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India's Number 1 Education App

## PHYSICS

## BOOKS - TS EAMCET PREVIOUS YEAR

## PAPERS

## QUESTION PAPER 2019(SOLVED)

Physics

1. Assertion (A) The number 0.00764 has three
significant figures.

Reason ( $R$ ) If the number is less than 1 , the zeros on the right of the decimal point but to the left of the first non-zero digit are not significant.
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.

## D Watch Video Solution

2. A car moving with a velocity $6.25 m s^{-1}$ is decelerated with $2.5 \sqrt{v} m s^{-2} \quad(\mathrm{v} \quad$ is instantaneous velocity). Time taken by the car to come to rest is
A. 2 s
B. 3s
C. 2.5s

## D. 4 s

## Answer: A

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3. A bullet fired from a gun falls at a distance
half of its maximum range. The angle of projection of the bullet is
A. $45^{\circ}$
B. $60^{\circ}$
C. $30^{\circ}$
D. $15^{\circ}$

## Answer: D

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4. A body is projected at an angle of $45^{\circ}$ from
a point on the ground at a distance of 30 m
from the foot of a vertical pole of height 20 m .
The body just crosses the top of the pole and strikes the ground at a distance $s$ from the
foot of the pole on the other side of the pole.

Then, s
A. 20 m
B. 30 m
C. 50 m
D. 60 m

Answer: D
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5. An explosion blows a stationary rock into
three parts. Two of masses 1 kg and 2 kg moves
at right angles to one another with velocities
$12 m s^{-1}$ and $8 m s^{-1}$, respectively. If the
velocity of third part is $4 m s^{-1}$, the mass of the rock is
A. 8 kg
B. 5 kg
C. 17 kg
D. 3 kg

Answer: A

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6. Four blocks A, B, C and D of masses $6 \mathrm{~kg}, 3$
$\mathrm{kg}, 6 \mathrm{~kg}$ and 1 kg respectively are connected by
light strings passing over frictionless pulleys as shown in the figure. The strings $P$ and $Q$ are
horizontal. The coefficient of friciton between
the horizontal surface and the block $B$ is 0.2
and the blocks $A$ and $B$ move together. If the
system is released from rest then the tension
in string $Q$ is (Acceleration due to gravity,

$$
\left.g=10 m s^{-2}\right)
$$


A. 48 N
B. 24 N
C. 12 N
D. 6 N

## Answer: C

## D Watch Video Solution

## 7. A constant power of 7 W is supplied on a toy

car of mass 15 kg . The distance travelled by the car when its velocity increases from $3 m s^{-1}$ to $5 m s^{-1}$ is
A. 56 m
B. 7 m
C. 61 m

D. 70 m

## Answer: D

## D Watch Video Solution

8. A body A moving with momentum P collides
one-dimensionally with another stationary
body B of same mass. During impact, A gives
impulse J to B. Then which of the following
is/are correct ?
(a) The total momentum of $A$ and $B$ is $P$ before
and after impact and ( $\mathrm{P}-\mathrm{J}$ ) during the impact.
(b) During the impact, $B$ gives impulse of magnitude J to A.
(c) The coefficient of restitution is $\left[\frac{2 J}{P}-1\right]$
(d) The coefficient of restitution is $\left[\frac{2 J}{P}+1\right]$
A. Only (a) is correct
B. (a) and (c) are correct
C. (b) and (c ) are correct
D. Only (c) is correct

Answer: C
9. In the figure shown, the blocks have equal masses. Friction, mass of the string and the mass of the pulley are negligible. The magnitude of the acceleration of the centre of mass of the blocks is (Acceleration due to gravity $=\mathrm{g}$ ).

A. $\left(\frac{\sqrt{3}-1}{\sqrt{2}}\right) g$
B. $\frac{g}{2}$
C. $(\sqrt{3}-1) g$
D. $\left(\frac{\sqrt{3}-1}{4 \sqrt{2}}\right) g$

