EXERCISE-I

Work Done by Constant Force

1. Which of the following is a scalar quantity

(A) Displacement (B) Electric field

(C) Acceleration (D) Work

2. The work done in pulling up a block of wood weighing 2 kN for a length of 10m on a smooth plane inclined at an angle of 15° with the horizontal is

(A) 4.36 kJ (B) 5.17 kJ

(C) 8.91 kJ (D) 9.82 kJ

3. A force $\vec{F} = 5\hat{i} + 6\hat{j} - 4\hat{k}$ acting on a body, produces a displacement $\vec{s} = 6\vec{i} + 5\vec{k}$.

Work done by the force is

(A) 18 units (B) 15 units

(C) 12 units (D) 10 units

4. A force of 5 N acts on a 15 kg body initially at rest. The work done by the force during the first second of motion of the body is

(A) 5 J (B) $\frac{5}{6}J$

(C) 6 J (D) $75\,J$

5. A force of 5 N, making an angle θ with the horizontal, acting on an object displaces it by $0.4m$ along the horizontal direction. If the object gains kinetic energy of 1J, the horizontal component of the force is

(A) 1.5 N (B) 2.5 N

(C) 3.5 N (D) 4.5 N

6. A force of $(3\hat{i} + 4\hat{j})$ Newton acts on a body and displaces it by $(3\hat{i} + 4\hat{j})\,m$. The work done by the force is

(A) 10 J (B) 12 J

(C) 16 J (D) 25 J

7. A 50kg man with 20kg load on his head climbs up 20 steps of 0.25m height each. The work done in climbing is

(A) 5 J (B) 350 J

(C) 100 J (D) 3430 J

8. A force $\vec{F} = 6\hat{i} + 2\hat{j} - 3\hat{k}$ acts on a particle and produces a displacement of $\vec{s} = 2\hat{i} - 3\hat{j} + x\hat{k}$. If the work done is zero, the value of x is

(A) -2 (B) 1/2

(C) 6 (D) 2

9. A particle moves from position $\vec{r}_1 = 3\hat{i} + 2\hat{j} - 6\hat{k}$ to position $\vec{r}_2 = 14\hat{i} + 13\hat{j} + 9\hat{k}$ under the action of force $4\hat{i} + \hat{j} + 3\hat{k}\,N$. The work done will be

(A) 100 J (B) 50 J

(C) 200 J (D) 75 J

10. A force $(\vec{F}) = 3\hat{i} + c\hat{j} + 2\hat{k}$ acting on a particle causes a displacement: $(\vec{s}) = -4\hat{i} + 2\hat{j} + 3\hat{k}$ in its own direction. If the work done is $6\,J$, then the value of $'c'$ is

(A) 0 (B) 1

(C) 6 (D) 12

11. If a force $\vec{F} = 4\hat{i} + 5\hat{j}$ causes a displacement $\vec{s} = 3\hat{i} + 6\hat{k}$, work done is

(A) 4×6 unit (B) 6×3 unit

(C) 5×6 unit (D) 4×3 unit

12. A man starts walking from a point on the surface of earth (assumed smooth) and reaches diagonally opposite point. What is the work done by him

(A) Zero

(B) Positive

(C) Negative

(D) Nothing can be said

13. It is easier to draw up a wooden block along an inclined plane than to haul it vertically, principally because

(A) The friction is reduced

(B) The mass becomes smaller

(C) Only a part of the weight has to be overcome

(D) 'g' becomes smaller

14. Two bodies of masses 1 kg and 5 kg are dropped gently from the top of a tower. At a point 20 cm from the ground, both the bodies will have the same

(A) Momentum (B) Kinetic energy

(C) Velocity (D) Total energy

15. Due to a force of $(6\hat{i} + 2\hat{j})N$ the displacement of a body is, $t(3\hat{i} - \hat{j})m$ hen the work done is

(A) 16 J (B) 12 J

(C) 8 J (D) Zero

Work Done by Variable Force

16. A body of mass 0.1 kg moving with a velocity of 10 m/s hits a spring (fixed at the other end) of force constant 1000 N/m and comes to rest after compressing the spring. The compression of the spring is

