship A is moving Westwards with a speed of $20 \mathrm{kmh}^{-1}$ and another ship B which is at 200 km South of A is moving Northwards with a speed of $10 \mathrm{kmh}^{-1}$. The time after which the distance between them is shortest and the shortest distance between them respectively,
A. $4 h, 80 \sqrt{5} k m$
B. $50 \sqrt{2} h, \sqrt{10} \mathrm{~km}$
C. $100 \sqrt{2} h, 2 \sqrt{10} \mathrm{~km}$
D. $80 \sqrt{5} h, 4 k m$

## Answer: A

4. A body is projecte at an angle of $60^{\circ}$ with the horizontal such that the vertical component of its initial velocity is $40 \mathrm{~ms}^{-1}$. The magnitude of velocity of the projectile at one quarter of its time of flight is nearly, (Acceleration due to gravity, $g=10 \mathrm{~ms}^{-2}$ )
A. 3. $54 m s^{-1}$
B. $35.40 \mathrm{~ms}^{-1}$
C. $30.54 m s^{-1}$
D. $34.5 \mathrm{~ms}^{-1}$

## Answer: A

5. A block of mass 48 kg kept on a smooth horizontal surface is pulled by a rope of length 4 m by a horizontal force of 25 N applied to the other end. If the linear density of the rope is $0.5 \mathrm{kgm}^{-3}$, the force acting on the block is
A. 24 N
B. 25 N
C. 12 N
D. 13 N

## Answer: A

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6. Two blocks A and B of masses 1.5 kg and i .5 kg , respectively are connected by a massless inextensible string passing over a
frictionles pulley as shown in the figure. Block A is lifted until block $B$ touches the ground and then block $B$ touches the ground and then block A is released. the initial height of block A is 80 cm when block $B$ just touches the ground. the maximum height reached by block B from the ground after the block A falls on the ground is

A. 80 cm
B. 120 cm
C. 140 cm
D. 160 cm

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7. A body is released from height of 30 m vertically downwards. The speed of the body at which potential is twice that of kinetic energy is
(Acceleration due to gravity, $g=10 m s^{-2}$ )
A. $20 \sqrt{20} \mathrm{~ms}^{-1}$
B. $10 \sqrt{2} m s^{-1}$
C. $10 m s^{-1}$
D. $20 \mathrm{~ms}^{-1}$

## Answer: B

8. The work done by a force $F=-5 x^{4} \hat{i} N$ in displacing a dody from, $x=2 m$ to $x=-2 m$ is
A. 6 J
B. 8 J
C. 64 J
D. 0 J

## Answer: C

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9. A wheel having moment of inertia $2 k g-m^{2}$ about its axis, rotates at 50 rpm about the same axis. The torque required to stop the wheel in one minute is
A. $\frac{\pi}{10} N m$
B. $\frac{\pi}{18} N m$
C. $-\frac{\pi}{12} N m$
D. $\frac{3 \pi}{8} N m$

## Answer: B

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10. The angular retardation of a rotating flywheel is proportional to the angle through which it rotates. If its kinetic energy gets reduced by $\Delta E$ while it rotates through at an angle $\theta$, then
A. $\Delta E \propto \theta^{2}$
B. $\Delta E \propto \sqrt{\theta}$
C. $\Delta E \propto \theta$
D. $\Delta E \propto \theta^{\frac{3}{2}}$

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11. One end of spring of force constant $k$ is fixed to a vertical wall and the other to a block of mass $m$ resting on a smooth horizontal surface. There is another wall at a distance, $x_{0}$ from the block. The spring is then compressed by $2 x_{0}$ and released. The time taken by the block to strike the other wall is

A. $\frac{1}{6} m \sqrt{\frac{m}{k}}$
B. $\sqrt{\frac{m}{k}}$
C. $\frac{2 \pi}{3} \sqrt{\frac{m}{k}}$
D. $\frac{\pi}{64} \sqrt{\frac{m}{k}}$

## Answer: C

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12. The amplitude of a damped oscillator becomes half in one minute. The amplitude after 3 munutes will be $\frac{1}{x}$ times the original .Then,$x$ is
A. 4
B. 8
C. 6
D. 12
13. A uniform rod of length I and density $\rho$ is revolving about a vertical axis passing through its one end. If $\omega$ is the angular velocity of the rod then the centrifugal force per unit area of the rod is
A. $\frac{\rho \omega^{2 / 2}}{4}$
B. $\frac{\rho \omega^{2 / 2}}{12}$
C. $\frac{\rho \omega^{2 / 2}}{2}$
D. $\frac{\rho \omega^{2 / 2}}{8}$

## Answer: C

14. Two capillary tubes of same length each of 50 cm but of different radii 4 mm and 2 mm are connected in series. When water flows, the pressure, difference between the ends of the first tube is
A. $\frac{\rho}{2}$
B. $\frac{\rho}{17}$
C. $\frac{\rho}{4}$
D. $\frac{\rho}{8}$

## Answer: B

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15. Two metal plates $P$ and $Q$ of same material are arranged as shown in the figure. If both the plates are uniformly heated
through the same range of temperature, then

