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## PHYSICS

# BOOKS - TS EAMCET PREVIOUS YEAR 

## PAPERS

## AP EAMCET ( ONLINE QUESTION PAPER 2018 SOLVED)

1. If $A$ represents Boltzmann constant $B$ represents Planck's constant and C represents
speed of light in vacuum then the quantity having the dimensions of $A^{4} B^{-3} C^{-2}$ is
A. universal gas constant
B. specific heat capacity
C. stefan's constant
D. heat energy

## Answer: C

2. The motion of a particle along a straight line is described by the function $\mathrm{x}=(2 t-3)^{2}$ where $x$ is in metres and $t$ is in seconds. The acceleration of the particle at $=2 s$ is
A. $1 m s^{-2}$
B. $4 m s^{-2}$
C. $8 m s^{-2}$
D. $7 m s^{-2}$

## Answer: C

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3. A particle moves in the $x y$ - plane with velocity $\mathrm{v}=x \hat{i}+y t \hat{j} . A t t=\frac{x \sqrt{3}}{y}$ the magnitudes of tangential and normal accelerations respectively are
A. $\frac{\sqrt{3 y}}{2}, \frac{y}{2}$
B. $\frac{\sqrt{2 y}}{3}, \frac{\sqrt{3 y}}{2}$
C. $\frac{\sqrt{3 y}}{2}, \frac{5 y}{2}$
D. $2 \sqrt{3 y}, \frac{11 y}{\sqrt{3}}$

## Answer: A

## D View Text Solution

4. Assertion (A) The speed of a body in uniform
circular motion is constant.

Reason ( R) In uniform circular motion, the acceleration of the body is constant .
A. Both (A) and (R) are true and (R) is the correct explanation of (A).
B. Both (A) and (R) are true but (R) is not the correct explanation of (A).
C. (A) is true but (R) is false .
D. (A) is false but (R) is true .

Answer: C

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5. One end of a light string is fixed to a clamp
on the ground and the other end passes over
a fixed frictionless pulley as shown in the
figure. It makes an angle of $30^{\circ}$ with the
ground . The clamp can tolerate a vertical
force of 40 N . If a monkey of mass 5 kg were
to climb up the rope then the maximum
acceleration in the upward direction with
which it can climb safely is ( $\mathrm{g}=10 \mathrm{~ms} \mathrm{~s}^{-2}$ )

A. $2 m s^{-2}$
B. $4 m s^{-2}$
C. $6 m s^{-2}$
D. $8 m s^{-2}$
6. In the arrangement shown in the figure if the blocks of masses m and 2 m are released from the state of rest tension in the string is ( $\mu=$ coefficient of friction string is massless and inextensible pulley is frictionless )

A. $m g$
B. $\sqrt{2} \mathrm{mg}$
C. $\frac{2 \sqrt{2} m g}{3}$
D. $\frac{\sqrt{2} m g}{3}$

## Answer: C

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7. A stone of mass 2 kg tied to a light inextensible string of length $\frac{5}{3} \mathrm{~m}$ is whirling in a circular path in a vertical plane. If the ration of the maximum tension to the
minimum tension in the string is 4 then the speed of the stone at the highest point of the circle is $\left(g=10 m s^{-2}\right)$
A. $20 m s^{-1}$
B. $10 \sqrt{3} m s^{-1}$
C. $\sqrt{50} m s^{-1}$
D. $10 m s^{-1}$

Answer: C

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8. A ball falls freely from a height of 180 m on to a hard horizontal floor and repectedly bounces. If the coefficient of restitution is 0.5
the average speed and aberage velocity of the ball before it ceases to rebound are respectively ( acceleration due to gravity = $10 \mathrm{~ms}^{-2}$ )
A. $10 m s^{-1}, 10 m s^{-1}$
B. $50 m s^{-1}, \frac{50}{3} m s^{-1}$
C. $\frac{50}{3} m s^{-1}, 10 m s^{-1}$
D. $\frac{20}{3} m s^{-1}, \frac{50}{3} m s^{-1}$

## Answer: C

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9. A circular disc of radius $R$ is removed from a
bigger circular disc of radius 2 R such that the circumferences of the discs touch. The centre of mass of the new disc is at a distance aR from the centre of the bigger disc. The value of $a$ is
A. $\frac{1}{2}$
B. $\frac{1}{3}$
C. $\frac{1}{4}$
D. $\frac{1}{6}$