(A) $0.01m$ (B) $0.1m$

(C) $0.2m$ (D) $0.5m$

17. When a 1.0kg mass hangs attached to a spring of length 50 cm, the spring stretches by 2 cm. The mass is pulled down until the length of the spring becomes 60 cm. What is the amount of elastic energy stored in the spring in this condition, if g = 10 m/s^2

(A) 1.5 Joule (B) 2.0 Joule

(C) 2.5 Joule (D) 3.0 Joule

18. A spring of force constant 800 N/m has an extension of 5cm. The work done in extending it from 5cm to 15 cm is

(A) 16 J (B) 8 J

(C) 32 J (D) 24 J

19. When a spring is stretched by 2 cm, it stores 100 J of energy. If it is stretched further by 2 cm, the stored energy will be increased by

(A) 100 J (B) 200 J

(C) 300 J (D) 400 J

20. A spring when stretched by 2 mm its potential energy becomes 4 J. If it is stretched by 10 mm, its potential energy is equal to

(A) 4 J (B) 54 J

(C) 415 J (D) None

21. A spring of spring constant 5×10^3 N/m is stretched initially by 5cm from the unstretched position. Then the work required to stretch it further by another $5cm$ is

(A) 6.25 N-m (B) 12.50 N-m

(C) 18.75 N-m (D) 25.00 N-m

22. A mass of 0.5kg moving with a speed of 1.5 m/s on a horizontal smooth surface, collides with a nearly weightless spring of force constant $k = 50\,N/m$. The maximum compression of the spring would be

(A) 0.15 m (B) 0.12 m

(C) 1.5 m (D) 0.5 m

23. A particle moves in a straight line with retardation proportional to its displacement. Its loss of kinetic energy for any displacement x is proportional to

(A) x^2 (B) e^x

(C) x (D) $\log_e x$

24. A spring with spring constant k when stretched through 1 cm, the potential energy is U. If it is stretched by 4 cm. The potential energy will be

(A) 4U (B) 8U

(C) 16 U (D) 2U

25. A spring with spring constant k is extended from $x = 0$ to $x = x_1$. The work done will be

(A) kx_1^2 (B) $\frac{1}{2}kx_1^2$

(C) $2kx_1^2$ (D) $2kx_1$

Conservation of Energy and Momentum

26. If the linear momentum is increased by 50%, the kinetic energy will increase by

(A) 50% (B) 100%

(C) 125% (D) 25%

27. A free body of mass 8 kg is travelling at 2 meter per second in a straight line. At a certain instant, the body splits into two equal parts due to internal explosion which releases 16 joules of energy. Neither part leaves the original line of motion finally

(A) Both parts continue to move in the same direction as that of the original body

(B) One part comes to rest and the other moves in the same direction as that of the original body

(C) One part comes to rest and the other moves in the direction opposite to that of the original body

(D) One part moves in the same direction and the other in the direction opposite to that of the original body

28. If the K.E. of a particle is doubled, then its momentum will

(A) Remain unchanged

(B) Be doubled

(C) Be quadrupled

(D) Increase $\sqrt{2}$ times

29. If the stone is thrown up vertically and return to ground, its potential energy is maximum

(A) During the upward journey

(B) At the maximum height

(C) During the return journey

(D) At the bottom

30. A body of mass 2 kg is projected vertically upwards with a velocity of $2\,m\sec^{-1}$. The K.E. of the body just before striking the ground is

(A) 2 J (B) 1 J

(C) 4 J (D) 8 J

31. The energy stored in wound watch spring is

(A) K.E. (B) P.E.

