Question Paper Name:	5241Engineering Mechanics30th June 2019 Shift 2
Subject Name:	Engineering Mechanics
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Duration:	180
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Display Marks:	Yes

Engineering Mechanics

Group Number :	1
Group Id :	489994182
Group Maximum Duration :	0
Group Minimum Duration :	120
Revisit allowed for view? :	No
Revisit allowed for edit? :	No
Break time:	0
Group Marks:	100

Engineering Mechanics

Section Id :	489994238
Section Number :	1
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	100
Number of Questions to be attempted:	100
Section Marks:	100
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	489994255
Question Shuffling Allowed :	Yes

Question Number : 1 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A body with mass but with dimensions that can be neglected is called

    a) particle
    b) rigid body
    c) continuum
    d) mass centre

Options :

1. 1

2. 2

3. 3

Question Number : 2 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A particle originally at rest or moving in a straight line with constant velocity tends to remain in this state provided the particle is not subjected to an unbalanced force. This is the statement of

   a) Newton's first law
   b) Newton's second law
   c) Newton's third law
   d) Newton's law of gravitation

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 3 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The retarding effect of bearing friction on the motion of a machine may be neglected if the frictional forces as small compared to other applied forces. This is an example of
   a) Modeling
   b) Idealization
   c) Assumption
   d) Approximation

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 4 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The effect of a loading which is assumed to act at a part on a body is represented by
   a) distributed force
   b) point force
   c) parallel force
   d) concurrent force

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 5 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

...t that deals with equilibrium of rigid bodies, that is, those which are either at rest or move with a constant velocity is called

a) Solid mechanics
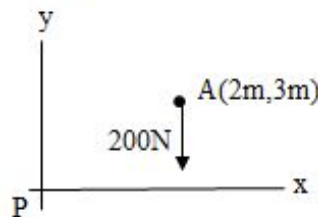b) Classical mechanics
c) Statics
d) Dynamics

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 6 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The study of a rigid body in motion, when the forces causing the motion are not considered, is called

a) Statics
b) Dynamics
c) Kinetics
d) Kinematics

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 7 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
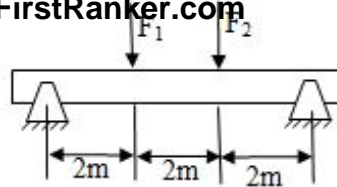
Correct Marks : 1 Wrong Marks : 0

The magnitude of the moment of the force at A about P is

a) 400 N-m, clockwise
b) 400 N-m, counterclockwise
c) 200 N-m, clockwise
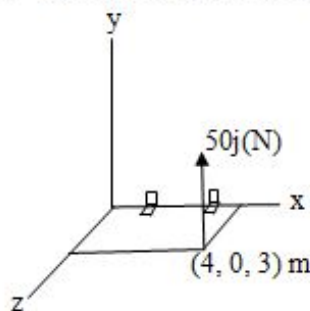d) 200 N-m, counterclockwise

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 8 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

... s exert a 140KN-m clockwise moment about A and 20 KN-m clockwise moment about B, the force F is

a) $(50/3)$ kN ↓, $(130/3)$ kN ↑
b) $(50/3)$ kN ↑, $(130/3)$ kN ↑
c) $(50/3)$ N↑, $(130/3)$ kN ↓
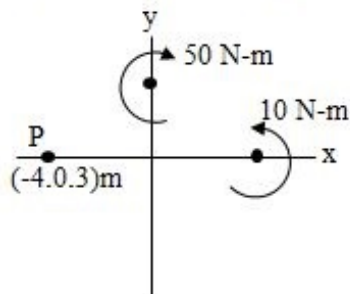d) $(50/3)$ kN↑, $(130/3)$ kN ↓

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 9 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A force of 50 N is applied on a hinged plate in the Y-direction at (4, 0, 3) m. The moment of the force about x axis is

a) + 200 N-m
b) -200 N-m,
c) +150 N-m,
d) -150 N-m

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 10 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If k is the unit vector along z axis then the sum of the moments about point P is

a) – 40 k (N-m)
b) + 40 k (N-m)
c) + 60 k (N-m)
d) - 60 k (N-m)

Options :

