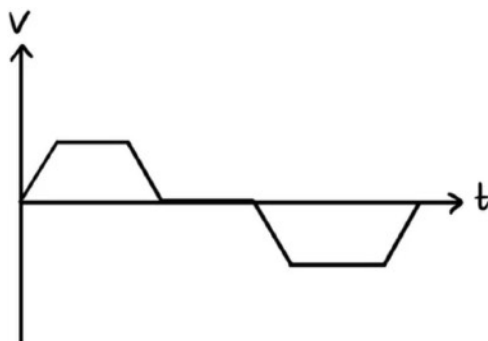
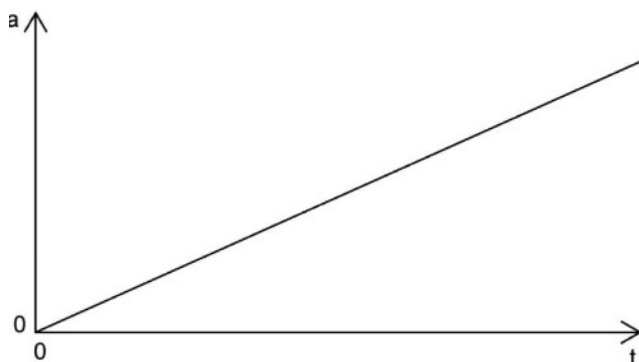


The below questions are selected from various reference books and online practice quizzes to give practise to students on Mechanics topic

1. Which property of the graph represents total displacement of the object ?

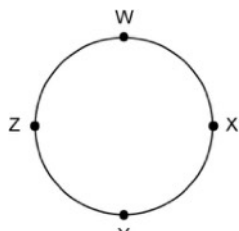


- a. The gradient of the line
 - b. The total area between the line and the axis
 - c. The x-intercept
 - d. The y-intercept
2. A speed boat travels down the river with an initial velocity of 10 m s^{-1} . The owner wishes to show off the power of its engine, accelerating at a rate of 2 m s^{-2} for 5 seconds. What is the final velocity of the speed boat ?
- a. 20 m s^{-1}
 - b. 22 m s^{-1}
 - c. 24 m s^{-1}
 - d. 26 m s^{-1}
3. A ball is thrown upward with an initial velocity of 3 m s^{-1} ~What SUVAT equation will correctly calculate the maximum height reached by the ball ?
- a. $v = u + at$
 - b. $s = ut + \frac{1}{2}at^2$
 - c. $v^2 = u^2 + 2as$
 - d. $s = \frac{(v + u)}{2}t$
4. Arpita draws an acceleration v/s time graph as below. What quantity can she deduce from the graph only and what quantity from the graph is used to deduce this



	Deduction	Quantity used
a	Change in velocity	Gradient of graph
b	Change in velocity	Area under line
c	Change in displacement	Gradient of graph
d	Change in displacement	Area under line

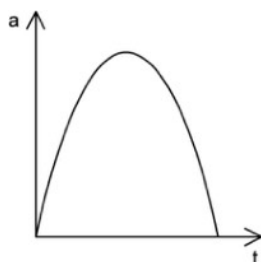
5. A stone is released from a hot air balloon moving upward with a uniform velocity of 25 ms^{-1} . If the hot air balloon is 30 m high when the stone was dropped. What is its height when the stone hits the ground ?
- 180 m
 - 55 m
 - 60 m
 - 150 m
6. An object moves through one complete circle from W to X to Y to Z and finally to W again. The radius of the circle is 3 km. Which row is correct about the distance and displacement of the object ?



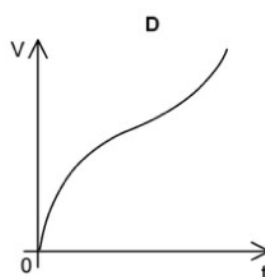
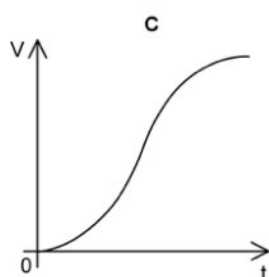
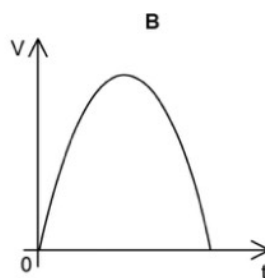
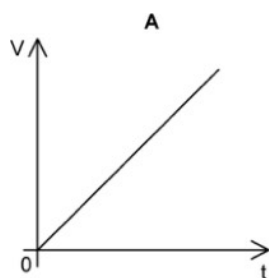
	Displacement	Distance
a	0	9π