(C) Heat energy (D) Chemical energy

32. Two bodies of different masses m_1 and m_2 have equal momenta. Their kinetic energies E_1 and E_2 are in the ratio

(A) $\sqrt{m_1} : \sqrt{m_2}$ (B) $m_1 : m_2$

(C) $m_2 : m_1$ (D) $m_1^2 : m_2^2$

33. A car travelling at a speed of 30 km/hour is brought to a halt in 8 m by applying brakes. If the same car is travelling at 60 km/hour, it can be brought to a halt with the same braking force in

(A) 8 m (B) 16 m

(C) 24 m (D) 32 m

34. Tripling the speed of the motor car multiplies the distance needed for stopping it by

(A) 3

(B) 6

(C) 9

(D) Some other number

35. If the kinetic energy of a body increases by 0.1%, the percent increase of its momentum will be

(A) 0.05% (B) 0.1%

(C) 1.0% (D) 10%

36. If velocity of a body is twice of previous velocity, then kinetic energy will become

(A) 2 times (B) $\frac{1}{2}$ times

(C) 4 times (D) 1 times

37. Two bodies A and B having masses in the ratio of 3 : 1 possess the same kinetic energy. The ratio of their linear momenta is then

(A) 3 : 1 (B) 9 : 1

(C) 1 : 1 (D) $\sqrt{3}:1$

38. In which case does the potential energy decrease

(A) On compressing a spring

(B) On stretching a spring

(C) On moving a body against gravitational force

(D) On the rising of an air bubble in water

39. A sphere of mass m, moving with velocity V, enters a hanging bag of sand and stops. If the mass of the bag is M and it is raised by height h, then the velocity of the sphere was

(A) $\frac{M+m}{m}\sqrt{2gh}$ (B) $\frac{M}{m}\sqrt{2gh}$

(C) $\frac{m}{M+m}\sqrt{2gh}$ (D) $\frac{m}{M}\sqrt{2gh}$

40. Two bodies of masses m and 2m have same momentum. Their respective kinetic energies E_1 and E_2 are in the ratio

(A) 1 : 2 (B) 2 : 1

(C) $1:\sqrt{2}$ (D) 1 : 4

41. Two identical cylindrical vessels with their bases at same level each contains a liquid of density ρ. The height of the liquid in one vessel is h_1 and that in the other vessel is h_2. The area of either base is A. The work done by gravity in equalizing the levels when the two vessels are connected, is

(A) $(h_1-h_2)g\rho$ (B) $(h_1-h_2)gA\rho$

(C) $\frac{1}{2}(h_1-h_2)^2 gA\rho$ (D) $\frac{1}{4}(h_1-h_2)^2 gA\rho$

42. If the increase in the kinetic energy of a body is 22%, then the increase in the momentum will be

(A) 22% (B) 44%

(C) 10% (D) 300%

43. If a body of mass 200 g falls from a height 200 m and its total P.E. is converted into K.E. at the point of contact of the body with earth surface, then what is the decrease in P.E. of the body at the contact $(g=10\,m/s^2)$

(A) 200 J (B) 400 J

(C) 600 J (D) 900 J

44. If momentum is increased by 20%, then K.E. increases by

(A) 44% (B) 55%

(C) 66% (D) 77%

45. The kinetic energy of a body of mass 2 kg and momentum of 2 Ns is

(A) 1 J (B) 2 J

(C) 3 J (D) 4 J

46. The decrease in the potential energy of a ball of mass 20 kg which falls from a height of 50 cm is

(A) 968 J (B) 98 J

(C) 1980 J (D) None of these

47. An object of 1 kg mass has a momentum of 10 kg m/sec then the kinetic energy of the object will be

(A) 100 J (B) 50 J

(C) 1000 J (D) 200 J

48. A ball is released from certain height. It loses 50% of its kinetic energy on striking the ground. It will attain a height again equal to

(A) One fourth the initial height

(B) Half the initial height

(C) Three fourth initial height

(D) None of these

49. A 0.5 kg ball is thrown up with an initial speed 14 m/s and reaches a maximum height of 8.0m. How much energy is dissipated by air drag acting on the ball during the ascent

(A) 19.6 *Joule* (B) 4.9 *Joule*

(C) 10 *Joule* (D) 9.8 *Joule*

50. An ice cream has a marked value of 700 kcal. How many kilowatt- hour of energy will it deliver to the body as it is digested