1. 1
2. 2
3. 3
4. 4

Correct Marks : 1 Wrong Marks : 0   www.FirstRanker.com

FirstRanker.com
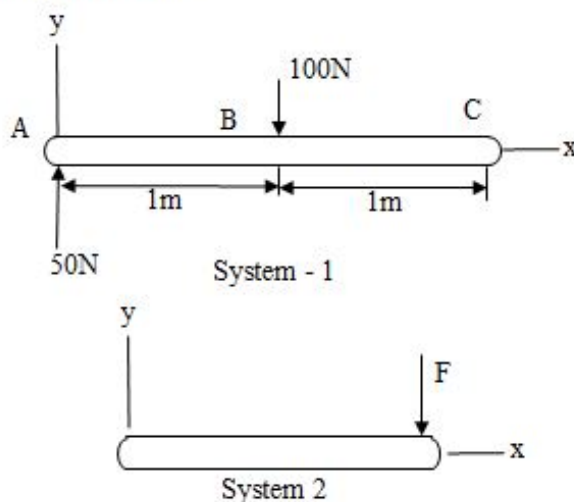Firstranker's choice
www.FirstRanker.com   www.FirstRanker.com

s are applied at points A and B of a beam. The system 1 is replaced by a system 2 an equivalent system force and moment. The force F is

a) 100 j (N)
b) - 100 j (N)
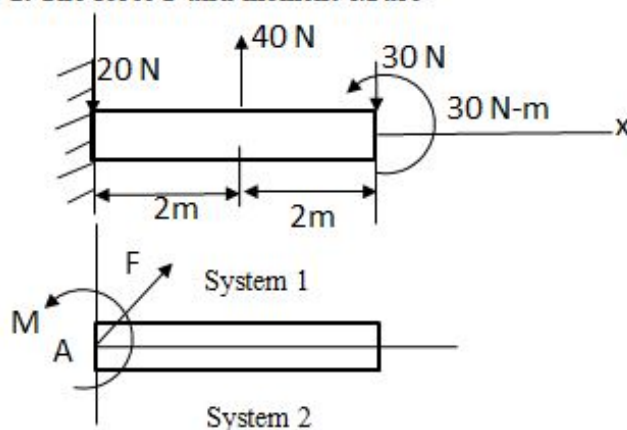c) 50 j (N)
d) - 50 j (N)

System - 1

System 2

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 12 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Three forces and a couple are applied to a beam (system 1). The system is replaced by an equivalent force and moment system 2. The force F and moment M are

a) − 10 j (N), -10 k (N-m)
b) + 10 j (N), + 10 k (N-m)
c) − 10 j (N), +10 k (N-m)
d) + 10 j (N), -10 k (N-m)

System 1

System 2

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 13 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The dimension formula for force is

a) $M L^2 T^2$
b) $M L T^{-2}$
c) $M L^2 T^3$
d) $M L^2 T^{-3}$

1. 1

2. 2

3. 3

4. 4

Question Number : 14 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If a system of concurrent forces whose lines of action intersect at a point P then the system can be represented by a

    a) single force
    b) single moment
    c) single force and single moment
    d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 15 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A system of forces and moments can be represented by a

    a) Force and couple only
    b) wrench only
    c) both A and B
    d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 16 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Mass is the absolute physical quantity and is considered to be

    a) quantity of matter in a body
    b) property giving rise to gravitational attraction
    c) quantitative measure of inertia
    d) all of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 17 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A rigid body rotates about a fixed axis O, the total moment about O is M_0 and moment of inertia about fixed axis is I_0 and α is the angular acceleration, then

a) $M_0 = I_0 \, \alpha$
b) $M_0 = I_0 / \alpha$
c) $M_0 = I_0 \, \alpha^2$
d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 18 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A flywheel of an engine weighs 1500 N and has a radius of gyration 0.6 m. The flywheel is subjected to a torque 2000 N-m. Take g = 9.80 m/s². The angular acceleration of the flywheel is

a) 36.33 rad/ s²
b) 540 rad/ s²
c) 36.5 rad/ s²
d) 40 rad/ s²

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 19 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A gear of 60 mm dia can turn freely on plain support. The moment of inertia of the gear about its centre of mass is 0.006 kg-m². A constant couple of 2 N-m is applied to the gear then angular acceleration is

a) 340 rad/ s²
b) 0.012 rad/ s²
c) 333.3 rad/ s²
d) 0.001 rad/ s²

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 20 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

metre stick of mass M is hinged at one end, supported in horizontal direction by a string attached to the other end. If g is acceleration due to gravity, then initial angular acceleration of the stick is

a) $\frac{3}{2}g$

b) g

c) $\frac{3}{4}g$

d) $4g$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 21 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A body of mass 50 kg is lifted by an elevator. The elevator is moving downward with an acceleration of 0.8 m/s^2. The force exerted by the body on the floor of the elevator is

a) 450 N downwards

b) 450 n upwards

c) 490 n downwards

d) 490 n upward

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 22 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The resultant moment about the centre of mass causes rotation about that point. There is no translation, of the centre of mass. Such type of motion of rigid body is called