Answer: B

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10. In the figure shown acceleration with which
the mass $m$ falls down when released is ( consider the string to be massless g-
acceleration due to gravity )

A. $\frac{2 g}{3}$
B. $\frac{g}{2}$
C. $\frac{5 g}{6}$
D. g

Answer: B

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11. At $\mathrm{t}=\mathrm{O}$ a particle exeucting SHM with a time period 3 s is in phase with another particle executing SHM. The time period of the second particle is $T$ (less than 3 s ). If they are again in
the same phase for the third time after 45 s , then the value of T is $\cdots$.
A. 1 s
B. 1.5 s
C. 2 s
D. 2.5 s

## Answer: D

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12. A body is projected vertically upwards from
the surface of the earth with a velocity
sufficient to carry it to infinity. The time taken
by it to reach a height of three times the
radius of the earth is ( acceleration due to gravity $=9.8 m s^{-2}$ and radius of the earth $=$ 6400 km)
A. 44.44 min
B. 22.22 min
C. 18.76 min
D. 37.52 min

Answer: A

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13. A copper wire of cross -sectional area 0.01 $\mathrm{cm}^{2}$ is under a tension of 22 N . Find the percentage change in the cross- sectional area.
(Young's modulus of copper
$=1.1 \times 10^{11} \mathrm{~N} / \mathrm{m}^{2}$ and Poisson's ratio $=0.32$
)
A. $0.128 \times 10^{-6} \mathrm{~cm}^{2}$
B. $128 \times 10^{-6} \mathrm{~cm}^{2}$
C. $12.8 \times 0^{-6} \mathrm{~cm}^{2}$
D. $128 \times 10^{-6} \mathrm{~cm}^{2}$

## Answer: D

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14. When a soap bubble of radius 0.2 mm is
charged it experiences an outward
electrostatic pressure of magnitude $\frac{\sigma^{2}}{2 \varepsilon_{0}}$, where $\sigma=20 \mu \mathrm{Cm}^{-2}$ is the surface charge density. If the excess pressure inside the soap bubble due to the tension is same as this electrostatic pressure then the surface
tension of the soap solution is

$$
\left(\varepsilon_{0}=8.85 \times 10^{-12} C^{2} N^{-1} m^{-1}\right)
$$

A. $8.85 \times 10^{-4} \mathrm{Nm}^{-1}$
B. $12.4 \times 10^{-4} \mathrm{Nm}^{-1}$
C. $11.3 \times 10^{-4} \mathrm{Nm}^{-1}$
D. $90 \times 10^{-4} \mathrm{Nm}^{-1}$

Answer: C

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15. The temperature of a spherical black body
is inversely proportional to its radius. If its
radius is doubled then the power radiating
from it will be
A. doubled
B. $\frac{1}{4}$ times of initial value
C. halved
D. four times of initial value

Answer: B
16. A metal sphere immersed in water weighs
$w_{1}$ at $0^{\circ} \mathrm{C}$ and $w_{2}$ at $50^{\circ} \mathrm{C}$. The coefficient of
cubical expansion of the metal is less than
that of water . Then

$$
\begin{aligned}
& \text { A. } w_{1}>w_{2} \\
& \text { B. } w_{1}<w_{2} \\
& \text { C. } w_{1}=w_{2} \\
& \text { D. } w_{1}=2 w_{2}
\end{aligned}
$$

Answer: B

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17. A reversible Carnot heat engine converts $\frac{1}{4}$ th of its input heat into work. When the temperature of the sink is reduced by 50 K its efficiency becomes $33 \frac{1}{3} \%$. The initial temperatures of the source and the sink respectively are

A. $600 \mathrm{~K}, 550 \mathrm{~K}$

B. $600 \mathrm{~K}, 450 \mathrm{~K}$
C. $300 \mathrm{~K}, 150 \mathrm{~K}$
D. $450 \mathrm{~K}, 350 \mathrm{~K}$

Answer: B

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18. An ideal monoatomic gas is carried along
the $A B C D A$ as shown in the figure. The total
heat absorbed during this process is

A. $10.5 P_{0} V_{0}$
B. $7.5 p_{0} V_{0}$
C. $2.5 P_{0} V_{0}$
D. $1.5 P_{0} V_{0}$

Answer: A

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19. The ratio of the sound in a monatomic gas
at $27^{\circ} \mathrm{C}$ and rms speed of the molecules of
the same gas at a temperature of $127^{\circ} \mathrm{C}$ is
A. $1: 2$
B. $\sqrt{5}: \sqrt{12}$
C. $3: 4$
D. $\sqrt{13}: \sqrt{17}$