(A) 0.81 *kWh* (B) 0.90 *kWh*

(C) 1.11 *kWh* (D) 0.71 *kWh*

51. A particle of mass m at rest is acted upon by a force F for a time t. Its Kinetic energy after an interval t is

(A) $\frac{F^2t^2}{m}$ (B) $\frac{F^2t^2}{2m}$

(C) $\frac{F^2t^2}{3m}$ (D) $\frac{Ft}{2m}$

52. The potential energy of a weight less spring compressed by a distance a is proportional to

(A) a (B) a^2

(C) a^{-2} (D) a^0

53. Two identical blocks A and B, each of mass 'm' resting on smooth floor are connected by a light spring of natural length L and spring constant K, with the spring at its natural length. A third identical block 'C' (mass m) moving with a speed v along the line joining A and B collides with A. the maximum compression in the spring is

(A) $v\sqrt{\frac{m}{2k}}$ (B) $m\sqrt{\frac{v}{2k}}$

(C) $\sqrt{\frac{mv}{k}}$ (D) $\frac{mv}{2k}$

54. Two bodies of masses m and 4 m are moving with equal K.E. The ratio of their linear momentums is

(A) 4 : 1 (B) 1 : 1

(C) 1 : 2 (D) 1 : 4

55. A stationary particle explodes into two particles of a masses m_1 and m_2 which move in opposite directions with velocities v_1 and v_2. The ratio of their kinetic energies E_1 / E_2 is

(A) m_1 / m_2 (B) 1

(C) m_1v_2 / m_2v_1 (D) m_2 / m_1

56. The kinetic energy of a body of mass 3 kg and momentum 2 Ns is

(A) 1 J (B) $\frac{2}{3}J$

(C) $\frac{3}{2}J$ (D) 4 J

57. A bomb of mass 3.0 Kg explodes in air into two pieces of masses 2.0 kg and 1.0 kg. The smaller mass goes at a speed of 80 m/s.The total energy imparted to the two fragments is

(A) 1.07 kJ (B) 2.14 kJ

(C) 2.4 kJ (D) 4.8 kJ

58. A bullet moving with a speed of 100 ms^{-1} can just penetrate two planks of equal thickness. Then the number of such planks penetrated by the same bullet when the speed is doubled will be

(A) 4 (B) 8

(C) 6 (D) 10

59. A particle of mass m_1 is moving with a velocity v_1 and another particle of mass m_2 is moving with a velocity v_2. Both of them have the same momentum but their different kinetic energies are E_1 and E_2 respectively. If $m_1 > m_2$ then

(A) $E_1 < E_2$ (B) $\frac{E_1}{E_2} = \frac{m_1}{m_2}$

(C) $E_1 > E_2$ (D) $E_1 = E_2$

60. A ball of mass 2kg and another of mass 4kg are dropped together from a 60 feet tall building. After a fall of 30 feet each towards earth, their respective kinetic energies will be in the ratio of

(A) $\sqrt{2}:1$ (B) 1 : 4

(C) 1 : 2 (D) $1:\sqrt{2}$

Power

61. A car of mass 'm' is driven with acceleration 'a' along a straight level road against a constant external resistive force 'R'. When the velocity of the car is 'V', the rate at which the engine of the car is doing work will be

(A) RV (B) maV

(C) $(R+ma)V$ (D) $(ma-R)V$

62. The average power required to lift a 100 kg mass through a height of 50 metres in approximately 50 seconds would be

(A) 50 J/s (B) 5000 J/s

(C) 100 J/s (D) 980 J/s

63. From a waterfall, water is falling down at the rate of 100 kg/s on the blades of turbine. If the height of the fall is 100 m, then the power delivered to the turbine is approximately equal to

