PHYSICS

BOOKS - MTG IIT JEE FOUNDATION

FOOTSTEPS TOWARDS JEE MAIN

Section A Multiple Choice Questions

1. A shell of mass 20 g is fired by a gun of mass 10 kg. If the shell leaves the gun with a speed

of `80 m s^(-1)~ , the speed of recoil of the gun is

A. $32cms^{-1}$

B. $16cms^{-1}$

C. $10cms^{-1}$

D. $24cms^{-1}$

Answer: B

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2. A body of mass 3 kg at rest is acted upon by a force and the body moves through a distance 20 m in 5 s. Force on the body is

A. 4.8 N

B. 2.4 N

C. 60 N

D. 10 N

Answer: A

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3. On an average, a human heart is found to beat 72 times in a minute. Its frequency and time period respectively are

A. 1.2 Hz, 0.83 s

B. 2.5 Hz, 1.2 s

C. 2 Hz, 1.2 s

D. 2.5 Hz, 0.83 s

Answer: A

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4. The first artificial satellite was

A. Sputnik 1

B. Explorer 1

C. Aryabhatta

D. Luna 3

Answer: A

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5. The diagram shows a simple mercury barometer. The mercury level is at a height h, when the atmospheric pressure is 100000 Pa. What is the pressure at P?

A. 40000 Pa

B. 60000 Pa

C. 100000 Pa

D. 140000 Pa

Answer: B

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6. A concave mirror forms an enlarged, erect and virtual image of an object, only when the object is placed

A. at focus

B. between pole and focus

C. at the centre of curvature

D. between focus and centre of curvature.

Answer: B

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7. Which of the following scales is/are not linear in nature?

(i) Decibel (ii) Richter (iii) Meter

A. (i) only

B. (ii) and (iii)

C. (ii) only

D. (i) and (ii)

Answer: D

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8. The human eye can focus objects at different distances by adjusting the focal length of the eye-lens. This is due to :

A. presbyopia

B. accommodation

C. near-sightedness

D. far-sightedness.

Answer: B

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9. On which planet one day is longer than its year?

A. Saturn

B. Neptune

C. Venus

D. Jupiter

Answer: C

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10. A man stands symmetrically between two large plane mirrors fixed to two adjacent walls of a reactangular room. The number of images formed as

A. 4

B. 3

C. 2

D. 6

Answer: B

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11. Ram pushes the box by applying a force of 500 N in horizontal direction so that the box starts sliding along the floor as shown in figure. Find the point where the frictional force acting on the box is maximum.

A. P

B. Q

C. R

D. P,Q and R

Answer: A

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12. Which of the following figures represent the electric field lines due to a single negative charge?

A. 

B. 

C. 

D. 

Answer: B

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13. Wavelength of ultrasonic waves of frequency 100 kHz at NTP is

A. 0.33 m

B. 3.3 cm

C. 0.33 cm

D. 0.033 cm

Answer: C

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14. Woollen clothes keep the body warm because they

A. radiate the energy incident on them

B. conduct heat through them to the body

C. produce heat due to convection

D. do not allow heat to flow out of the body.

Answer: D

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15. If an atom has 2 excess electrons, then what is the charge on this atom?

A. $+1.2 \times 10^{-19} C$

B. $-1.6 \times 10^{-19} C$

C. $-3.2 \times 10^{-19} C$

D. $+3.2 \times 10^{-19} C$

Answer: C

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16. An unsupported horizontal wire is to be prevented from falling under gravity using an external magnetic field. Wire carries current from North to South. The magnetic field should be directed towards

A. south

B. north

C. east

D. west

Answer: C

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17. Clear images of soft tissues can be well studied using

A. MRI

B. X-rays

C. Ultrasonics

D. IR rays

Answer: A

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18. Electroplating of chromium is based on

A. chemical effect of current

B. magnetic effect of current

C. heating effect of current

D. mechanical effect of current.

Answer: A

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19. When a horse pulls a cart, the force that helps the horse to move forward is the force exerted by

A. the cart on the horse

B. the ground on the horse

C. the ground on the cart

D. the horse on the ground.

Answer: B

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20. A wooden block, with a coin placed on its top, floats in water as shown in figure. The distances I and h are shown there. After some time the coin falls into the water Then

A. I decreases and h increases

B. l increases and h decreases

C. both l and h increase

D. both l and h decrease.

Answer: D

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Section B Numerical Value Type Questions

1. You drive a car at a speed of $70 km/h$ in a straight road for 8.4 km, and then the car runs out of petrol. You walk for 30 min to reach a petrol pump at a distance of 2 km. The average velocity from the beginning of your drive till you reach the petrol pump is

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2. A person wants a real image of his own, 3 times enlarged. Where should he stand in front of a concave mirror of radius of curvature of 30cm.

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3. A small object is placed $10cm$ in front of a plane mirrorr. If you stand behind the object $30cm$ from the mirrorr and look at its image, the distance focused for your eye will be

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4. A faulty thermometer reads $5^\circ C$ melting ice and $99^\circ C$ in steam. Find the correct temperature in $.^\circ F$ when this faulty thermometer reads $52^\circ C$.

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5. Sound waves were sent down from a ship and they returned after 2 seconds. If the speed

of sound in water is $1.5kms^{-1}$ then, the depth of the sea (in km) is _____.

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6. A concave mirror has a focal length of 5 cm. When an object is placed at a distance of 15 cm from the mirror, then the image is formed in front of the mirror at ____cm.

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7. Two plane mirrors are inclined at an angle of 60°. An object is placed between the mirrors. The number of images formed by the two mirrors is

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8. The retarding acceleration of $7.35ms^{-2}$ due to frictional force stops the car of mass 400 kg travelling in a road. Then, the coefficient of

friction between the tyre of the car and the road, is__.

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9. The time period of a satellite of earth is 5 hours. If the separation between the centre of earth and the satellite is increased to 4 times the previous value, the new time period will become-

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10. If a body of mass 5 kg is moving in a circle of radius 5 m with a velocity 100 m/s, then the centripetal force acting on the body is $10^x N$, where the value of x is____.

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