b	0	6π
0	6π	0
d	6π	9π

7. The graph shows the variation of acceleration a of an object with time t



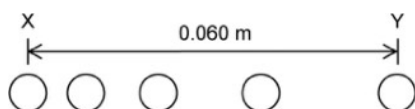
Which graph shows how the velocity v of the graph varies with time.



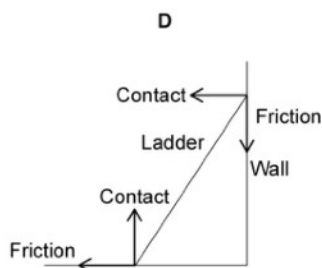
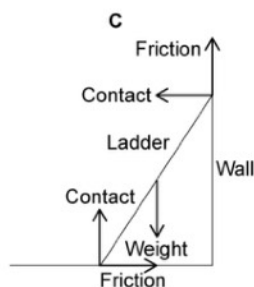
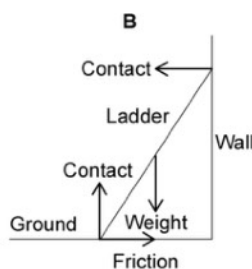
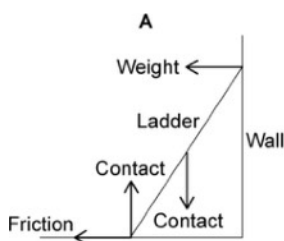
8. A student throws a stone with velocity 3 m s^{-1} at an angle of θ to the vertical from the surface of a lake. Air resistance can be ignored. The acceleration due to gravity is g . What is the angle θ if the stone hits the surface of the lake 15 m from the student after 10 s ?
- 90°
 - 45°

- c. 60°
- d. 30°

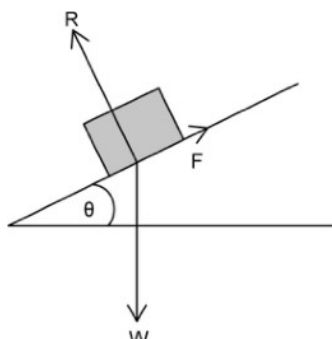
9. A ball starts from rest and moves horizontally. Five positions of the ball are shown at time intervals of 0.5 ms. The horizontal distance between X (initial position) and Y(final position) is 0.060 m. What is the average acceleration of the ball between X and Y?



- a. 48 ms^{-2}
 - b. 60 ms^{-2}
 - c. 19200 ms^{-2}
 - d. 30000 ms^{-2}
10. A ladder rests on a rough wall and rough horizontal surface. Which of the following correctly labels the forces acting on the ladder ?



11. The image shows a block resting on an inclined plane. Which row in the table gives the correct interpretation of the forces acting on the block R, F and W ?



	R	F	W
a.	Weight	Reaction	Static Friction
b.	Dynamic friction	Weight	Reaction
c.	Reaction	Dynamic friction	Weight
d.	Reaction	Static friction	Weight

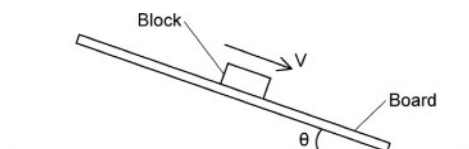
12. Which of the following statements about friction is not true ?

- Friction always acts in the direction opposite to that of motion,
- Static friction occurs when two solid objects are in contact and no movement occurs between them.
- For a stationary object, the force due to dynamic friction is at its maximum.
- For a static object, the force due to its dynamic friction is zero.

13. Which of the following equations for static friction is correct ?

- $F = ma$
- $F_f \leq \mu_s R$
- $F_f = \mu_d R$
- $F = I \Delta t$

14. A wooden block of weight W rests on a rough board that produces a friction force F . The end of the board is then raised up to an angle θ until the block slides down the plane of the board at constant velocity. Which row describes the forces acting on the block as it slides down the plane.