Answer: D

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10. A wheel of radius 8 cm is attached to a support so as to rotate about a horizontal axis
through its centre. A string of negligible mass
wrapped arounf its circumference carries a mass of 0.4 kg attached to its free end. When
the mass is released, it descends through 1 m
in 10 seconds, then its moment of inertia is
(Acceleration due to gravity, $g=10 m s^{-2}$ )

$$
\Theta
$$

A. $1.277 \mathrm{kgm}^{2}$
B. $2.177 \mathrm{kgm}^{2}$
C. $21.77 \mathrm{kgm}^{2}$
D. $12.77 \mathrm{kgm}^{2}$

Answer: A

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11. A body of mass 1 kg is suspended from a spring of negligible mass. Another body of mass 500 g moving vertically upwards hits the
suspended body with a velocity of $3 m s^{-1}$ and
gets embedded in it. If the frequency of oscillation of the system of the two bodies after collision is $\frac{10}{\pi} H z$, the amplitude of the motion and the spring constant are respectively,
A. $5 \mathrm{~cm}, 300 \mathrm{Nm}^{-1}$
B. $10 \mathrm{~cm}, 300 \mathrm{Nm}^{-1}$
C. $10 \mathrm{~cm}, 600 \mathrm{Nm}^{-1}$
D. $5 \mathrm{~cm}, 600 \mathrm{Nm}^{-1}$

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12. The gravitational field in a region is given by $E=(5 \hat{i}+12 \hat{j}) \mathrm{Nkg}^{-1}$. If a particle of mass 2 kg is moved from the origin to the point ( $12 \mathrm{~m}, 15 \mathrm{~m}$ ) in this region, the change in gravitational potential energy is
A. -450 J
B. -480 J
C. $-240 J$

## D. $-500 J$

## Answer: B

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13. A uniform wire of length 10 m and diameter
0.6 mm is stretched by 6 mm with certain
force. If the Poisson's ratio of the material of
the wire is 0.3 , then the change in diameter of
the wire is

$$
\text { A. } 108 \times 10^{-8} m
$$

B. $108 \times 10^{-6} m$
C. $10.8 \times 10^{-8} m$
D. $1.08 \times 10^{-8} \mathrm{~m}$

## Answer: C

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14. Two tubes of same length and diameters

4 mm and 8 mm are joined together to form a

U-shaped tube open at both the ends. If the U-
tube contains water, then the difference
between the levels of water in the two lims of the tube is
(Surface tension of water at the temperature of experiment is $7.3 \times 10^{-2} \mathrm{Nm}^{-1}$, angle of contact $=0^{\circ}$, density of water $=1.0 \times 10^{3} \mathrm{kgm}^{-3}$ and acceleration due to gravity $=10 m s^{-2}$ )
A. 3.65 mm
B. 36.5 mm
C. 0.365 mm
D. 365 mm

Answer: A

## D Watch Video Solution

15. A uniform metal bar of length 10 m with a crack at its midpoint is clamped between two rigid supports. The bar buckles upward due to temperature rise of $40^{\circ} \mathrm{C}$. If the coefficient of
linear expansion of the metal is
$2.5 \times 10^{-6} .{ }^{\circ} C^{-1}, \quad$ the maximum
displacement of the mid-point of the bar is
A. 11.3 cm
B. 22.3 cm
C. 33.3 cm
D. 44 . cm

Answer: B

## D Watch Video Solution

16. Three rods each of length I and cross sectional area A joined in series between two
heat reservoirs as shown in the figure. Their
conductivities are $2 \mathrm{~K}, \mathrm{~K}$ and $\frac{K}{2}$, respectively.
Assuming that the conductors are insulated
from surroundings, the temperatures $T_{1}$ and
$T_{2}$ of the junctions in steadly state condition are respectively.

A. $\frac{600}{7} \cdot{ }^{\circ} C, \frac{400}{7} .{ }^{\circ} C$
B. $\frac{600}{7} .{ }^{\circ} C, \frac{700}{4} .{ }^{\circ} C$
C. $\frac{500}{6} .{ }^{\circ} C, \frac{600}{5} .{ }^{\circ} C$

$$
\text { D. } \frac{600}{4} \cdot{ }^{\circ} C, \frac{400}{7} \cdot{ }^{\circ} C
$$

## Answer: A

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17. Two heat engines $X$ and $Y$ of same efficiency are connected in series in such a way that the sink of $X$ works as source of $Y$. X receives heat at 900 K and rejects some heat to its sink at

TK and in turn Y rejects heat to its sink at 400 $K$, then the temperature $T$ is
A. 550 K
B. 600 K
C. 650 K
D. 700 K

Answer: B

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18. The specific heat capacities of an ideal gas at the constant pressure and at constant volume $\quad$ are $\quad 620 \mathrm{Jkg}^{-1} \mathrm{~K}^{-1} \quad$ and
$420 \mathrm{Jkg}^{-1} \mathrm{~K}^{-1}$ respectively. The density of the gas at STP is approximately,
A. $2.88 \mathrm{kgm}^{-3}$
B. $4.86 \mathrm{kgm}^{-3}$
C. $3.88 \mathrm{kgm}^{-3}$
D. $1.86 \mathrm{kgm}^{-3}$