a) Pure rotation about centre of mass

b) Pure translation

c) Unconstrained motion

d) None of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 23 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A system of parallel forces in space may reduce to a

a) Resultant force

b) Resultant couple

c) State of equilibrium

d) Any of the above

1. 1

2. 2

3. 3

4. 4

Question Number : 24 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The sum of the moments of all external forces computed about the body's mass centre is equal to the product of the moment of inertia of the body about an axis passing through mass centre and the body's acceleration. This is the statement of

a) Translational equation of motion

b) Rotational equation of motion

c) Equation of general plane motion

d) None of the above
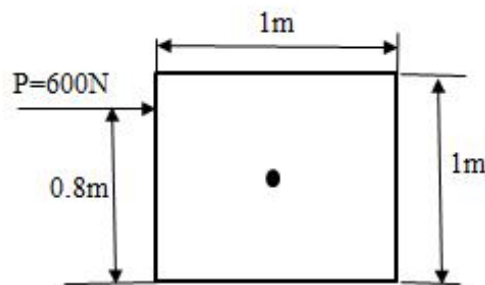
Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 25 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A 50 kg crate rests on a horizontal surface for which the coefficient of kinematic friction is $\mu_k = 0.2$. Force P = 600 N is applied to the crate. If the crate slides on the floor the acceleration of the crate is

a) 12 m/s^2

b) 11 m/s^2

c) 10 m/s^2

d) 9 m/s^2

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 26 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

vectors are of _____ types

a) One

b) Two

c) Three

d) Five

Options :

2. 2

3. 3

4. 4

Question Number : 27 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is vector quantity?
a) Mass
b) energy
c) momentum
d) angle

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 28 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Addition of vectors is
a) associative
b) commutative
c) both
d) none

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 29 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$M = r \times F$ yields
a) $r\,F\,\cos\alpha$
b) $r\,F\sin\alpha$
c) $r\,F\,\tan\alpha$
d) $r\,F\,\cot\alpha$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 30 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

...e of magnitude 50N at xy plane makes an angle 60º with x axis, can be expressed in Cartesian vector form as
a) 30i + 20j
b) 20i +30j
c) 43.3i + 25j
d) 25i + 43.3j

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 31 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the dot product of two vectors is zero, then

(a) either of the vectors must be zero
(b) the vectors must be perpendicular to each other
(c) either (a) or (b) is satisfied
(d) the vectors must be concurrent

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 32 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Two vectors A and B are given by (2i + 3j + 4k) and (4i + 3j + 2k), then $\vec{A} \times \vec{B}$ is given by
(a) 25
(b) 18
(c) (-6i + 12j - 6k)
(d) (6i + 12j + 6k)

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 33 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A couple consists of
(a) Two like parallel forces of same magnitude.
(b) Two like parallel forces of different magnitudes.
(c) Two unlike parallel forces of same magnitude.
(d) Two unlike parallel forces of different magnitude.

Options :

1. 1

2. 2

Question Number : 34 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A system of coplanar force acting on a rigid body can be reduced to
a) one force only
b) one couple only
c) one force and one couple only
d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 35 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A free-body diagram of a body shows a body
a) Isolated from all external effects
b) Isolated from its surroundings all forces acting on it
c) Isolated from its surroundings and all support reactions acting on it
d) Isolated from its surroundings and all applied forces acting on it

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 36 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If a body is in equilibrium, we may conclude that
(a) No force is acting on the body
(b) The resultant of all the forces acting on it is zero.
(c) The moments of the forces about any point is zero.
(d) Both (b) and (c)

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 37 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A body in equilibrium is subjected to only two forces, then the only requirement is that
a. the forces must be of equal magnitude
b. the forces must be equal in magnitude and opposite direction
c. the forces must be collinear, equal in magnitude and opposite direction
d. the forces must be equal in magnitude and perpendicular to each other

1. 1

2. 2

3. 3

4. 4

Question Number : 38 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the sum of all the forces acting on a body is zero, it may be concluded that the body

    (a) must be in equilibrium

    (b) cannot be in equilibrium

    (c) may be in equilibrium provided the forces are concurrent

    (d) may be in equilibrium provided the forces are parallel

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 39 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The method of joints for the analysis of forces in the members of a pin-jointed truss

    (a) is a special case of method of sections

    (b) does not need the determination of reactions at the supports

    (c) works equally well, irrespective of starting point for the analysis

    (d) fails when there are only two members at a joint and no external load is applied there.