A. both $x$ and $y$ increase
B. both $x$ and $y$ decrease
C. $x$ decreases and $y$ increase
D. $x$ increases and $y$ decrease

## Answer: B

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16. A liquid of mass 250 g is kept warm in a vessel using an electric heater. The liquid is maintained at $57^{\circ}$ when the power supplied by
the heater is 30 W and surrounding temperature is $27^{\circ} \mathrm{C}$. As the heater is switched off, it took 10 s time for the temperature of the liquid to fall from $47^{\circ} \mathrm{C}$ to $46.9^{\circ} \mathrm{C}$. The specific heat capacity of the liquid is
A. $8000 j \mathrm{~kg}^{-1} \mathrm{~K}^{-1}$
B. $9000 j \mathrm{~kg}^{-1} \mathrm{~K}^{-1}$
C. $6000 j \mathrm{~kg}^{-1} \mathrm{~K}^{-1}$
D. $12000 \mathrm{jkg}^{-1} \mathrm{~K}^{-1}$

## Answer: D

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17. The amount of heat that must be supplied to 35 g of oxgen at room temperature to raise its temperature by $80^{\circ} \mathrm{C}$ at constant
volume is
(Molecular mass of oxygen is 32 and $R=8.3 \mathrm{Jmol}^{-1} \mathrm{~K}^{-1}$ )
A. 2.84 kJ
B. 1.68 kJ
C. 1.81 kJ
D. 2.88 kJ

## Answer: C

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18. A Carnot engine of efficiency $40 \%$, takes heat from a source maintained at a temperature of 500 K . If is desired to have an engine of efficiency $60 \%$. Then, the source temperature for the same sink temperature must be
B. 750 K
C. 550 K
D. 850 K

## Answer: B

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19. For a gas the value of $\frac{R}{C_{v}}=0.4$ so the gas is (R-universal gas constant)
A. monoatomic
B. diatomic
C. triatomic
D. polyatomic
20. A cylindrical tube open at both ends has a fundamental fruquency $f$ in air. The tube is dipped vertically in water so that $60 \%$ of the tube is in water. Then, the fundamental frequency of air column is
A. $\frac{f}{2}$
B. $\frac{5 f}{4}$
C. $\frac{3 f}{4}$
D. $2 f$

## Answer: B

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21. A train approaching a railway crossing at a speed of $120 \mathrm{~km} / \mathrm{h}$ sounds a whistle of frequency 576 Hz , when it is 288 m away from the crossing. The frequency heard by the observer standing on the road perpendicular to the track from the crossing at a distance of 384 m is
(Speed of sound in air $=340 \mathrm{~ms}^{-1}$ )
A. 632 Hz
B. 612 Hz
C. 512 Hz
D. 472 Hz

## Answer: B

22. A small object is enclosed in a transparent solid sphere of radius 8 cm . the object is situated at 2 cm from the centre of the sphere. If its image appears to be at 3.2 cm from the nearest side, then the refractive index of the material of the sphere is
A. 1. 62
B. 1.45
C. 1.55
D. 1.50

## Answer: D

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23. A Young 's double slit experimental setup is immersed in water of refrective index 1.33 . It has slit seperation 1 mm and the distance
between slits and screen is 1.33 m . If the wavelength of incident light on slits is $6300 \AA$, then the fringe width on the screen is
A. 6.3 mm
B. 0.63 mm
C. 0.63 m
D. 6.3 m

## Answer: B

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24. In a hydrogen atom, an electron of mass $9.1 \times 10^{-31} \mathrm{~kg}$ revolves about a proton in circular orbit of radius $0.53 \AA$. The radial acceleration and angular velocity of electron are respectively.
A. $9 \times 10^{22} \mathrm{~ms}^{-2}, 4.1 \times 10^{16} s^{-1}$
B. $4.1 \times 10^{16 m s^{-2}, 9 \times 10^{22} s^{-1}}$
C. $9 \times 10^{16} \mathrm{~ms}^{-2}, 4.1 \times 10^{22} s^{-1}$
D. $4.1 \times 10^{22} m s^{-2}, 9 \times 10^{16} s^{-1}$

## Answer: A

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25. Two long parallel plates $A$ and $B$ are separated by a distance of 4 cm with an electric field of $45.5 \mathrm{Vm}^{-1}$ between the plates normally from plate $A$ to plate $B$, as shown in the figure. An electron is projected from plate $A$ with velocity $v$ at an angle of $30^{\circ}$ with the surface of plate $A$. The maximum value of $v$ so that the electron does not hit plate $B$ is
(Assume gravity free space, charge of electron $=1.6 \times 10^{-19} \mathrm{C}$
and mass of electron $=9.1 \times 10^{-31} \mathrm{~kg}$ )


## Electron

A. $400 \mathrm{kms}^{-1}$
B. $3200 \mathrm{~km}^{-1}$
C. $800 \mathrm{kms}^{-1}$
D. $1600 \mathrm{kms}^{-1}$

Answer: D

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26. Three point charges of 2 mC each are kept at the vertices of an equilateral triangle of side 50 cm . If the system is supplied energy at the rate 2 kW , the time taken to move one of the charges to the mid point of the line joining the other two charge is
A. 18 s
B. 36 s
C. 72 s
D. 144 s

