TEST – 2

MECHANICS

1. When two vectors and of magnitude a and b are added, the magnitude of the resultant vector is always
(a) greater than $(a + b)$ (b) not greater than $(a + b)$
(c) equal to $(a + b)$ (d) less than $(a + b)$

2. The projectile goes farthest away from the earth, when the angle of projection is
(a) 180° (b) 90°
(c) 45° (d) 0°

3. Which of the following quantities is a scalar
(a) magnetic moment (b) acceleration due to gravity
(c) electric field (d) electrostatic potential

4. Moment of inertia is
(a) vector (b) scalar
(c) phasor (d) tensor

5. Estimated radius of the universe is of the order
(a) 10^{80}m (b) 10^{55}m
(c) 10^{30}m (d) 10^{25}m

6. If the magnitudes of vectors and are 12, 5 and 13 units respectively and = , the angle between vectors and is
(a) $\pi/4$ (b) $\pi/2$
(c) π (d) 0

7. A particle starts with initial velocity 10 ms^{-1}. It covers a distance of 20 m along a straight line in two seconds. What is acceleration of the particle?
(a) 20 ms^{-2} (b) 10 ms^{-2}
(c) 1 ms^{-2} (d) zero

8. Which of the following is the unit of latent heat
(a) Jkg^{-1} (b) $Jkg^{-1}mol^{-1}$
(c) J mol–1 (d) J

9. A car travels a distance s on a straight road in two hours and then returns to the same point in the next 3 hours. Its average velocity is
(a) $s/2 + s/3$ (b) $s/5$
(c) $2s/5$ (d) none of these

10. If the distance covered by a particle is zero, then what can we say about its displacement?
(a) It is negative (b) It may or may not be zero
(c) It must be zero (d) It cannot be zero

11. A ball is thrown at an angle θ with the horizontal. Its horizontal range is equal to its maximum height. This is possible when tan α
(a) 4 (b) 2
(c) 1 (d) 0.5

12. If the units of force and that of length are doubled, the unit of energy will be
(a) 1/4 times (b) 1/2 times
(c) 2 times (d) 4 times

13. Two stones are projected with the same (magnitude) velocity but making different angles with the horizontal. Their ranges are equal. If the angle of projection of one is $\pi/3$, and its maximum height is y_1 then the maximum height of the other will be
(a) $y_1/2$ (b) $y_1/3$
(c) $3y_1$ (d) $2y_1$

14. A projectile has the maximum range 500 m. If the projectile is thrown up an inclined plane of 30° with the same (magnitude) velocity, the distance covered by it along the inclined plane will be
(a) 990 m (b) 670.5 m
(c) 333.3 m (d) 250 m

15. A bullet is fired horizontally with a velocity of 2000 ms^{-1}. If acceleration due to gravity is 10 ms^{-2}, in first second it will fall through a height of
(a) 200 m (b) 20 m
(c) 10 m (d) 5 m

16. An object is projected with a kinetic energy *k*. Its range is *r*. It will have the minimum kinetic energy, after covering a horizontal distance equal to
(a) *r* (b) 0.75 r
(c) 0.5 r (d) 0.25 r

17. In case of a projectile, what is the angle between the is instantaneous velocity and acceleration at the highest point?
(a) 180° (b) 90°
(c) 45° (d) 0°

18. A projectile can have the same range *R* for two angles of projection. It t_1 and t_2 be the time of flight in the two cases then what is the product of the two times of flight?
(a) $t_1t_2 \propto$ (b) $t_1t_2 \propto$
(c) $t_1t_2 \propto R^2$ (d) $t_1t_2 \propto R$

19. A projectile is thrown at an angle of 40° with the horizontal and its range is R_1. Another projectile is thrown at an angle 40° with the vertical and its range is R_2. What is the relation between R_1 and R_2?
(a) $R_2 = 2R_1$ (b) $R_1 = 4R_2/5$
(c) $R_1 = 2R_2$ (d) $R_1 = R_2$

20. A projectile is projected with kinetic energy *KE*. If it has the maximum possible horizontal range, then its kinetic energy at the highest point will be
(a) *KE* (b) 0.75 *KE*
(c) 0.5 *KE* (d) 0.25 *KE*

ANSWER KEYS:

1. (b)	2. (b)	3. (d)	4. (d)	5. (d)	6. (b)	7. (d)
8. (a)	9. (a)	10. (c)	11. (a)	12. (d)	13. (b)	14. (c)
15. (d)	16. (c)	17. (b)	18. (d)	19. (d)	20. (c)	