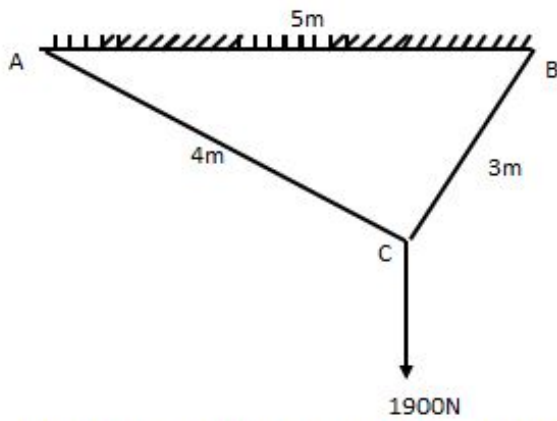Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 40 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

...ht of 1900kN is supported by two cables AC and CB of length 4m and 3m as shown in the figure below.

1900N

The tension in the cables AC and CB are given by

(a) 1220N, 1340N
(b) 1130N, 860N
(c) 1150N, 1210N
(d) 1520N, 1140N

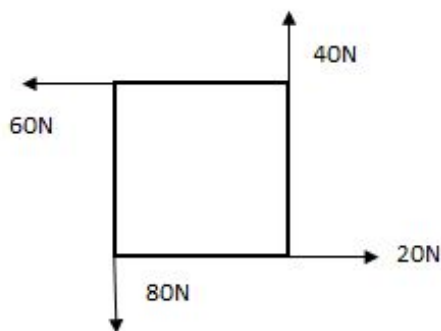Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 41 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Four forces of magnitude 20N, 40N, 60N and 80N are acting respectively along four sides of a square ABCD as shown in the figure below.

The magnitude of the resultant is given by
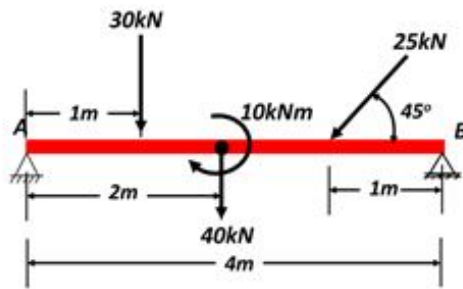
(a) 40√2N
(b) 60√2N
(c) 45√2N
(d) 60√2N

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 42 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A beam is loaded as in the figure below.

30kN
25kN
10kNm
45°
A
1m
2m
B
1m
40kN
4m

The vertical support reaction at support B is given by

(a) 50kN
(b) 43.26kN
(c) 44.72kN
(d) 70kN

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 43 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the truss, shown in the figure below, the magnitude of the force in member PQ and QR, are respectively

P
Q
30°
60°
W
R

(a) 2W tensile and √3W compressive
(b) √3W tensile and 2W compressive
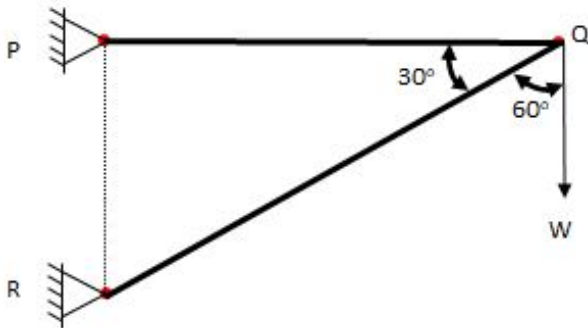(c) √3W compressive and 2W tensile
(d) 2W compressive and √3W tensile

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 44 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

through which the whole weight of the body acts is called

a) Inertial point

b) Center of gravity

c) Centroid

d) Central point

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 45 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Centroid of a semicircular area with a radius r lie at

a) 0.75r from base

(b) 0.5r from base

(c) 0.424r from base

(d) 0.333r from base

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 46 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The location of the C.G of an isosceles triangle of base 20 cm and side 40 is at ----------from base

(a) 12.90 cm

(b) 13.28 cm

(c) 19.36 cm

(d) 38.72 cm

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 47 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Centre of gravity of a solid cone lies on the axis at the height

(a) one-fourth of the total height above base

(b) one-third of the total height above base

(c) one- half of the total height above base

(d) three-eighth of the total height above the base

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 48 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The centre of gravity of a trapezium of base b, height h, and upper side a lies at following distance from the base

(a) $(h/3)$ $\{(2a + b)/(a+ b)\}$
(b) $(h/3)$ $\{(a + b)/(2a+ b)\}$
(c) $(h/3)$ $\{(a + 2b)/(a + b)\}$
(d) $(h/2)$ $\{(2a + b)/(a+ b)\}$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 49 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The C.G. of plane lamina will not be at its geometrical centre in case of a

