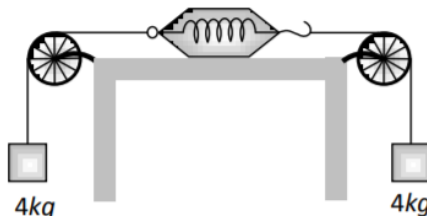


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Physics and Astronomy – Category 3 Sample Questions

Q: As shown in the figure, two equal masses each of 4 kg are suspended from a spring balance. The reading of the spring balance will be

- (a) Zero
- (b) 2 kg
- (c) 4 kg
- (d) Between zero and 2 kg



Q: A body of mass 3 kg is under a force, which causes a displacement in it given by $S = 2t^3/3$ (in m). Find the work done by the force in first 2 seconds

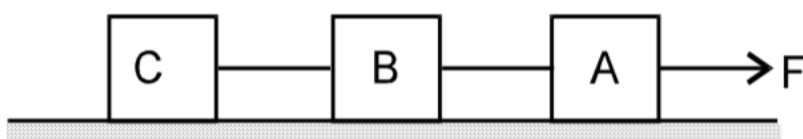
- (a) 2 Js
- (b) 3.8 J
- (c) 24 J
- (d) 96 J



Q: If an electron and a proton having same momenta enter perpendicular to a magnetic field, then

- (a) the length of curved path of electron and proton will be same
- (b) they will move undeflected
- (c) the length of curved path of electron is more curved than that of the proton
- (d) the length of curved path of proton is more curved than that of the electron

Q: Three point masses A, B and C are 66 gram each and connected as shown. The acceleration of system is 5 m/s^2 . Tension between B and C is approximately-



- (a) 0.33 N
- (b) 4 N

- (c) 5 N
- (d) 6 N

Q: The energy stored in wound watch spring is

- a. K.E
- b. P.E
- c. Heat Energy
- d. Chemical Energy

Q: A particle is moving on a circular path of 10 m radius. At any instant of time its speed is 5 m/s and the speed is increasing at a rate of 2 m/s^2 . At this instant magnitude of the net acceleration will be:

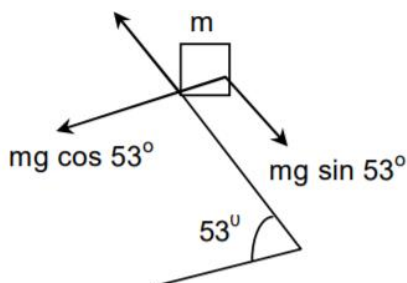
- (a) 3.2 m/s^2
- (b) 2 m/s^2
- (c) 2.5 m/s^2
- (d) 4.3 m/s^2

Q: With the increase in temperature, the frequency of the sound from an organ pipe

- (a) Decreases
- (b) Increases
- (c) Remain unchanged
- (d) Changes erratically

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Q: An inclined plane is moving with Constant velocity $v = 4 \text{ m/s}$ on a horizontal surface as shown in figure. If a block of mass 2 kg is kept at top of the incline and there is no friction between the block and the incline, then the distance travelled by the incline till the block reaches bottom of the inclined is ($g = 10 \text{ m/s}^2$)

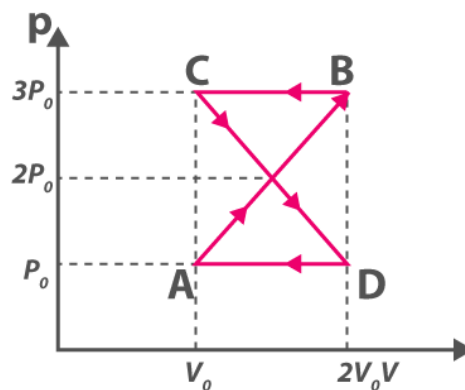


- (a) 4 m
- (b) 5 m
- (c) $1.6\sqrt{5} \text{ m}$
- (d) $2\sqrt{5} \text{ m}$

Q: A body of mass 5 kg, projected at an angle of 45° from the ground covers a horizontal range of 45 m ($g = 10 \text{ m/s}^2$). What is the velocity with which it was projected?

- a) 21.21 m/s
- b) 20 m/s
- c) 22 m/s
- d) 21.1 m/s

Q: ABCDA is a cyclic process explaining the thermodynamic process. What is the work done by the system in the cycle?