(A) 100 kW (B) 10 kW

(C) 1 kW (D) 1000 kW

64. The power of a pump, which can pump 200kg of water to a height of 200m in 10sec is $(g = 10 m/s^2)$

(A) 40 kW (B) 80 kW

(C) 400 kW (D) 960 kW

65. A 10 H.P. motor pumps out water from a well of depth 20m and fills a water tank of volume 22380 litres at a height of 10m from the ground. the running time of the motor to fill the empty water tank is $(g = 10 ms^{-2})$

(A) 5 minutes (B) 10 minutes

(C) 15 minutes (D) 20 minutes

66. A car of mass 1250 kg is moving at 30m/s. Its engine delivers 30 kW while resistive force due to surface is 750N. What max acceleration can be given in the car

(A) $\frac{1}{3} m/s^2$ (B) $\frac{1}{4} m/s^2$

(C) $\frac{1}{5} m/s^2$ (D) $\frac{1}{6} m/s^2$

67. A force applied by an engine of a train of mass $2.05\times10^6 kg$ changes its velocity from $5 m/s$ to $25 m/s$ in 5 minutes. The power of the engine is

(A) $1.025 MW 4$ (B) $2.05 MW$

(C) $5 MW$ (D) $6 MW$

68. A truck of mass 30,000kg moves up an inclined plane of slope 1 in 100 at a speed of 30 kmph. The power of the truck is (given $g = 10 ms^{-1}$)

(A) 25 kW (B) 10 kW

(C) 5 kW (D) 2.5 kW

69. A 60 kg man runs up a staircase in 12 seconds while a 50 kg man runs up the same staircase in 11, seconds, the ratio of the rate of doing their work is

(A) 6 : 5 (B) 12 : 11

(C) 11 : 10 (D) 10 : 11

70. A pump motor is used to deliver water at a certain rate from a given pipe. To obtain twice as much water from the same pipe in the same time, power of the motor has to be increased to

(A) 16 times (B) 4 times

(C) 8 times (D) 2 times

71. What average horsepower is developed by an 80 kg man while climbing in 10 s a flight of stairs that rises 6 m vertically

(A) 0.63 HP (B) 1.26 HP

(C) 1.8 HP (D) 2.1 HP

72. A car of mass 1000 kg accelerates uniformly from rest to a velocity of 54 km/hour in 5s. The average power of the engine during this period in watts is (neglect friction)

(A) 2000 W (B) 22500 W

(C) 5000 W (D) 2250 W

73. A quarter horse power motor runs at a speed of 600 r.p.m. Assuming 40% efficiency the work done by the motor in one rotation will be

(A) 7.46 J (B) 7400 J

(C) 7.46 ergs (D) 74.6 J

74. An engine pumps up 100 kg of water through a height of 10 m in 5 s. Given that the efficiency of the engine is 60% . If $g = 10 ms^{-2}$, the power of the engine is

(A) $3.3 kW$ (B) $0.33 kW$

(C) $0.033 kW$ (D) $33 kW$

75. A force of $2\hat{i} + 3\hat{j} + 4\hat{k}\ N$ acts on a body for 4 second, produces a displacement of $(3\hat{i} + 4\hat{j} + 5\hat{k}) m.$ The power used is

(A) 9.5 W (B) 7.5 W

(C) 6.5 W (D) 4.5 W

Elastic and Inelastic Collision

76. A ^{238}U nucleus decays by emitting an alpha particle of speed $v ms^{-1}$. The recoil speed of the residual nucleus is (in ms^{-1})

(A) $-4v/234$ (B) $v/4$

(C) $-4v/238$ (D) $4v/238$

77. A smooth sphere of mass M moving with velocity u directly collides elastically with another sphere of mass m at rest. After collision their final velocities are V and v respectively. The value of v is

(A) $\frac{2uM}{m}$ (B) $\frac{2um}{M}$

(C) $\frac{2u}{1+\frac{m}{M}}$ (D) $\frac{2u}{1+\frac{M}{m}}$

78. A body of mass m having an initial velocity v, makes head on collision with a stationary body of mass M. After the collision, the body of mass m comes to rest and only the body having mass M moves. This will happen only when