(a) right angled triangle
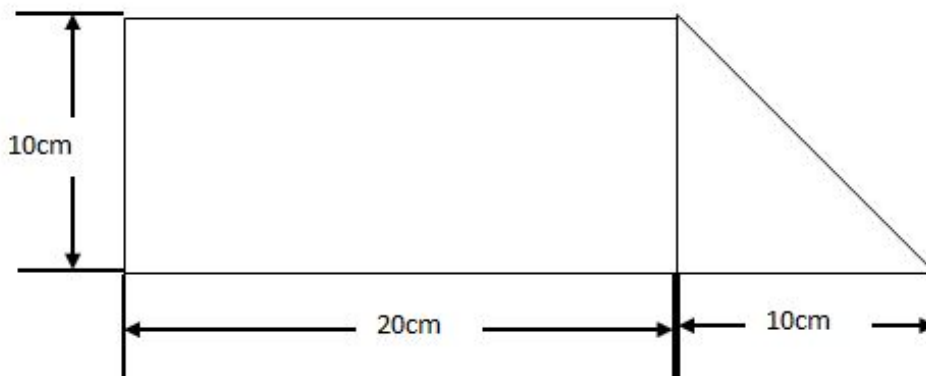(b) equilateral triangle
(c) square
(d) circle

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 50 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The centroid of the composite area lie at

(a) (15,5)
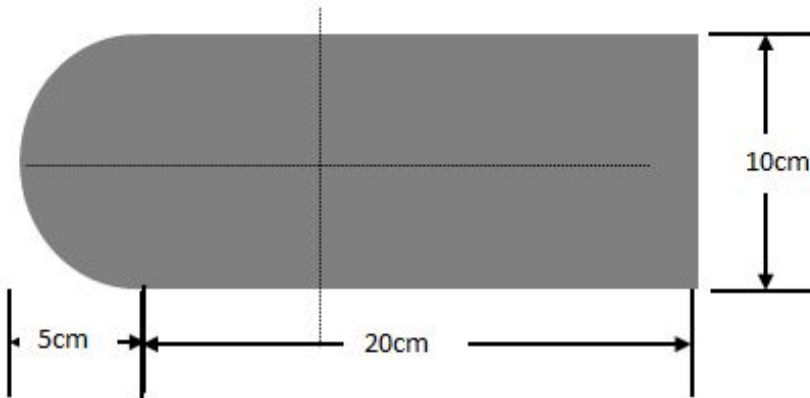(b) (12.66, 4.67)
(c) (11.66,5.67)
(d) (13.66,4.67)

Options :

1. 1

2. 2

Question Number : 51 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option :
No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The centroid of the composite area as in the figure below lie at

(a) (10,5.2)
(b) (11.98,5)
(c) (12.89, 5)
(d) (12.18,5)

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 52 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option :
No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Moment of inertia about an axis is always

(a) negative

(b) positive

(c) either positive or negative

(d) dependent on the choice of the reference axis

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 53 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option :
No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

of inertia of a circular area of diameter d about the centroidal x-axis is

(a) $0.049d^4$
(b) $0.098d^4$
(c) $0.261d^4$
(d) $0.196d^4$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 54 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Moment of inertia of a triangular area with a base length of b and height h about the centroidal x-axis is

(a) $bh^3/6$
(b) $bh^3/12$
(c) $bh^3/36$
(d) $hb^3/12$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 55 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Moment of inertia of a semicircular area of diameter d about centroidal x axis is given by

(a) $0.0261d^4$
(b) $0.098d^4$
(c) $0.00686d^4$
(d) $0.0196d^4$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 56 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of moment of inertia of a triangle and that of a rectangle having same base and height about their bases is

(a) 1
(b) 0.25
(c) 0.5
(d) 0.75

2. 2

3. 3

4. 4

Question Number : 57 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The radii of gyration are expressed as

(a) $A (k_{xx})^2 = I_{yy}$ and $A (k_{yy})^2 = I_{xx}$
(b) $A (k_{xx})^2 = I_{xx}$ and $A (k_{yy})^2 = I_{yy}$
(c) $A (k_{xx}) = I_{yy}$ and $A (k_{yy}) = I_{xx}$
(d) $A (k_{xx}) = I_{xx}$ and $A (k_{yy}) = I_{yy}$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 58 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

I_{xy} (for any set of axes) $= I_{xy}$ (about a parallel set of axes at centroid)

