PHYSICS

AAKASH INSTITUTE ENGLISH

MOCK TEST 13

Example

1. If the escape velocity of the body which is thrown from earth surface is V_e, then the

escape velocity of the body if it is thrown at an angle θ from horizontal earth`s surface is

A. V_e

B. $V_e \cos\theta$

C. $V_e \sin\theta$

D. $V_\eta n\theta$

Answer: A

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2. If a body is thrown at speed of triple as that of escape speed (V_e) from earth`s surface, then at what speed it will move in interstellar space?

A. $2\sqrt{2}V_e$

B. $\sqrt{2}V_e$

C. V_e

D. $\sqrt{3}V_e$

Answer: B

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3. What will be the escape speed from, a planet having volume 27 times that of earth and the same mean density as that of the earth? Take escape speed from the earth 11.2 km/s, earth and planet are perfectly sphere)

A. 5.6 km/s

B. 22.4 km/s

C. 11.2 km/s

D. 33.6 km/s

Answer: D

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4. Time period of a satellite to very close to earth`s surface, around the earth is approximately

A. 1.42 h

B. 2.42 h

C. 24 h

D. 0.72 h

Answer: A

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5. Suppose the force of gravitation is inversely proportional to the cube of the radius of circular orbit in which satellite is revolving then its time period is proportional to

A. r^{-2}

B. r^{2}

C. $r^{\frac{3}{2}}$

D. $r^{-\frac{3}{2}}$

Answer: B

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6. The orbital speed of geostationary satellite is around

A. 3.07 km/s

B. 7.95 km/s

C. 11.2 km/s

D. 15.8 km/s

Answer: A

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7. Weightlessness in satellite is due to

A. Zero gravity of earth

B. Zero reaction force by satellite surface

C. Center of gravity of satellite

D. Both (2) and (3)

Answer: B

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8. If a body of mass m is raised to height 2 R from the earth`s surface, then the change in potential energy of the body is (R is the radius of earth)

A. mgR

B. 12 mgR

C. $\frac{2}{3}mgR$

D. 9 mgR

Answer: C

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9. E, U and K represent total mechanical energy. potential energy and kinetic energy respectively of a satellite revolving around a planet, then which of the following is correct?

A. K = E

B. U= 2E

C. $K = |E|$

D. Both (2) and (3)

Answer: D

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10. A satellite is revolving around earth in a circular orbit of radius 3 R. Which of the following is incorrect? (M is mass of earth, R is radius of earth m is mass of satellite)

A. Its orbital velocity is $\sqrt{\frac{GM}{3R}}$

B. Its potential energy is $\frac{-GMm}{3R}$

C. Its total energy is $\frac{GMm}{6R}$

D. Its kinetic energy is $\frac{GMm}{6R}$

Answer: C

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11. Two bodies of masses m_1 and m_2 are initially at rest placed infinite distance apart. They are then allowed to move towards each

other under mutual gravitational attraction. Their relative velocity when they are r distance apart is

A. $\sqrt{\frac{2Gm}{d}}$

B. $\sqrt{\frac{4Gm}{d}}$

C. $\sqrt{\frac{d}{2G}} \cdot \frac{1}{m}$

D. $\sqrt{2\frac{G}{d}} \cdot m$

Answer: B

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12. According to Hooke's law of elasticity if stress is increased, the ratio of stress to strain

A. Increased to n^2 times

B. Decreased to n^2 times

C. Remain unchanged

D. Depend upon material

Answer: C

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13. A steel rod has a radius of cross-sectional area is R= 10 mm and length L = 90 cm ls fixed at one end, a force $F = 3.14 \cdot 10^4 N$ stretches it along its length, the stress in the rod is equal to (take π = 3.14)

A. $10^8 \frac{N}{m^2}$

B. $3.14 \cdot 10^{-5} \frac{N}{m^2}$

C. $10^4 \frac{N}{m^2}$

D. $3.14 \cdot 10^{-4} \frac{N}{m^2}$

Answer: A

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14. A spherical ball contracts in radius by 2%, when subjected to a normal uniform force. The volumetric strain produced in ball is

A. $6 \cdot 10^{-2}$

B. $2 \cdot 10^{-2}$

C. $4 \cdot 10^{-2}$

D. 10^{-2}

Answer: A

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15. Assertion:- Materials can be stretched even beyond proportionality limit. (point till which Hooke's law is valid is called proportionality limit)

Reason:- Elastic forces can be conservative even beyond proportional limit.

A. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

B. Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion

C. Assertion is correct but Reason is wrong

D. Both Assertion and Reason are wrong

Answer: A

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16. What is the Young's modulus for a perfect rigid body?

A. Zero

B. Infinite

C. 1

D. 100

Answer: B

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17. If the load of a wire is increases such that its stress is twice as that of previous, then the new value of Young`s modulus is

A. Increases

B. Remain same

C. Decreases

D. May increases or decreases

Answer: B

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18. Copper of fixed volume V is drawn into wire of length l. When this wire is subjected to a constant force F, the extension produced in the wire is Δl. Which of the following graphs is a straight line?

A. $\Delta lversus\left(\frac{1}{l}\right)$

B. $\Delta lversusl^2$

C. $\Delta lversus\left(\frac{1}{l^2}\right.$

D. $\Delta lversusl$

Answer: B

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19. A lead cube of side 20 cm is subjected under a shearing force of magnitude $5.6x10^6 N$. If the lower face of the cube is fixed, then the displacement in the upper face is (If shear modulus of lead is $5.6 \cdot 10^6 \frac{N}{m^2}$)

A. 15 mm

B. 10 mm

C. 20 mm

D. 5 m

Answer: D

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20. Which is the following is correct (symbol have their usual meaning)

A. $B_{solid} < B_{liquid} < B_{gas}$

B. $B_{solid} > B_{liquid} > B_{gas}$

C. $B_{solid} = B_{liquid} = B_{gas}$

D. $B_{solid} < B_{gas} < B_{liquid}$

Answer: B

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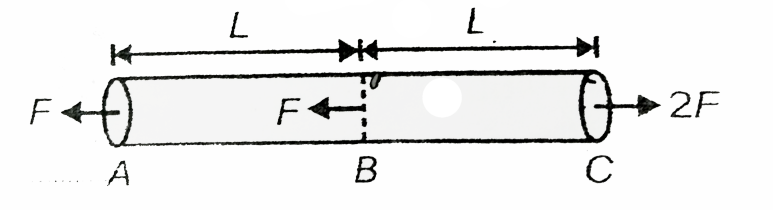
21. A uniform rod of length 2L, area of cross - section A and Young's modulus Y is lying at rest under the action of three forces as shown.



Select the correct alternatives.

A. $1.5 \cdot 10^{-2} m$

B. $10^{-1} m$

C. $2 \cdot 10^{-2} m$

D. $5 \cdot 10^{-2} m$

Answer: A

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22. Elastic potential energy density of a given stretch wire is proportional

A. $(Stress)^2$

B. Strain

C. Stress

D. (Strain)^-1

Answer: A

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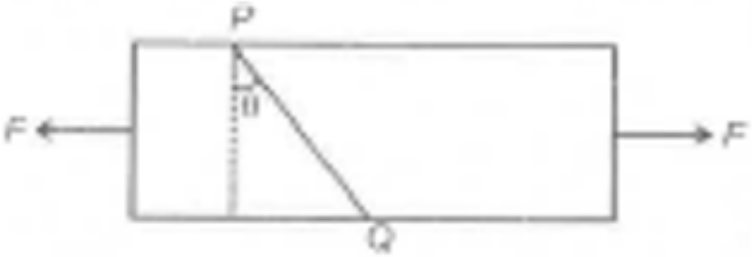
23. A long rod of steel under a tensile stress due to the force acting on the edges along the length. The value of angle 0 for which shearing

stress is maximum is



A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{2}$

Answer: A

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24. Which of the following relations is true?

A. $Y = \dfrac{BS}{2B + S}$

B. $Y = 3B[1 - 2\sigma]$

C. $Y = S[1 + \sigma]$

D. $Y = \dfrac{B^2 + S^2}{B} S$

Answer: B

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25. The diagram represents the applied force F per unit area with the corresponding change in length x per unit length produced in a thin wire of uniform Cross section. The region in which the material acts like a viscous liquid is

A. ab

B. Ob

C. bc

D. cd

Answer: D

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