

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.

Answer: A



2. A car moving with a velocity $6.25ms^{-1}$ is decelerated with $2.5\sqrt{v}ms^{-2}$ (v is instantaneous velocity). Time taken by the car to come to rest is

A. 2s

B. 3s

D. 4s

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°

C. 30°

D. 15°

Answer: D



4. A body is projected at an angle of 45° from a point on the ground at a distance of 30 m from the foot of a vertical pole of height 20m. 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



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

A. 8 kg

B. 5 kg

C. 17 kg

D. 3 kg

Answer: A



6. Four blocks A, B, C and D of masses 6 kg, 3 kg, 6 kg and 1kg 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,

$$g=10ms^{-2}$$
)



A. 48 N

- B. 24 N
- C. 12 N

D. 6 N

Answer: C



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 $3ms^{-1}$ to $5ms^{-1}$ is

A. 56m

B.7 m

C. 61 m

D. 70 m

Answer: D

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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 (P - J) during the impact.

(b) During the impact, B gives impulse of magnitude J to A.

(c) The coefficient of restitution is $\left| rac{2J}{P} - 1
ight|$

(d) The coefficient of restitution is $\left[\frac{2J}{P}+1\right]$

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 = g).





Answer: D



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 1m in 10 seconds, then its moment of inertia is (Acceleration due to gravity, $g=10ms^{-2}$)



A. $1.277 kgm^2$

B. $2.177 kgm^2$

C. $21.77 kgm^2$

D. $12.77 kgm^2$

Answer: A



11. A body of mass 1kg is suspended from a spring of negligible mass. Another body of mass 500g moving vertically upwards hits the

suspended body with a velocity of $3ms^{-1}$ and gets embedded in it. If the frequency of oscillation of the system of the two bodies after collision is $\frac{10}{\pi}Hz$, the amplitude of the motion and the spring constant are respectively,

A. $5cm, 300Nm^{-1}$

B. 10cm, $300Nm^{-1}$

C. 10cm, $600Nm^{-1}$

D. $5cm,\,600Nm^{-1}$

Answer: D

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

A. -450J

 ${\sf B}.-480J$

 $\mathsf{C}.-240J$

$\mathrm{D.}-500J$

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

A. $108 imes 10^{-8} m$

B. $108 imes 10^{-6} m$

 $\mathsf{C}.\,10.8 imes10^{-8}m$

D. $1.08 imes 10^{-8}m$

Answer: C

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14. Two tubes of same length and diameters 4mm and 8mm are joined together to form a U-shaped tube open at both the ends. If the Utube 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 $7.3 \times 10^{-2} Nm^{-1}$, angle of contact = 0° , density of water = $1.0 \times 10^{3} kgm^{-3}$ and acceleration due to gravity = $10ms^{-2}$)

A. 3.65 mm

B. 36.5 mm

 $\mathsf{C.}\,0.365mm$

D. 365 mm

Answer: A



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 $40^{\circ}C$. If the coefficient of linear expansion of the metal is 2.5×10^{-6} . $^{\circ}C^{-1}$, the maximum

displacement of the mid-point of the bar is

A. 11.3cm

B. 22.3cm

C. 33.3*cm*

D. 44. cm

Answer: B



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 2K, 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.
$$\frac{600}{7} \cdot C, \frac{400}{7} \cdot C$$

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

D.
$$\frac{600}{4}$$
. $^{\circ}$ $C, \frac{400}{7}$. $^{\circ}$ 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 are $620Jkg^{-1}K^{-1}$ and $420 J k g^{-1} K^{-1}$ respectively. The density of the

gas at STP is approximately,

A. $2.88 kgm^{-3}$

B. $4.86 kgm^{-3}$

C. $3.88 kgm^{-3}$

D. $1.86 kgm^{-3}$

Answer: D



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.
$$rac{(v_1+v_2)}{2}$$

B. *v*₁

 $\mathsf{C.}\left(v_{1}v_{2}\right)$

D. $rac{v_1}{2}$

Answer: B

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20. Match the following List I with List II.

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

The correct answer is

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 $22ms^{-1}$ 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 $= 330ms^{-1}$)

- A. $33ms^{-1}$
- B. $22ms^{-1}$
- C. $44ms^{-1}$
- D. $11ms^{-1}$

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

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23. In a Young's double slit experiment, light of wavelength 5900 Å is used. When the slits are 2 mm apart, the fringe width is 1.3mm. If the slit separation is increased to one and half

times the previous value, then the fringe width

will be

A. 0.9mm

B.0.8mm

 $C.\,1.8mm$

 $\mathsf{D}.\,1.6mm$

Answer: B



24. Two particles with charges $+3.72\mu$ and $+1.86\mu$ 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%

Answer: B

25. ABC is a right triangle in which AB = 3 cm, BC = 4 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

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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

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

circuit is



A. $24 \mu C$

B. $100 \mu C$

 $\mathsf{C.}\, 2.4 \mu C$

D. $30 \mu C$

Answer: A



28. A cell of emf ε 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



29. In a meter-bridge if the left and right gaps are connected with 2Ω and 3Ω resistances, respectively then the bridge is balanced. The resistance to be connected with 3Ω resistance to get the balancing point at midpoint of the bridge wire is

A. 3Ω in series

- B. 3Ω in parallel
- C. 6Ω in series
- D. 6Ω in parallel

Answer: D



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.
$$rac{BA^2}{\mu_0\pi}$$

B. $rac{Ba\sqrt{A}}{\mu_0}$
C. $rac{Ba\sqrt{A}}{\mu_0\pi}$

D. $\frac{2BA\sqrt{A}}{\mu_0\sqrt{\pi}}$

Answer: D

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31. A circular coil of radius 10cm with 100 turns carrying a current of 0.5A lies in a magetic field of 2 T such that the normal drawn to the plane of the coil makes an angles θ with the direction of the field. Work done in rotating

the coil to change the angle heta from 0° to 180°

is

A. πJ

 $\mathsf{B.}\,2\pi J$

C. $4\pi J$

D. $8\pi J$

Answer: B



32. The resultant magnetic moment of three magnetic dipoles, each of the magnetic moment M shown in the arrangement is





B.
$$\left(\sqrt{2}+1
ight)$$
 M

C.
$$\left(\sqrt{2}-1
ight)$$
 M

D. M

Answer: B

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33. A long solenoid with 2000 turns per meter has a small loop of radius 3cm 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 $\frac{\pi^2}{100}$ 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

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

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35. A parallel plate capacitor consists of two circular plates each of radius 2cm, separated by a distance of 0.1mm. If the potential difference across the plates is varying at the rate of $5 \times 10^6 V s^{-1}$, 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

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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



B.
$$\frac{4}{75}$$
 V
C. $\frac{15}{16}$ V
D. $\frac{75}{4}$ V

Answer: A





38. The energy released when one nucleus of $._{92} u^{235}$ undergoes fission is 188 MeV. The energy released when 100g of undergoes fission is $._{92} u^{235}$

A. $3.55 imes10^{12}$ J

B. $7.71 imes10^{12}$ J

C. $3.55 imes10^{13}$ J

D. $7.71 imes10^{13}$ J

Answer: D



39. The value of Y_1 and Y_2 , respectively in the

following logic circuit if both A and B are 1.



B. 1, 0

C. 0, 1

D. 0, 0

Answer: B

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40. If E_c and E_m are peak values of carrier and modulating signals, respectively then for 100% modulation,

A.
$$E_c=rac{E_m}{2}$$

B. $rac{E_c^2}{2}=E_m^2$
C. $E_c=E_m$

D.
$$E_c=2E_m$$

Answer: C