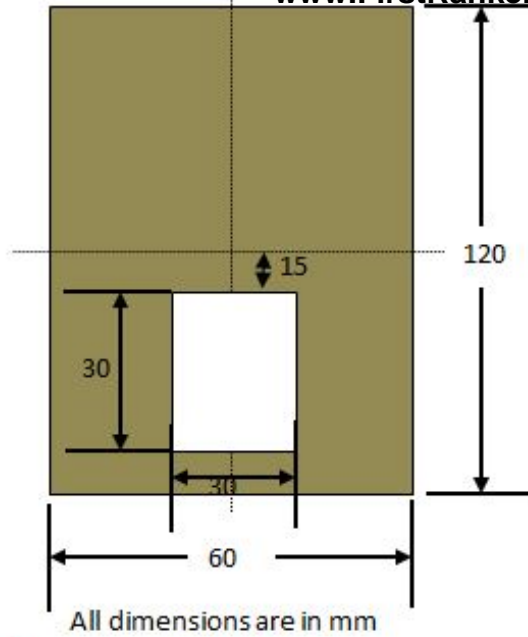(a) - Adc
(b) + Adc
(c) + A(d+c)
(d) + A(d-c)

Where, d and c are the distances between the axes

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 59 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

of moment of inertia shown in the figure blow about XX axis is

All dimensions are in mm

(a) $8.5050 \times 10^6 \text{mm}^4$
(b) $6.8850 \times 10^6 \text{mm}^4$
(c) $7.7625 \times 10^6 \text{mm}^4$
(d) $8.5725 \times 10^6 \text{mm}^4$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 60 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The product of inertia about the xy axis as shown in the figure below is

All dimension are in cm

(a) 52cm^4
(b) $- 42 \text{ cm}^4$
(c) -52cm^4
(d) 42 cm^4

1. 1
2. 2
3. 3
4. 4

Question Number : 61 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Four students were asked to arrange forces due to rolling, static and sliding frictions in

increasing order. The correct arrangement is
a) Rolling, Static, Sliding
b) Static, Rolling, Sliding
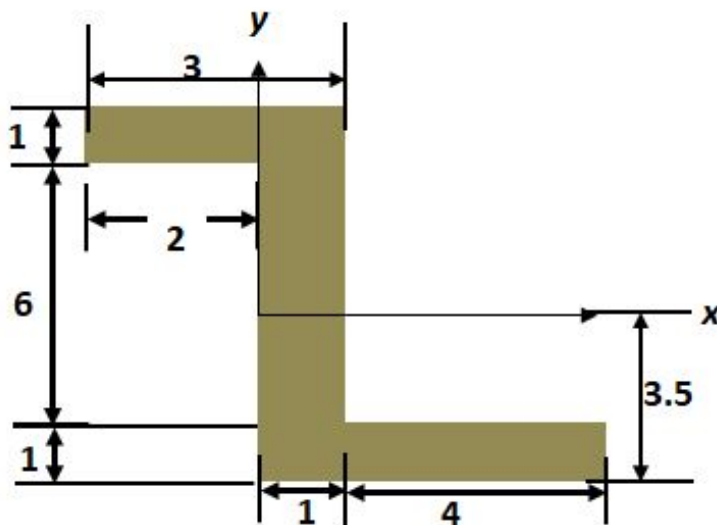c) Rolling,Sliding,Static
d) Sliding,Static,Rolling

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 62 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The value of Normal reaction (R) for the following figure is

a) $W - PSin\theta$
b) $W + PSin\theta$
c) $P - WSin\theta$
d) $P + WSin\theta$
Where, W = Weight of block, P = Applied force, μ = Coefficient of friction, θ = Angle

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 63 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

block rests on an inclined plane of $\mu = 1/\sqrt{3}$, determine the angle of inclination when the block just slides down the incline is...

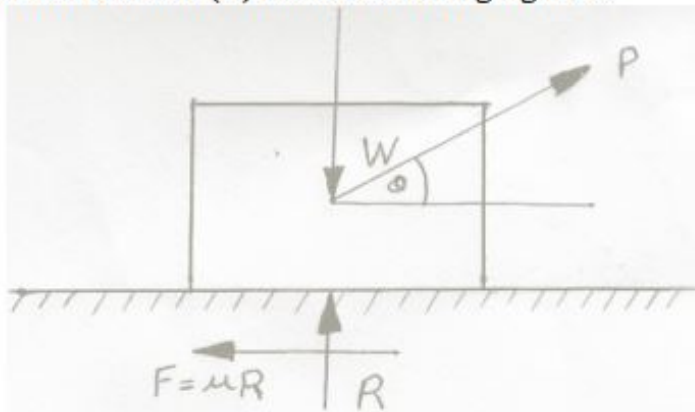a) 40°
b) 50°
c) 30°
d) 20°

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 64 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A block of mass 4 kg is kept on a rough horizontal surface. The coefficient of static friction is 0.8. If a force of 19 N is applied on the block parallel to the floor, then the force of friction between the block and floor is

a). 32 N
b). 18 N
c). 19 N
d). 9.8 N

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 65 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A block of mass 1 kg is placed on a truck which accelerates with acceleration 5 m/s². The coefficient of static friction between the block and truck is 0.6. The frictional force acting on the block is:

a). 5 N
b). 6 N
c). 5.88 N
d). 4.6 N

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 66 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

work work works on the same principle as ---------------plane works.