Answer: B

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20. Two unifrom strectched strings $A$ and $B$, made of steel, are vibrating under the same tension. If the first overtone of $A$ is equal to the second overtone of $B$ and if the radius of $A$
is twice that of $B$, the ratio of the lengths of the strings is
A. A
B. 0
C. $\frac{A}{\sqrt{2}}$
D. $\frac{\sqrt{3} A}{2}$

Answer: C

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21. A open pipe of length $l$ is vibrating in 3 rd overtone with maximum amplitude $A$. The amplitude at a distance of $\frac{l}{16}$ from any open end is
A. A
B. 0
C. $\frac{A}{\sqrt{2}}$
D. $\frac{\sqrt{3 A}}{2}$

Answer: C

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22. Magnifying power of an astronomical telescope for normal adiustment is 10 and
length of the teescope is 110 cm . Magnifying
power of the same telescope when the image is formed at the near point is
A. 14
B. 18
C. 23
D. 26

Answer: A
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23. In Young 's double slit experiment th two
slits are illuminated by a light beam consisting
of wavelenghts $4200 \AA$ and $5040 \AA$. If the distance between the slits is 2.4 mm and the
distance between the slits and the screen is

200 cm the minimum distance from the central bright fringe to teh point where the bright fringes due to both the wavelengths coincide is
A. 0.7 mm
B. 1.4 mm

## C. 2.1 mm

D. 2.8 mm

## Answer: C

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24. Flux coming out from a positive charge of 8C placed in a medium of dielectric constant 4 is
A. $\frac{2}{2 \varepsilon_{0}}$
B. $\frac{2}{\varepsilon_{0}}$
C. $8 \varepsilon_{0}$
D. $32 \varepsilon_{0}$

Answer: B

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25. Two charged particles each of mass 9.8 g
and charges $+20 \mu \mathrm{C}$ and $-20 \mu \mathrm{C}$ are attached to the two ends of a massless and rigid uniform non-conducting rod of length 50
cm . This arrangement is held in a uniform electric field of $12.1 N C^{-1}$ such that the rod makes a very small angle with the field direction. If the rod is set free the minimum
time needed for the rod to become parallel to
the direction of the electric field is
seconds.
A. 5
B. 8
C. 12
D. 17

Answer: A

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26. Four capacitors of capacitances
$2 \mu F, 3 \mu F, 4 \mu F$ and $x \mu F$ are connected to a battery of emf 6 V and of negligible internal resistance as shown in the figure. If the ratio of the charges on $x \mu F$ and $4 \mu F$ capacitances
is $\frac{3}{8}$ then the value of $x$ is

A. 2
B. 5
C. 3
D. 8

## Answer: B

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27. The plates of a parallel plate capacitor are
charged upto 100 V . A 2 mm thich insulator
sheet is inserted between the plates. Then to
maintain the same potential difference the
distance between the plates is increased by 1.6
mm . The dielectric constant of the insulator is
A. 6
B. 8
C. 5
D. 4

Answer: C

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28. In the given circuit current $I$ is independent of the resistance $R_{6}$. Then

A. $R_{1} R_{2} R_{5}=R_{3} R_{4} R_{6}$
B. $\frac{1}{R_{5}}+\frac{1}{R_{6}}=\frac{1}{R_{1}+R_{2}}+\frac{1}{R_{3}+R_{4}}$
C. $R_{1} R_{4}=R_{2} R_{3}$
D. $R_{1} R_{3}=R_{2} R_{4}$

Answer: C

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29. A fuse wire of radius 0.2 mm blows off with a current of 5 a . The fuse wire of same material but of radius 0.3 mm will blow off with a current of
A. $\frac{15}{2} A$
B. $\frac{5 \sqrt{3}}{2} \mathrm{~A}$
C. $\frac{5 \sqrt{3}}{2} \mathrm{~A}$
D. $5 \sqrt{\frac{27}{8}} A$

## Answer: C

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30. A circular loop and an infinitely long straight conductor carry equal currents, as
shown in the figure . The net magnetic field at the centre of the loop is $B_{1}$ when the current in the loop is clockwise and $B_{2}$ when the current in the loop is anti - clockwise. Then
$\frac{B_{1}}{B_{2}}$ is


