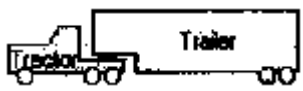


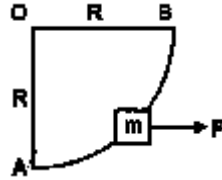
Dear student following is a Moderate level [00●00] test paper. Score of 15 Marks in 10 Minutes would be a satisfactory performance. Questions 1-8 (+3, -1). (All Questions have Single Options correct)

- Q.1** A tractor-trailer trucks is traveling down the road. The mass of the trailer is 4 times the mass of the tractor. If the tractor accelerates forward, the force that the trailer applies on the tractor is
- 
- (A) 4 times greater than the force of the tractor on the trailer.
 (B) 2 times greater than the force of the tractor on the trailer
 (C) equal to the tractor on the trailer.
 (D) 1/4 the force of the tractor on the trailer.

- Q.2** Which of the following principles best explains why large tractor-trailer trucks generally accelerate much more slowly than automobiles?
- (A) The every action there is an equal reaction.
 (B) Every body attracts every other body in the universe.
 (C) A force is necessary to change the speed or direction of a body.
 (D) The acceleration of body is inversely proportional to its mass and directly proportional to the external force acting on the body.

- Q.3** A balloon with mass M is descending down with an acceleration a ($a < g$). What mass of its contents must be removed so that it starts moving up with same acceleration a
- (A) $\frac{2M(g)}{a}$ (B) $\frac{M(g+a)}{g}$ (C) $\frac{Mg}{g+a}$ (D) $\frac{2Ma}{g+a}$

- Q.4** A person with mass M stands on a bathroom scale in an elevator. What will the scale read when the elevator is accelerating downward with acceleration a?
- (A) Mg (B) $M(g - a)$
 (C) $M(a + g)$ (D) $M(a - g)$

- Q.5** A block of mass m is taken from A to B under the action of a constant force F. Work done by this force is :
- 
- (A) FR (B) $\frac{\pi}{2}$ FR (C) $\frac{FR}{\sqrt{2}}$ (D) $\frac{FR}{4}$

- Q.6** The displacement x of a body of mass 1 kg on horizontal smooth surface as a function of time t is given by $x = \frac{t^4}{4}$. The work done in the first one second is :
- (A) $\frac{1}{4}$ J (B) $\frac{1}{2}$ J (C) $\frac{3}{4}$ J (D) $\frac{5}{4}$ J

The following questions consist of two statements one labelled Assertion (A) and the another labelled Reason (R). Select the correct answers to these questions from the codes given below :

(A) Both A and R are true and R is the correct explanation of A.
 (B) Both A and R are true but R is not correct explanation of A
 (C) A is true but R is false
 (D) A is false but R is true.

- Q.7** **Assertion** : The work done in pushing a block is more than the work done in pulling the block in a rough surface.
Reason : In the pushing condition normal reaction is more.
- Q.8** **Assertion** : For stable equilibrium Force has to be zero and potential energy should be minimum.
Reason : For equilibrium, it is not necessary that the force is not zero.

PHYSICS IIT JEE (JULY 1ST WEEK CLASS TEST 1) (NLM) ANSWER KEY

Name : Roll No. :

	A	B	C	D		A	B	C	D		A	B	C	D
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					

ANSWER KEY

Que.	1	2	3	4	5	6	7	8
Ans.	C	D	D	B	A	B	A	C

SOLUTIONS

Sol.1 (C)

According to the newton's 3rd law, the force that the trailer applying on the tractor is equal to the force of the tractor on the trailer.

Sol.2 (D)

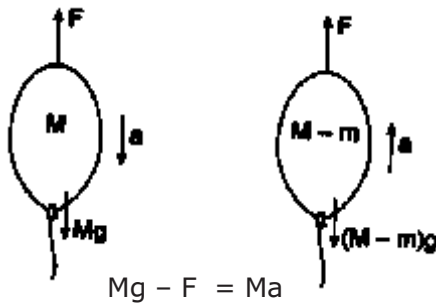
$$F = ma$$

or $a = \frac{F}{m}$

$$a \propto F, a \propto \frac{1}{m}$$

Sol.3 (D)

Upthrust F will remain same in both the cases. Equations of motion will be



$Mg - F = Ma$
and $F - (M - m)g = (M - m)a$
Solving equations (1) and (2) we get,

$$\text{mass to be removed } m = \frac{2Ma}{g + a}$$

Sol.4 (B)

When elevator is accelerating downward with acceleration a , then scale read $M(g-a)$

Sol.5 (A)

$$W = \int \vec{F} \cdot d\vec{S}$$

$$= \int F \cos \theta = \int_0^R F dx$$

$$W = FR$$

Choice (B), (C) and (D) are wrong.

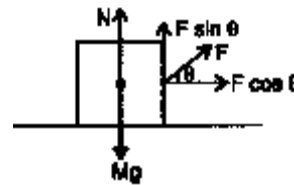
Sol.6 (B)

$$v = \frac{dx}{dt} = \frac{1}{4} \times 4t^3 = t^3 = 1 \text{ m/s}$$

Work done = change in K.E.

$$= \frac{1}{2} \times 1 \times (1)^2 - \frac{1}{2} \times 1 \times (0)^2 = \frac{1}{2} \text{ J}$$

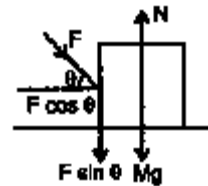
Sol.7 (A)



Both Assertion and Reason are correct Reason is correct explanation of Assertion.

$$N + F \sin \theta = Mg$$

$$M = Mg - F \sin \theta \quad \dots(1)$$



Equation (1) represent normal reaction is pulling condition.

$$N = F \sin \theta + Mg \quad \dots(2)$$

Equation (2) represent the Normal reaction is pushing condition.

Sol.8 (C)

Assertion is true from Newton's law and Reason is incorrect.

For any type of translatory equilibrium Net force is zero.