## Answer: C

## D Watch Video Solution

27. Two identical charged spheres separated by a distance repel other with a force F. If $10 \%$ of electrons are transferred from one
sphere of the other ,then the force between them becomes
A. F
B. 1.21 F
C. 0.99 F
D. 0.81 F

## Answer: C

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28. In the given circuit, the electric cruuents through $15 \Omega$, respectively are :

A. 0 A, 0.5 A
B. 0 A, 1 A
C. $0.5 \mathrm{~A}, 1 \mathrm{~A}$
D. 1 A, 0 A

Answer: A
(D) Watch Video Solution
29. In the given circuit, the current through $2 \Omega$ resistor is

A. $9 A$
B. $0.9 A$
C. $\frac{1}{9} A$
D. $\frac{1}{0.9} \mathrm{~A}$

Answer: B
30. A circular coil connected to a battery of emf E produced a certain magnetic induction field at its centre. The coil is unwound, stretched to double its length rewound into a coil of $\frac{1^{r d}}{3}$ of the original radius and connected to a battery of emf $E$ to produce same field at the centre. Then , E is
A. $\frac{2 E}{9}$
B. $\frac{3 E}{7}$
C. $\frac{9 E}{4}$
D. $\frac{E}{6}$

## Answer: A

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31. Assertion (A) The work done by the electrostatic force is zero when a point charge move in a circular path around another charge.

Reason (R) The dot product of force and displacement vectors gives work done.
A. Both (A) and (R) are correct and (R) is the correct explanation of (A)
B. Both (A) and (R) are correct but (R) is not correct explanation of (A)
C. (A) is correct but (R) is not correct.
D. (A) is not correct but (R) is correct.

## Answer: A

32. The magnetic susceptibility of a paramagnetic substance at $-173^{\circ} \mathrm{C}$ is $1.5 \times 10^{-2}$. To have the susceptibility $0.5 \times 10^{-2}$, the change in temperature in.$^{\circ} C$ is
A. 100
B. 180
C. 200
D. 220

## Answer: C

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33. A coil of mean area $500 \mathrm{~cm}^{2}$ and having 1000 turns is held with its plane perpendicular to a uniform field of 00.4 G . If the coil is turned through $180^{\circ}$ in $\frac{1}{10}$ second, then the average induced emf
(Take ,1 G $=10^{-4} T$ )
A. 0.04 V
B. 0.4 V
C. 4 V
D. 40 V

## Answer: A

## D Watch Video Solution

34. An emf of 15 V is applied to a circuit containing 5 H inductance and $10 \Omega$ resistance. The ratio of the currents at time, $t=\infty$ and $t=1 \mathrm{~s}$ is
A. $\frac{e}{e^{2}-1}$
B. $\frac{e^{2}}{e-1}$
C. $\frac{e}{1-e^{2}}$
D. $\frac{e^{2}}{e^{2}-1}$

## Answer: D

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35. The amplitude of the electric field in a parallel beam of plane electromagnetic waves of intensity $53.1 \mathrm{~W} \mathrm{~m}^{-1}$ is
(Permittivity of free space $=8.85 \times 10^{-12} C^{2} N^{-1} M^{-2}$ )
A. $400 N C^{-1}$
B. $50 N C^{-1}$
C. $100 N C^{-1}$
D. $200 N C^{-1}$

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36. An $\alpha$-particle moves in a circular path of radius 1 cm in a uniform magnetic field of 0 1.25 T . The de-Broglie wavelength associated with the $\alpha$-particle is
A. $1.65 \times 10^{-12} m$
B. $3.3 \times 10^{-12} m$
C. $4.95 \times 10^{-12} m$
D. $6.6 \times 10^{-12} \mathrm{~m}$

## Answer: A

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37. When a hydrogen atom emits a photon during a transition from $n=4$ to $n=2$, its recoil speed is about,
A. $4.28 m s^{-1}$
B. $0.814 m s^{-1}$
C. $0.07 m s^{-1}$
D. $0.407 \mathrm{~ms}^{-1}$

## Answer: B

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38. If the binding energy of $N^{14}$ is 7.5 Mev per nucleons and that of $N^{15}$ is 7.7 MeV per nucleon, then, the energy is required to remove a neutron from $N^{15}$ is
A. 5.25 MeV
B. 0.2 MeV
C. 10.5 MeV
D. 0.4 MeV

## Answer: C

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39. In the following common-emitter circuit,
$\beta=100$ and $V_{C E}=7 . I f V_{B E}$ is negligible, then the base current

A. 0.01 mA
B. 0.04 mA
C. 0.02 mA
D. 0.03 mA

## Answer: B

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40. The frequency suitable for beyond - the - horizon communication using sky waves is
A. $10^{12} \mathrm{~Hz}$
B. $10^{9} \mathrm{~Hz}$
C. $10^{7} \mathrm{~Hz}$
D. $10^{4} \mathrm{~Hz}$

## Answer: C

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