Answer: D

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19. Three closed vessels $A, B$ and $C$ are at the same temperature T and contain gases. Vessel

A contains only $O_{2}$, B contains only $N_{2}$ and C contains a mixture of equal quantities of $O_{2}$
and $N_{2}$. If the rms speed of $O_{2}$ molecules in
vessel A is $v_{1}$ and that of $N_{2}$ molecules in vessel B is $v_{2}$ then the rms speed of $O_{2}$ molecules in vessel C is
A. $\frac{\left(v_{1}+v_{2}\right)}{2}$
B. $v_{1}$
C. $\left(v_{1} v_{2}\right)$
D. $\frac{v_{1}}{2}$

## Answer: B

## - Watch Video Solution

## 20. Match the following List I with List II.

| List I | List II |
| :--- | :--- |
| (A) Transverse wave (i) Vibrations parallel to the <br> direction of propagation <br> (B) Longitudinal (ii)Vibrations perpendicular to <br> the direction of propagation <br> (C) Beats (iii)Superposition of waves <br> travelling in the opposite <br> directions <br> (D) Stationary waves (iv)Superposition of waves <br> travelling in same direction  |  |

A. A-(ii), B-(i), C-(iii), D-(iv)

> B. ‘A -(ii), B - (i), C - (iv), D - (iii)
C. A-(iii), B-(iv), C-(i), D-(ii)
D. A-(iv), B - (i), C - (ii), D - (iii)

Answer: B

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21. A police car moving at $22 m s^{-1}$ chases a motor cyclist. The police man sounds horn at

176 Hz . While both of them move towards a
stationary siren of frequency 165 Hz . If the number of beats heard by the motor cyclist per second is zero, then the speed of motorcycle is (Speed of sound in air $=330 m s^{-1}$ )
A. $33 m s^{-1}$
B. $22 m s^{-1}$
C. $44 m s^{-1}$
D. $11 m s^{-1}$

Answer: B
22. When an object is moved along the principle axis of a concave mirror placed in air, the image coincides with the object if the object is 50 cm from the mirror. If the mirror is placed at a depth of 20 cm in a transparent medium, the image coincides with the object when the object is 40 cm from the mirror. The refractive index of the liquid is
A. $\frac{5}{4}$
B. $\frac{4}{3}$
C. $\frac{3}{2}$
D. $\frac{5}{3}$

## Answer: C

## D View Text Solution

23. In a Young's double slit experiment, light of wavelength $5900 \AA$ is used. When the slits are

2 mm apart, the fringe width is 1.3 mm . If the
slit separation is increased to one and half
times the previous value, then the fringe width
will be
A. 0.9 mm
B. 0.8 mm
C. 1.8 mm
D. 1.6 mm

Answer: B
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24. Two particles with charges $+3.72 \mu \mathrm{C}$ and
$+1.86 \mu C$ are some distance apart. If $20 \%$ of
the charge is transferred from particle to second particle then the electrostatic force between them is
A. decreases by $12 \%$
B. increases by $12 \%$
C. increases by $4 \%$
D. decreases by 4\%
25. $A B C$ is a right triangle in which $A B=3 \mathrm{~cm}$, $B C=4 \mathrm{~cm}$ and right angle is at $B$. Three charges $+15 \mu C+12 \mu C$ and $-20 \mu C$ are placed respectively at A, B and C. The force acting on the charge at $B$ is
A. 1250 N
B. 3500 N
C. 1200 N

## D. 2250 N

## Answer: D

## D Watch Video Solution

26. A spherical capacitor has outer sphere of
radius 5 cm and inner sphere of radius 2 cm .

When the inner sphere is earthed, its capacity is $C_{1}$ and when the outer sphere is earthed its
capacity is $C_{2}$. Then $\frac{C_{1}}{C_{2}}$ is
A. $\frac{5}{2}$
B. $\frac{2}{5}$
C. $\frac{7}{3}$
D. $\frac{3}{7}$

Answer: A

## - Watch Video Solution

27. The charge on $4 \mu F$ capacitor, in the given circuit is

A. $24 \mu C$
B. $100 \mu C$
C. $2.4 \mu C$
D. $30 \mu C$

## D Watch Video Solution

28. A cell of emf $\varepsilon$ and internal resistance $r$ is connected across a variable load resistance $R$.

The graph drawn between its terminal voltage and resistance $R$ is



Answer: A

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29. In a meter-bridge if the left and right gaps are connected with $2 \Omega$ and $3 \Omega$ resistances, respectively then the bridge is balanced. The resistance to be connected with $3 \Omega$ resistance to get the balancing point at midpoint of the bridge wire is
A. $3 \Omega$ in series
B. $3 \Omega$ in parallel
C. $6 \Omega$ in series
D. $6 \Omega$ in parallel