(A) $m >> M$ (B) $m << M$

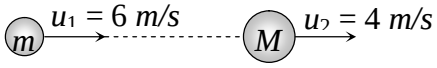
(C) $m = M$ (D) $m = \frac{1}{2}M$

79. A particle of mass m moving with a velocity $\vec{V}$ makes a head on elastic collision with another particle of same mass initially at rest. The velocity of the first particle after the collision will be

(A) $\vec{V}$ (B) $-\vec{V}$

(C) $-2\vec{V}$ (D) Zero

80. A particle of mass m moving with horizontal speed 6 m/sec as shown in figure. If $m << M$ then for one dimensional elastic collision, the speed of lighter particle after collision will be



(A) 2m/sec in original direction

(B) 2 m/sec opposite to the original direction

(C) 4 m/sec opposite to the original direction

(D) 4 m/sec in original direction

81. A billiard ball moving with a speed of 5 m/s collides with an identical ball originally at rest. If the first ball stops after collision, then the second ball will move forward with a speed of

(A) $10\,ms^{-1}$ (B) $5\,ms^{-1}$

(C) $2.5\,ms^{-1}$ (D) $1.0\,ms^{-1}$

82. If two balls each of mass 0.06 kg moving in opposite directions with speed 4 m/s collide and rebound with the same speed, then the impulse imparted to each ball due to other is

(A) 0.48 kg-m/s (B) 0.24 kg-m/s

(C) 0.81 kg-m/s (D) Zero

83. A ball of mass m falls vertically to the ground from a height h_1 and rebound to a height h_2. The change in momentum of the ball on striking the ground is

(A) $mg(h_1 - h_2)$

(B) $m(\sqrt{2gh_1} + \sqrt{2gh_2})$

(C) $m\sqrt{2g(h_1 + h_2)}$

(D) $m\sqrt{2g}\,(h_1 + h_2)$

84. A body of mass 50 kg is projected vertically upwards with velocity of 100 m/sec. 5 seconds after this body breaks into 20 kg and 30 kg. If 20 kg piece travels upwards with 150 m/sec, then the velocity of other block will be

(A) 15 m/sec downwards

(B) 15 m/sec upwards

(C) 51 m/sec downwards

(D) 51 m/sec upwards

85. A steel ball of radius 2 cm is at rest on a frictionless surface. Another ball of radius 4cm moving at a velocity of 81 cm/sec collides elastically with first ball. After collision the smaller ball moves with speed of

(A) 81 cm/sec (B) 63 cm/sec

(C) 144 cm/sec (D) None of these

86. A space craft of mass M is moving with velocity V and suddenly explodes into two pieces. A part of it of mass m becomes at rest, then the velocity of other part will be

(A) $\frac{MV}{M-m}$ (B) $\frac{MV}{M+m}$

(C) $\frac{mV}{M-m}$ (D) $\frac{(M+m)V}{m}$

87. A ball hits a vertical wall horizontally at 10m/s bounces back at 10 m/s

(A) There is no acceleration because $10\frac{m}{s} - 10\frac{m}{s} = 0$

(B) There may be an acceleration because its initial direction is horizontal

(C) There is an acceleration because there is a momentum change

(D) Even though there is no change in momentum there is a change in direction. Hence it has an acceleration

88. A bullet of mass 50 gram is fired from a 5 kg gun with a velocity of 1km/s. the speed of recoil of the gun is

(A) $5\,m/s$ (B) $1\,m/s$

(C) $0.5\,m/s$ (D) $10\,m/s$

89. A body falling from a height of 10m rebounds from hard floor. If it loses 20% energy in the impact, then coefficient of restitution is

(A) 0.89 (B) 0.56

(C) 0.23 (D) 0.18

90. A body of mass m_1 moving with a velocity 3 ms^{-1} collides with another body at rest of mass m_2. After collision the velocities of the two bodies are 2 ms^{-1} and 5ms^{-1} respectively along the direction of motion of m_1 The ratio m_1/m_2 is