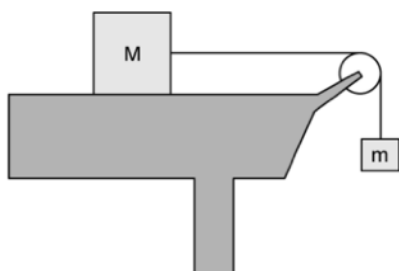


	Friction force on the block	Resultant force on the block
a.	$W \sin \theta$	0
b.	$W \cos \theta$	$W \sin \theta - F$
c.	$W \cos \theta$	0
d.	$W \sin \theta$	$F - W \sin \theta$

15. Which row gives the correct Newton's third law force pair for a block on a table ?

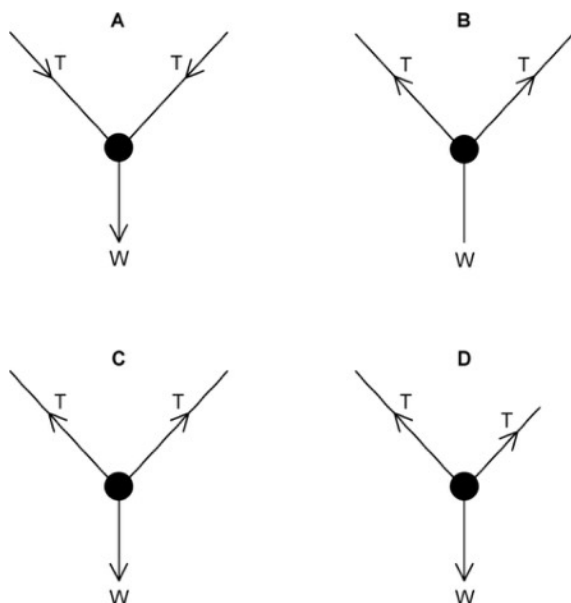
	Force A	Force B
a.	Weight of the block	Force of the block on the table
b.	Gravitational force of the earth pulling on the block	Gravitational force of the book pulling on the block
c.	Weight of the block	Reaction force from the table surface
d.	Gravitational force of the earth pulling on the block	Gravitational force of the table pulling the earth

16. An object of mass m is connected via a frictionless pulley to an object of mass M , Where $M > m$. M rests on a horizontal rough surface with a frictional force f . What is the acceleration of the system ?



- a. 0
- b. $\frac{Mg + f}{M + m}$
- c. $\frac{Mg - f}{M + m}$
- d. g

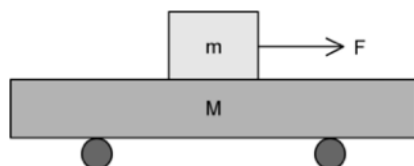
17. A photo hangs from two strings. It has weight W and the two strings has equal tension T . What is the free body diagram of the system ?



18. Which of the following are possible values of coefficient of static friction and coefficient of dynamic friction ?

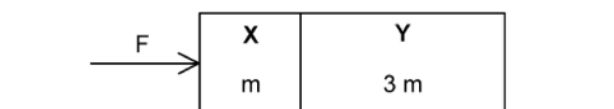
	Coefficient of static friction	Coefficient of dynamic friction
a.	0.012	0.78
b.	0.35	0.12
c.	1.50	0.90
d.	0.26	-0.76

19. A block of mass m rests on a trolley of mass M . The coefficient of dynamic friction is μ . A horizontal force F acts on the block causing it to slide over the trolley. What is the acceleration of the trolley ?



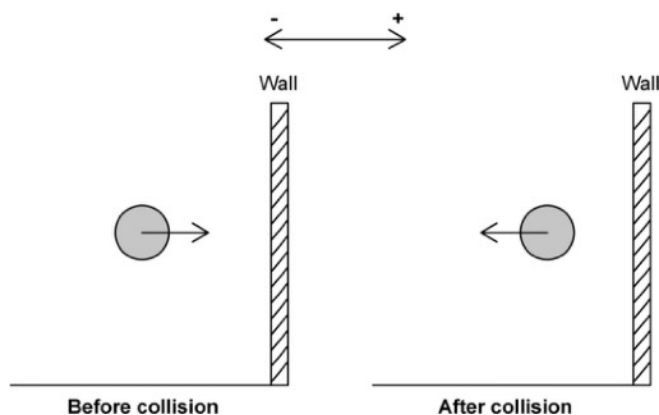
- a. $\frac{F - \mu mg}{M}$
 b. $\frac{\mu mg}{M + m}$
 c. $\frac{F - \mu Mg}{m}$
 d. $\frac{\mu mg}{M}$

20. Two boxes in contact are pushed in a line along a floor with a force F . The boxes are moving at a constant speed. Box X has a mass m and box Y has a mass $3m$. What is the resultant force acting on Y ?