## Answer: D

## D Watch Video Solution

30. Magnetic field at the centre of a circular
loop of area $A$ is $B$. Then the magnetic moment of the loop is
( $\mu_{0}$-permeability of the free space)

> A. $\frac{B A^{2}}{\mu_{0} \pi}$ B. $\frac{B a \sqrt{A}}{\mu_{0}}$ C. $\frac{B a \sqrt{A}}{\mu_{0} \pi}$

## D. $\frac{2 B A \sqrt{A}}{\mu_{0} \sqrt{\pi}}$

## Answer: D

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31. A circular coil of radius 10 cm with 100 turns
carrying a current of 0.5 A lies in a magetic field of 2 T such that the normal drawn to the plane of the coil makes an angles $\theta$ with the direction of the field. Work done in rotating
the coil to change the angle $\theta$ from $0^{\circ}$ to $180^{\circ}$ is
A. $\pi J$
B. $2 \pi J$
C. $4 \pi J$
D. $8 \pi J$

Answer: B
( Watch Video Solution
32. The resultant magnetic moment of three
magnetic dipoles, each of the magnetic moment $M$ shown in the arrangement is
A. $\sqrt{2} M$
B. $(\sqrt{2}+1) \mathrm{M}$
C. $(\sqrt{2}-1) M$
D. $M$

## Answer: B

## D Watch Video Solution

33. A long solenoid with 2000 turns per meter has a small loop of radius 3 cm placed inside the solenoid normal to its axis. If the current through the solenoid increases steadily from
1.5 A to 5.5 A in $\frac{\pi^{2}}{100} \mathrm{~s}$, the induced emf in the loop is
A. 0.144 mV
B. 0.288 mV
C. 0.072 mV
D. 0.316 mV

Answer: B

- Watch Video Solution

34. In the given circuit, the angular frequency of the voltage source is $70 \times 10^{3} \mathrm{rads}^{-1}$. The circuit effectively behaves like,

A. purely resistive circuit
B. series RL circuit
C. series RC circuit

## D. series LC circuit with $R=0$

## Answer: C

## - Watch Video Solution

35. A parallel plate capacitor consists of two
circular plates each of radius 2 cm , separated by a distance of 0.1 mm . If the potential difference across the plates is varying at the rate of $5 \times 10^{6} \mathrm{Vs}^{-1}$, then the value of displacement current is
A. 5.56 A
B. 5.56 mA
C. 0.556 mA
D. 2.28 mA

Answer: C

## D Watch Video Solution

36. Light of wavelength 488 nm is produced by an argon laser which is used in the photoelectric effect. When light from this
spectral line is incident on the emitter, the stopping (cut - off) potential of
photoelectrons is 0.38 V . Find the work function of the material from which the emitter is made.
A. 2.16 eV
B. 216 eV
C. 21.6 eV
D. 0.216 eV

Answer: A
37. If the first excitation potential of $a$ hypothetical hydrogen like atom is 15 V , then the third excitation potential of the atom is
A. 13.6 V
B. $\frac{4}{75}$ V
C. $\frac{15}{16} \mathrm{~V}$
D. $\frac{75}{4} \mathrm{~V}$
38. The energy released when one nucleus of .92 $u^{235}$ undergoes fission is 188 MeV . The energy released when 100 g of undergoes fission is .92 $u^{235}$
A. $3.55 \times 10^{12}$ J
B. $7.71 \times 10^{12}$ J
C. $3.55 \times 10^{13} \mathrm{~J}$
D. $7.71 \times 10^{13}$ J

## Answer: D

## - Watch Video Solution

39. The value of $Y_{1}$ and $Y_{2}$, respectively in the following logic circuit if both $A$ and $B$ are 1 .

A. 1,1
B. 1, 0
C. 0,1
D. 0,0

Answer: B

## D Watch Video Solution

40. If $E_{c}$ and $E_{m}$ are peak values of carrier and modulating signals, respectively then for $100 \%$ modulation,
A. $E_{c}=\frac{E_{m}}{2}$
B. $\frac{E_{c}^{2}}{2}=E_{m}^{2}$
C. $E_{c}=E_{m}$
D. $E_{c}=2 E_{m}$

Answer: C

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