a) horizontal
b) vertical
c) Inclined plane
d) None of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 67 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The form of the ============ suggests that if a hypothetical force termed as inertia force is to act on the body in addition to external force P, then the body would hypothetically come to a state of equilibrium.

a) Newton's Second Law of Motion
b) D' Alembert's principle
c) Newton's First Law of Motion
d) Pascal Law

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 68 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In applying virtual work principle a simple relation is required to be found out among the ----------------- of the points of application of the various forces involved in a rigid body /system.

a) Movements
b)   shifts
c) dislodgements
d)   displacements

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 69 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

...fficient of friction of a plane inclined at 30° is 0.4, then the acceleration of the body sliding freely on it, is: (g = 9.8 m/s²)

  a. 1.51 m/s²
  b. 3.54 m/s²
  c. 9.8 m/s²
  d. 4.9 m/s²

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 70 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

External forces acting on two connected bodies can be determined by making small --------displacements of the system that cause the forces of constraint to do work.

  a) virtual
  b) simulated
  c) replicated
  d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 71 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The state of equilibrium of a Homogeneous Cylinder is stable if the potential energy of it is --------------------

  a) maximum
  b) minimum
  c) neutral
  d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 72 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

vector normal to a curve

a) is directed towards the local centre of curvature
b) is directed outward along the join of the centre of curvature and the point
c) is the same as the radial unit vector
d) is in the direction of acceleration of the point

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 73 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A particle O moves along a straight line and its position is given by

$x = t^3 - 2t^2 + 2$ [Where x is in meter and t is in seconds]. **Velocity at t = 4 seconds is**

a) 33 m/s
b) 32 m/s
c) 34 m/s
d) 23 m/s

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 74 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When a particle moves a distance s (which is a function of time), its velocity v has a direction always----------------- to the path.

a) Normal
b) tangent
c) curvature
d) arch

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 75 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

a). work by virtue of actual forces
b). work by virtue of actual displacements
c). work in overcoming the constraints
d). work associated with a possible displacement

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 76 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Stability of equilibrium of a body requires that

a) $\frac{dPE}{ds} = 0$

b) $\frac{dPE}{ds} = 0$ and $\frac{d^2 PE}{ds^2} < 0$

c) $\frac{dPE}{ds} = 0$ and $\frac{d^2 PE}{ds^2} > 0$

d) $\frac{d^2 PE}{ds^2} = 0$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 77 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A rigid body in translation

a) can only move in a straight line

b) may move along a straight or curved path

c) cannot move on a circular path

d) must undergo plane motion only

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 78 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

a) is a hypothetical concept

b) can exist for any space motion

c) is appoint about which the rotational velocity is zero.

d) must exist for any plane motion

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 79 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Velocity and acceleration have --------------lines of action during the motion in case of rectilinear translation.

a) continuous

b) perpetual

c) constant

d) unbroken

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 80 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A rigid body is said to be in fixed axis rotation if there exists a fixed straight line within or outside the body such that the points identified with the body but on that line have ----------velocity

a) zero

b) non zero

c) constant

d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 81 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

...on of a rigid body is said to be plane motion if all the points in the body stay in the same ------------------planes.

a) nonparallel
b) same
c) equivalent
d) parallel

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 82 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Any plane motion of a slab can be replaced by a translation defined by the motion of an arbitrary reference point and a simultaneous------------- about that point.

a) rotation
b) translation
c) motion
d) none of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 83 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Velocity of a point on a rigid body in plane motion =-----------velocity due to rotation about a convenient reference point + Velocity of the reference point

a) constant
b) variable
c) relative
d) none of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 84 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The instantaneous centre is located in direct proportion if velocities of two points A and B are------------- and the line joining them is perpendicular to the direction of velocity'

a) non parallel
b) parallel
c) same
d) different

1. 1

2. 2

3. 3

4. 4

Question Number : 85 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The force which acts along the radius of a circle and directed _____ the centre of the circle is known as centripetal force.

    a) away from

    b) towards

    c) at the

    d) none of the mentioned

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 86 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The energy possessed by a body, for doing work by virtue of its position, is called

    a) potential energy

    b) kinetic energy

    c) electrical energy

    d) chemical energy

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 87 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The wheels of a moving car possess

    a) potential energy only

    b) kinetic energy of translation only

    c) kinetic energy of rotation only

    d) kinetic energy of translation and rotation both.