- (a) Zero
- (b) $\rho_0 v_0^2$
- (c) $\rho_0 V_0$
- (d) $2\rho_0 V_0$



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Δ TRADITION OF EXCELLENCE

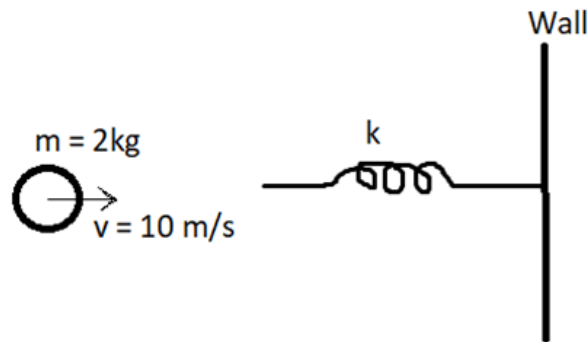
Q: What will be the longest wavelength in the Balmer series of hydrogen spectrum?

- (a) $6557 \times 10^{-10} \text{ m}$
- (b) $5557 \times 10^{-10} \text{ m}$
- (c) $9557 \times 10^{-10} \text{ m}$
- (d) $1557 \times 10^{-10} \text{ m}$

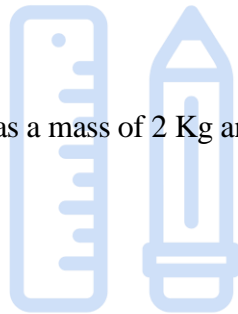
Q: A bolt is dropped from a bridge under construction, falling 90m to the valley below the bridge. What is its speed when it reaches the valley beneath the bridge?

- (a) 42 m/s
- (b) 40 m/s
- (c) 1764 m/s
- (d) 1600m/s

Q: An object is travelling at a velocity of 10 m/s. It has a mass of 2 kg. It impacts a spring of spring constant “k” as shown in the figure. What is the compression of the spring?



- (a) $10 \times (2/k)^{0.5}$
- (b) $10 \times (200/k)^{0.5}$
- (c) $(200/k)$
- (d) $(200/k)^2$

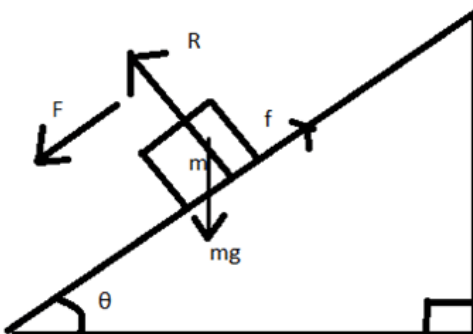


Q: Compute the height of the body if it has a mass of 2 Kg and touches the ground after 5 seconds?

- (a) 125m
- (b) 122.5 m
- (c) 150 m
- (d) 22.5 m

CODEDNICHS

Q: For a body of mass “m” on a rough inclined plane with a constant but arbitrary coefficient of friction as shown in the figure, what is the acceleration on the inclined plane if the net downward force is denoted as “F”. Let “g” be the acceleration due to gravity and “u” be the coefficient of friction.



- (a) $g \times \sin \theta$
- (b) $g \times \cos \theta$
- (c) $g (\sin \theta - u \cos \theta)$
- (d) $g (\cos \theta - u \sin \theta)$

Q: The string of pendulum of length l is displaced through 90° from the vertical and released. Then the minimum strength of the string in order to withstand the tension, as the pendulum passes through the mean position is

- (a) mg
- (b) $3mg$
- (c) $5mg$
- (d) $6mg$

Q: A stone tied with a string, is rotated in a vertical circle. The minimum speed with which the string has to be rotated _____

- (a) Is independent of the mass of the stone
- (b) Is independent of the length of the stone
- (c) Decreases with increasing mass of the stone
- (d) Decreases with increasing length of the stone

Q: A solid disc has a mass of 10kg and radius 1m . Find its radius of gyration.

- (a) 1.414m
- (b) 0.707m
- (c) 1m
- (d) 1.732

Q: What are the dimensions of coefficient of friction?