- a. F
 b. $\frac{F}{3}$
 c. $3F$
 d. 0

21. A tennis ball is thrown at a wall and then bounces off the wall. Which row states the correct direction for the velocity before and after hitting the wall ?



	Before hitting	After hitting
a.	-	-
b.	-	+
c.	+	-
d.	+	+

22. A car drives into a wall. The change in momentum is 17000 ms^{-1} and the time of impact is 0.1 s . What is the force acting on the car as a result of collision?

- a. 17000 N
- b. 1700000 N
- c. 170000 N
- d. 1700 N

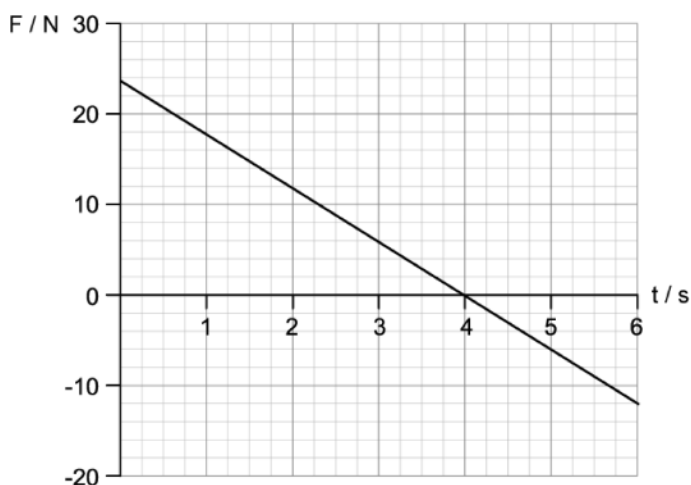
23. Which of the following is the correct equation for impulse

- a. $I = mv - mu$
- b. $I = F \Delta p$
- c. $I = \Delta t$
- d. $I = \frac{F}{\Delta t}$

24. Which feature on a force time graph represents the impulse ?

- a. Gradient
- b. Y intercept
- c. Area
- d. X intercept

25. What is the definition of an elastic collision ?
- A collision where kinetic energy is conserved
 - A collision where momentum is conserved
 - A collision where both objects are stationary after the collision
 - A collision where kinetic energy is not conserved
26. What is the main purpose of the crumple zone in a car ?
- To decrease the contact time over which the collision occurs.
 - To increase the contact time over which the collision occurs.
 - To reduce the mass of the car involved in collision
 - To reduce the damage to the rest of the car in a collision.
27. What type of collision are explosive
- Elastic
 - Conserved
 - Inelastic
 - Impulsive
28. A force acts on a mass of 5.0 kg and it is initially at rest. What is the time taken for the mass to reach an acceleration of 2 ms^{-2} ?



- 2.50 s
 - 2.20 s
 - 2.25 s
 - 2.00 s
29. A body of mass $3M$ at rest explodes into two pieces of mass $2M$ and M . What is the ratio

$$\frac{\text{kinetic energy of } 2M}{\text{Kinetic energy of } M} \quad \text{and} \quad \frac{\text{Momentum of } 2M}{\text{Momentum of } M}$$

	$\frac{\text{kinetic energy of } 2M}{\text{Kinetic energy of } M}$	$\frac{\text{Momentum of } 2M}{\text{Momentum of } M}$
a.	$\frac{1}{2}$	-1
b.	1	-1
c.	$\frac{1}{4}$	2
d.	$\frac{1}{2}$	-2

30. Which of the following is an elastic collision ?

- A ball dropped from a height and bouncing up to a lower height
- Two railway trucks colliding and they link together
- Two gas molecules collide and a bond is formed between them
- Two gas molecules collide and then travel perpendicular to each other.