> A. $\frac{15}{19}$
> B. $\frac{13}{15}$
> C. $\frac{13}{17}$
> D. $\frac{17}{19}$

Answer:

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31. Two circular loops of diameters 0.6 cm and

40 cm are kept coaxially with a separation of
15 cm between their centres. If a current 2 A
flows through the smaller loop then the flux
linked with the bigger loop is (approximately)

$$
\begin{aligned}
& \text { A. } 9 \times 10^{-11} \mathrm{wb} \\
& \text { B. } 0.9 \times 10^{-11} \mathrm{~Wb} \\
& \text { C. } 1.8 \times 10^{-11} \mathrm{~Wb}
\end{aligned}
$$

## D. $2.7 \times 10^{-11} \mathrm{~Wb}$

## Answer:

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32. In the magnetic meridian of a certain place
the vertical component of the earth's magnetic field is 0.3464 G and the dip angle is $30^{\circ}$. The horizontal component of the earth 's magnetic field at this location is
B. 0.6 G
C. 0.7 G
D. 0.8 G

Answer: B

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33. A current carrying circular loop is perpendicular to a magnetic field of induction $10^{-4} \mathrm{~T}$. If the radius of the loop starts shrinking at a uniform rate of $2 \mathrm{mms}^{-1}$ then
the emf induced in the loop at the instant when its radius is 20 cm will be
A. $0.02 \pi \mu V$
B. $0.08 \pi \mu V$
C. $0.03 \pi \mu V$
D. $0.05 \pi \mu V$

Answer: B
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34. A resistor and an inductor are connected in series to an AC source of voltage 150 sin
$(100 \pi t+\pi)$ volt. If the current in the circuit is $5 \sin \left(100 \pi t+\frac{2 \pi}{3}\right)$ ampere then the average power dissipated and the resistance of the resistor are respectively
A. $187.5 W 30 \Omega$
B. $187.5 W 15 \Omega$
C. $375 W 30 \Omega$
D. $375 W 15 \Omega$

Answer: B

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35. An electromagnetic wave of frequency 45

MHz travels in free space along X -axis. At some point and at some instant the electric field has a maximum value of $750 N C^{-1}$ along
$Y$-axis . The magnetic field at this position and time is
A. $2.5 \times 10^{-6} \hat{j}$
B. $5 \times 10^{-6} \hat{k} T$
C. $2.5 \times 10^{-6} \hat{k} T$
D. $2.5 \times 10^{-6} \hat{i} T$

## Answer: C

## D Watch Video Solution

36. When light of frequency $\nu$ incidents on two metallic plates $A$ and $B$ photo electrons are emitted. If the work function of $A$ is more than
that of $B$ the correct curve of the following
curves drawn between stopping potential V and incident frequency $\nu$ is


Answer: D
37. The approximate value of principal quantum number for a circular orbit of hydrogen atom of radius 530 nm is
A. 26
B. 100
C. 200
D. 21

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38. A radioactive element $X$ converts into another stable element $Y$. Half life of $X$ is 2 hours. Initially only $X$ is present. After a time $t$ if the ratio of atoms of $X$ to $Y$ is $1: 4$ then the value of $t$ is
A. 2 hours
B. 4 hours
C. between 4 hours and 6 hours

## D. 6 hours

## Answer: C

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39. Match the following List I and List II .

|  | List I |  | List II |
| :---: | :--- | :--- | :--- |
| A. | Small Scale <br> Integration (SSI) <br> B. | Medium Scale <br> Integration (MSI) <br> Carge Scale | I. | Logic gates < 100 $\quad$ Logic gates > 1000

The correct answer is
$\begin{array}{llll}A & B & C & D\end{array}$
A.
$I$ III I IV
$A \quad B \quad C \quad D$
B. $\begin{array}{lllll}I V & I & I I & I I I\end{array}$
c. $\begin{array}{llll}A & B & C & D\end{array}$
C. ${ }_{I} \quad I V \quad I I I \quad I I$
$\begin{array}{llll}A & B & C & D\end{array}$
D. $\begin{array}{lllll}I I I & I & I V & I I\end{array}$

Answer: D

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40. A modulated signal is given by
$C_{m}(t)=A_{c} \sin \omega_{c} t+\mu A_{c} \sin \omega_{m} t \sin \omega_{c} t$
where $\mu$ is modulation index. To keep the
signal without distortion the value of $\mu$ should be
A. $>1$
B. $\geq 1$
C. $=1$
D. $\leq 1$

Answer: D
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