- (a) MLT^{-2}
- (b) LT^{-1}
- (c) L
- (d) It is dimensionless

Q: A large metal sheet carries an electric current along its surface. Current per unit length is λ . Magnetic field near the metal sheet is

- (a) $(\frac{1}{2})\mu_0\lambda$
- (b) $\mu_0\lambda/2\pi$
- (c) $M_0\lambda$
- (d) $\mu_0/\lambda 2\pi$

Q: Charged particle 'q' moving through a magnetic field with velocity V will have zero magnetic force when the angle is _____

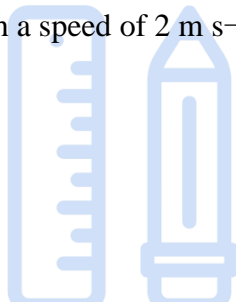
- (a) 0
- (b) 90
- (c) 180
- (d) Both a and b

Q: When a force acts on a ball of mass 150 g for 0.1 sec, it produces an acceleration of 20 m/s². What is the value of this impulsive force?

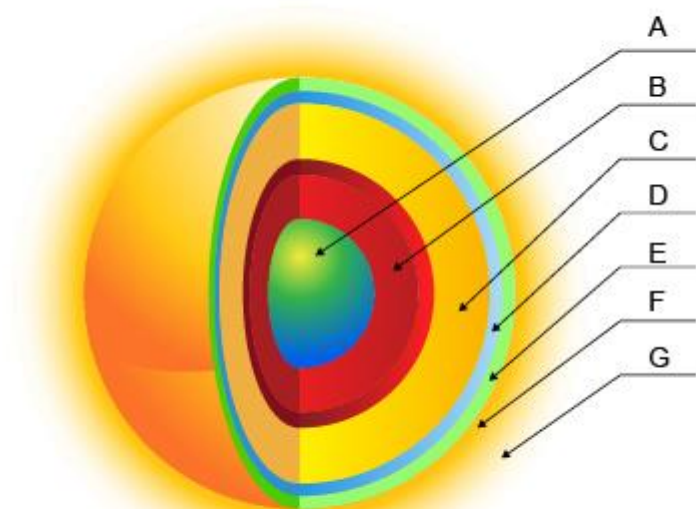
- (a) 0.5 N-s
- (b) 0.1 N-s
- (c) 0.3 N-s
- (d) 1.2 N-s

Q: A hammer of mass 5 kg moving with a speed of 2 m s⁻¹ strikes the head of a nail driving it 20 cm into the wall. Find the impulse.

- (a) 10 N s
- (b) 20 N s
- (c) 30 N s
- (d) 40 N s



Q: The diagram represents the layers of the Sun. Which layer shows where the Sun's thermonuclear fusion occurs?

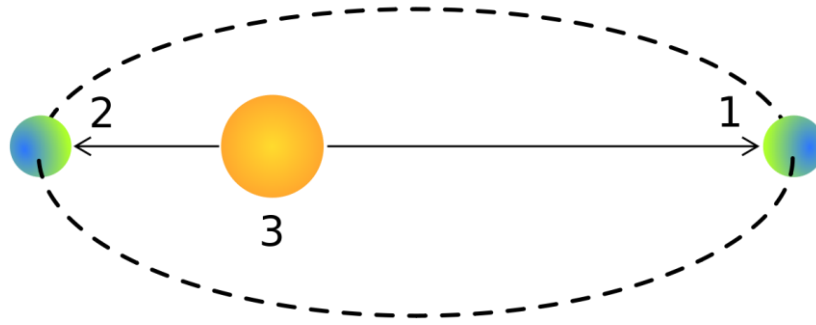


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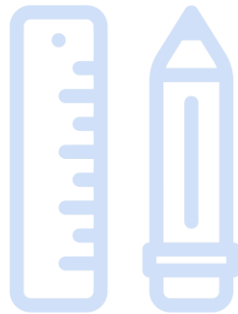
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- a. A
- b. B
- c. D
- d. G

Q: The point in Earth's orbit where Earth is furthest from the Sun (see point 1 in figure) is called its _____.



- a. perihelion
- b. insolation
- c. transit
- d. aphelion



Q: What is the actual colour of the Sun?