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 88 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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mass m moving with a constant velocity v strikes another body of same mass m moving with same velocity but in opposite direction. The common velocity of both the bodies after collision is

a) v
b) 2 v
c) 4 v
d) 8 v

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 89 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When motion of rockets and satellites are studied then ---------reference frame considered to be fixed to the star/satellite.

a) Inertial
b) 3 –D
c) cylindrical
d) none of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 90 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A force will perform work only when the particle undergoes a -----------in the direction of the force.

a) movement
b) shift
c) displacement
d) translation

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 91 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

rk of a force is independent of the path and depends only on the force's initial and final positions on the path, that force is known as ------ force

a) non conservative
b) traditional
c) conventional
d) conservative

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 92 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Consider an ant crawling along the curve $(x-2)^2 + y^2 = 4$, where x and y are in meteres,the ant starts at the point (4,0) and moves counter-clockwise with a speed of 1.57 m/s .Time taken by the ant to reach the point (2,2) is in seconds -------------------------------.

a) 4
b) 3
c) 2
d) 1

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 93 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The D, Alembert Principle

a) Is a hypothetical principle
b) Provides no special advantage over Newton's Law
c) Is based on existence of inertial force
d) allows a dynamical problem to be treated as a statistical problem

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 94 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

...lse –momentum principle is applicable

a) if there is no external force acting on it

b) when the momentum is conserved

c) only when a body hits another body

d) whenever Newton's law is applicable

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 95 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Work done by a spring to a body from moving it from x1 to x 2 distances is given by _____

a) $-\int_{x1}^{x2} ks\,ds$

b) $\int_{x1}^{x2} ks\,ds$

c) $-\int_{0}^{x2} ks\,ds$

d) $-\int_{x1}^{0} ks\,ds$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 96 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An object of 30 kg is moved with a velocity of 2 m/s on a horizontal smooth surface. What is the velocity of the block for 4 seconds if force of 40 N is applied on it in the direction of force?

a) 2 m/s

b) 4.6 m/s

c) 7.33 m/s

d) 9.33 m/s

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 97 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

...ne by an engine in 6 secs is 1000 joules. **What is the power generated by the engine in watt?**

a) 1600 watt
b) 600 watt
c) 166 watt
d) 600 watt

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 98 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is the momentum of a body of 2 kg at its highest point, when thrown with a velocity of 15 m/s at an angle of 70° with the horizontal?

a) 9.23 kg ms^{-1}
b) 10.26 kg ms^{-1}
c) 28.19 kg ms^{-1}
d) None of the above

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 99 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Two cars X and Y move on adjacent roads in opposite directions. If velocity of car X and Y is 80 km/hr and 60 km/hr respectively, then what will be the relative velocity of car X w.r.t. Y?

a) 70 km/hr
b) 100 km/hr
c) 140 km/hr
d) Insufficient data

Options :
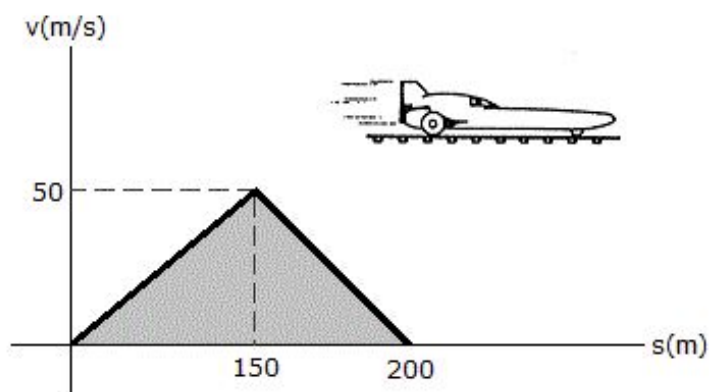
1. 1

2. 2

3. 3

4. 4

Question Number : 100 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

...aph for a rocket sled is shown. Determine the acceleration of the sled when s = 100 m and s = 175 m.

a) $a_{100} = 3.75$ m/s^2, $a_{175} = -1.250$ m/s^2

b) $a_{100} = 11.11$ m/s^2, $a_{175} = -25.0$ m/s^2

c) $a_{100} = 0.333$ m/s^2, $a_{175} = -1.000$ m/s^2

d) $a_{100} = 33.3$ m/s^2, $a_{175} = -25$ m/s^2

Options :

1. 1
2. 2
3. 3
4. 4