31. The projectile path taken by an object with air resistance is a shorter horizontal distance to that without air resistance. The effects of air resistance could be decreased by a projectile with

- A rough surface
- Larger surface to volume ratio
- Similar angle of release
- Trajectory at a lower altitude

32. The efficiency of an electric motor is 80 %. When lifting a body the amount of energy wasted is E_w . What is the useful work done by the motor ?

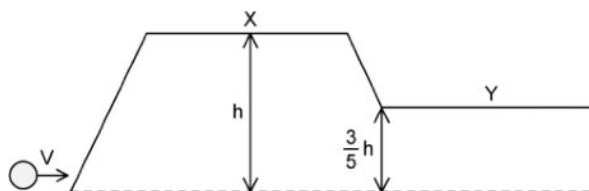
- $\frac{E_w}{4}$
- $4E_w$
- $0.8 E_w$
- $0.4 E_w$

33. A student of mass 50 kg climbs a vertical ladder 4.0 m tall in a time of 8.0 s. What is the power developed by the student against gravity ?

- 25 W
- 200 W
- 1000 W

d. 250 W

34. A mass with speed v travels up to a point X then down to Y. Assuming air resistance is negligible, what is v of the mass at point Y ?



- a. $\sqrt{\frac{2gh}{5}}$
b. $2\sqrt{\frac{gh}{5}}$
c. $4\sqrt{\frac{gh}{5}}$
d. $\sqrt{\frac{3gh}{5}}$

35. The power generated by the nuclear reaction in the core of the reactor is 35 GW. If the efficiency of the power station is 60 %, how much power goes into producing waste energy ?

- a. 35 GW
b. 21 GW
c. 14 GW
d. 18 GW

36. A student states three scenarios in which she thinks no work is done on an object.

- i. A pulling force on a sledge being pulled at an angle
- ii. A charged particle on a magnetic field
- iii. Drag force acting on a car

Which of the above scenario is/ are correct

- a. i and ii
b. i and iii
c. ii only
d. ii and iii

37. Which is the correct equation for the efficiency of the system ?

- a. $efficiency = \frac{useful\ energy\ in}{total\ energy\ out} \times 100$
- b. $efficiency = \frac{wasted\ energy\ out}{total\ energy\ out} \times 100$
- c. $efficiency = \frac{useful\ energy\ out}{total\ energy\ in} \times 100$
- d. $efficiency = \frac{energy\ transferred}{time} \times 100$

38. What is another way of saying that energy is wasted ?
 - a. Energy has been transferred
 - b. Energy has been dissipated
 - c. Energy has been conserved
 - d. Energy has been destroyed
39. Which energy below indicates energy transfer and not store of energy ?
 - a. Chemical
 - b. Electrical
 - c. gravitational potential
 - d. Elastic
40. Which one of the following situations does not describe the work done on an object ?
 - a. Lifting a bar above the head
 - b. Pushing a supermarket trolley across a car parking
 - c. Walking upstairs
 - d. Holding a box at a height of 1.5 m above the ground.
41. Which feature of the force extension graph represents the work done on a material under tensile stress ?
 - a. Gradient
 - b. Area
 - c. X intercept
 - d. Y intercept
42. Which of the following is the correct definition of elastic potential energy ?
 - a. Elastic potential energy is a measure of how much a material can be stretched or compressed.
 - b. Elastic potential energy is the maximum amount that can be stretched or compressed.
 - c. Elastic potential energy is the measure of the stiffness of a material.
 - d. Elastic potential energy is the energy stored in the material when it is stretched or compressed,

43. Two balls m and $2m$ collide elastically with speeds v and $2v$ respectively. After the collision, they both move in opposite directions. With what speed does the $2m$ move with after the collision ?



- a. $\sqrt{\frac{5}{2}} v$
b. $\frac{1}{2} v$
c. $\sqrt{\frac{1}{2}} v$
d. $\frac{5}{2} v$

Key

1 b	2 a	3 c	4 b	5 c	6 b	7 c
8 d	9 d	10 c	11 d	12 d	13 b	14
15 c	16 c	17 c	18 b	18 b	20 a	21 c
22 c	23 a	24 c	25 a	26 b	27c	28 c
29 a	30 a	31 d	32 b	33 a	34 b	35 c
36 c	37 c	38 b	39 b	40 d	41 b	42 d
43 b						