- a. Red
- b. Yellow
- c. Blue
- d. White

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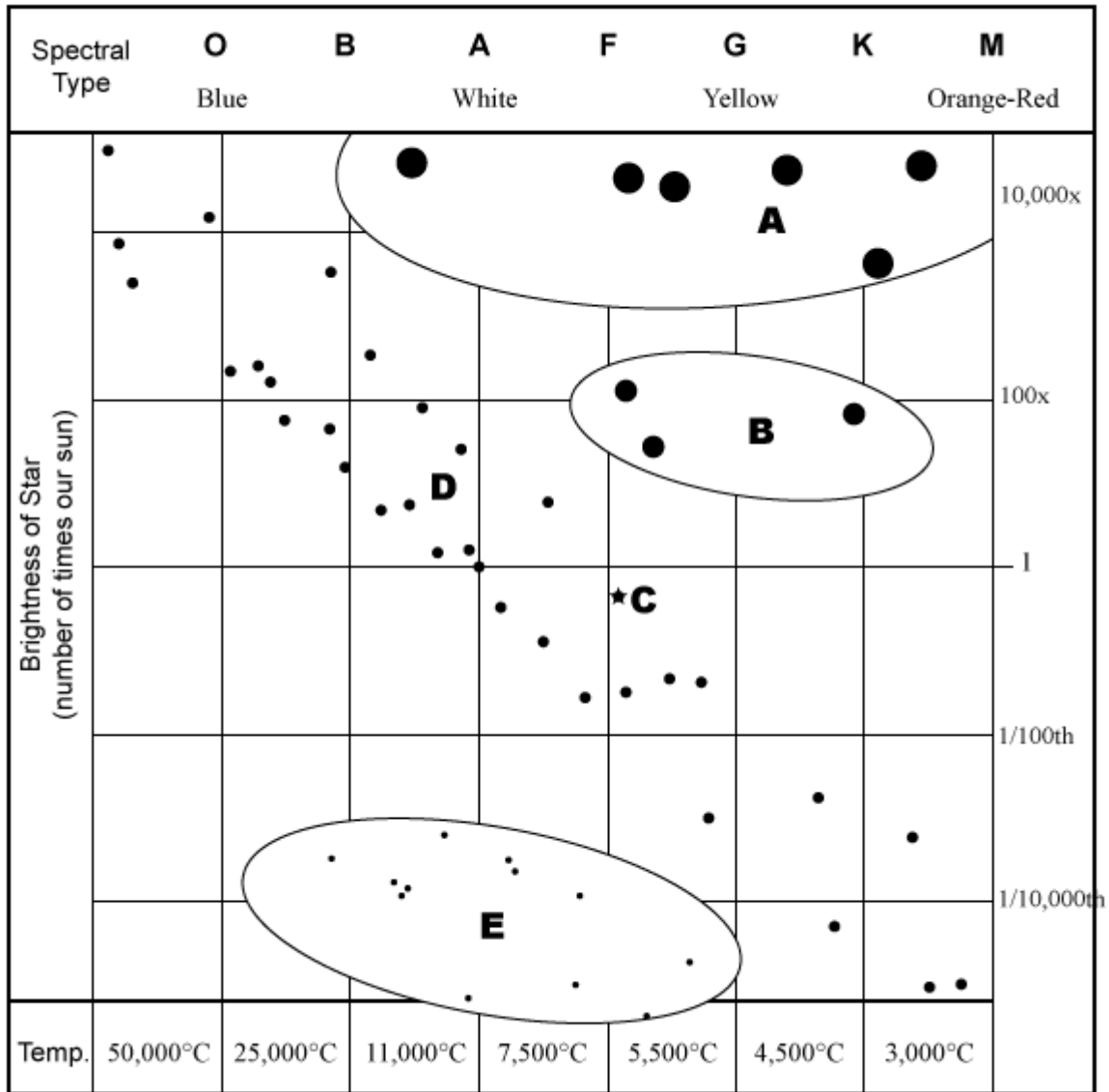
Q: The glowing area of gas that surrounds the core of comet is called _____



- a. nucleus
- b. coma
- c. tail
- d. aura

- Q:** How did the solar system form?
- an expanding galaxy
 - cloud of gas and dust pulled together by gravity
 - an enormous explosion
 - a black hole's gravity