(A) $\frac{5}{12}$ (B) 5

(C) $\frac{1}{5}$ (D) $\frac{12}{5}$

91. In the elastic collision of objects

(A) Only momentum remains constant

(B) Only K.E. remains constant

(C) Both remains constant

(D) None of these

92. Two particles having position vectors $\vec{r_1} = (3\hat{i} + 5\hat{j})$ metres and $\vec{r_2} = (-5\hat{i} - 3\hat{j})$ metres are moving with velocities $\vec{v}_1 = (4\hat{i} + 3\hat{j})\,m/s$ and $\vec{v}_2 = (\alpha\,\hat{i} + 7\hat{j})$ m/s. If they collide after 2 seconds, the value of 'α' is

(A) 2 (B) 4

(C) 6 (D) 8

93. A neutron makes a head-on elastic collision with a stationary deuteron. The fractional energy loss of the neutron in the collision is

(A) 16/81 (B) 8/9

(C) 8/27 (D) 2/3

94. A body of mass m is at rest. Another body of same mass moving with velocity V makes head on elastic collision with the first body. After collision the first body starts to move with velocity

(A) V (B) 2V

(C) Remain at rest (D) No predictable

95. A body of mass M moves with velocity v and collides elastically with a another body of mass m (M>>m) at rest then the velocity of body of mass m is

(A) v (B) 2v

(C) v/2 (D) Zero

Perfectly Inelastic Collision

96. If a skater of weight 3 kg has initial speed 32 m/s and second one of weight 4 kg has 5 m/s. After collision, they have speed (couple) 5 m/s. Then the loss in K.E. is

(A) 48 J (B) 96 J

(C) Zero (D) None of these

97. A ball is dropped from height 10 m. Ball is embedded in sand 1 m and stops, then

(A) Only momentum remains conserved

(B) Only kinetic energy remains conserved

(C) Both momentum and K.E. are conserved

(D) Neither K.E. nor momentum isconserved

98. A metal ball of mass 2 kg moving with a velocity of 36 km/h has an head on collision with a stationary ball of mass 3 kg. If after the collision, the two balls move together, the loss in kinetic energy due to collision is

(A) 40 J (B) 60 J

(C) 100 J (D) 140 J

99. A body of mass 2kg is moving with velocity 10 m/s towards east. Another body of same mass and same velocity moving towards north collides with former and coalsces and moves towards north-east. Its velocity is

(A) 10 m/s (B) 5 m/s

(C) 2.5 m/s (D) $5\sqrt{2}\, m/s$

100. Which of the following is not a perfectly inelastic collision

(A) Striking of two glass balls

(B) A bullet striking a bag of sand

(C) An electron captured by a proton

(D) A man jumping onto a moving cart

101. A mass of 20 kg moving with a speed of 10m/s collides with another stationary mass of $5kg$. As a result of the collision, the two masses stick together. The kinetic energy of the composite mass will be

(A) 600 Joule (B) 800 Joule

(C) 1000 Joule (D) 1200 Joule

102. A neutron having mass of $1.67\times10^{-27}\, kg$ and moving at $10^{8}\, m/s$ collides with a deutron at rest and sticks to it. If the mass of the deutron is $3.34\times10^{-27}\, kg$ then the speed of the combination is

(A) $2.56\times10^{3}\, m/s$ (B) $2.98\times10^{5}\, m/s$

(C) $3.33\times10^{7}\, m/s$ (D) $5.01\times10^{9}\, m/s$

103. The quantity that is not conserved in an inelastic collision is

(A) Momentum (B) Kinetic energy

(C) Total energy (D) All of these

104. A body of mass 40kg having velocity 4 m/s collides with another body of mass 60kg having velocity 2 m/s. If the collision is inelastic, then loss in kinetic energy will be

(A) 440 J (B) 392 J

(C) 48 J (D) 144 J

105. A body of mass m_1 is moving with a velocity V. It collides with another stationary body of mass m_2. They get embedded. At the point of collision, the velocity of the system

(A) Increases

(B) Decreases but does not become zero

(C) Remains same

(D) Become zero