Q: The H-R Diagram shows that main sequence stars



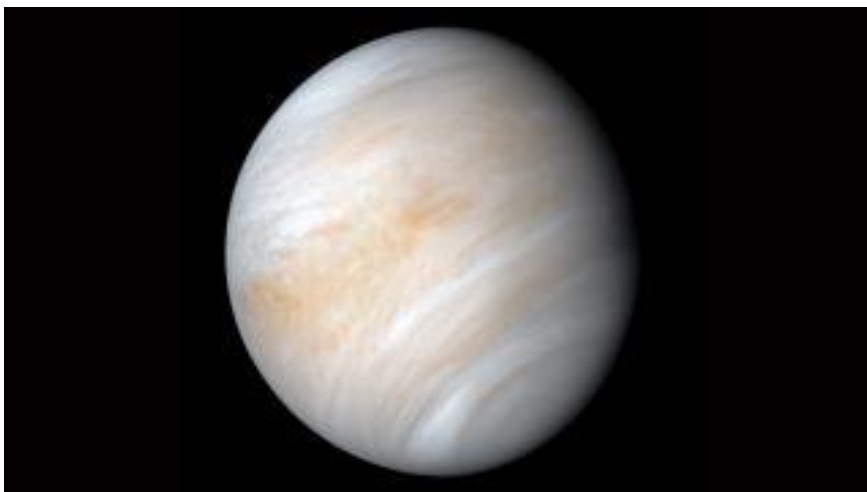
- are mostly hot and dim.
- are mostly cool and bright.
- increase in brightness as they increase in temperature.
- decrease in brightness as they increase in temperature.

Q: A group of thousands of mostly older stars, gathered in a relatively small area, would most likely be which of the following?



- a. Open Cluster
- b. Globular Cluster
- c. Molecular Cloud
- d. Planetary Nebula

Q: Venus has a surface temperature of about



- a. 375° Celsius.
- b. 475° Celsius.
- c. 125° Celsius.
- d. 250° Celsius.

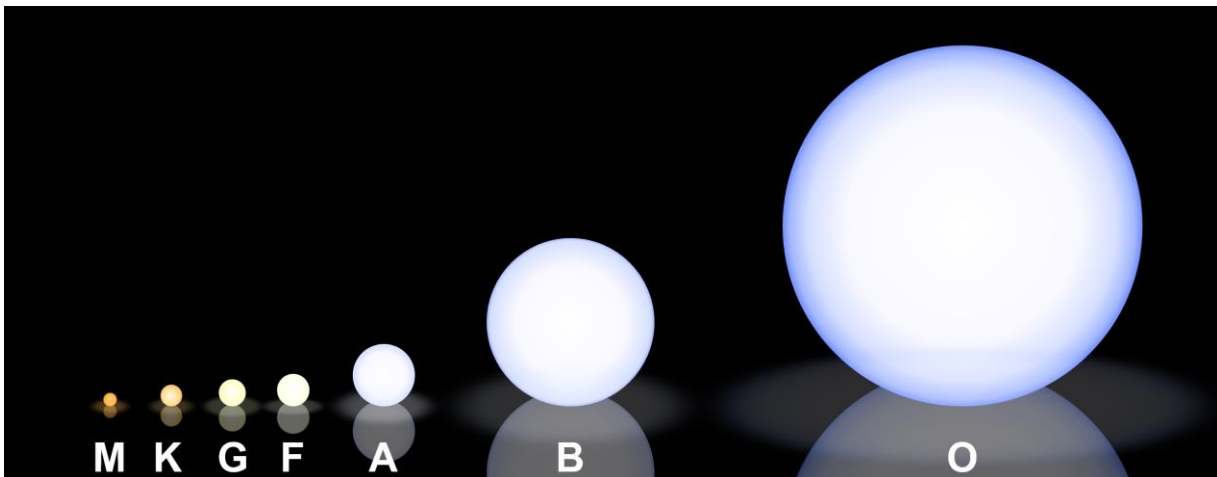
Q: Which of the following stars is brightest?

- a. $M= 3.9$
- b. $M= 5.2$
- c. $M= -1.7$
- d. $M= -2.3$

Q: How often does Neptune orbit the Sun?

- a. every 12 days
- b. every 78 days
- c. once a year
- d. once every 165 years

Q:The approximate main-sequence lifetime of a star of spectral type O is _____



- a. 10 Million
- b. 100 Million
- c. 10 Billion
- d. 100 Billion

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