

Program: FE (All Branches)

Curriculum Scheme: CBCS (Revised 2019) Scheme

Examination : First Year Semester I

Course Code: FEC104

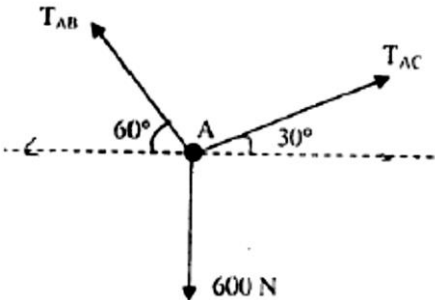
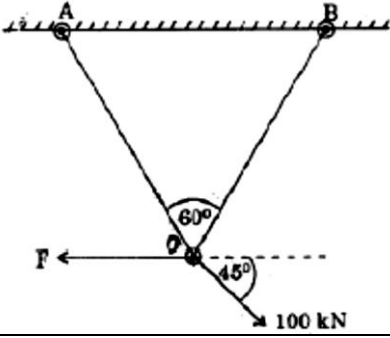
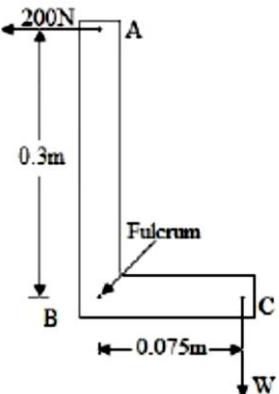
Course Name: Engineering Mechanics

Time: 01 Hour

Max. Marks: 50

Note: All questions are compulsory and carry equal marks.

Q1	If two forces of magnitude 10 kN and 20 kN act on a body, then their minimum resultant is
Option A	20 kN
Option B	30 kN
Option C	50 kN
Option D	10 kN
Q2	The splitting of a force into two perpendicular directions without changing its effect is called
Option A	Resultant
Option B	Resolution
Option C	Moment
Option D	Couple
Q3	A mass of 72 Kg is resting on a board inclined at 200 with horizontal. What is the component of the mass normal & parallel to the board.
Option A	241.6 N, 663.7 N
Option B	246.3 N, 354.3 N
Option C	354.3 N, 246.3 N
Option D	663.7 N, 241.6 N
Q4	A pulley of diameter AB = 200 mm is subjected to equal unlike parallel forces of 2000 N, one at A and other at B tangentially. A third force of 500 N acts through center of pulley at 45°. The resultant force will be
Option A	2500 N at 135°
Option B	500 N at 45°
Option C	4500 N at 45°
Option D	2000 N at 45°
Q5	Find resultant of forces when two like parallel forces of 40 N and 70 N which act at the ends of the rod 40 cm long
Option A	110 N
Option B	50 N
Option C	30 N
Option D	160 N
Q6	Centroidal distance of an equilateral triangle with side 'a' from any of the three sides is
Option A	0.866 a
Option B	0.471 a
Option C	0.288 a
Option D	0.235 a
Q7	Varignon's theorem of moment is used to find

Option A	Moment of resultant
Option B	Position of resultant
Option C	Algebraic sum of moments
Option D	All of the above
Q8	<p>If point A is in equilibrium under the action of the applied forces, the values of tension <math>T_{AB}</math> and <math>T_{AC}</math> are respectively</p> 
Option A	520 N and 300 N
Option B	300 N and 520 N
Option C	450 N and 150 N
Option D	150 N and 450 N
Q9	<p>The force F such that both the bars AC and BC (AC and BC are equal in length) as shown in the figure are identically loaded, is</p> 
Option A	70.7 N
Option B	100 N
Option C	141.4 N
Option D	168 N
Q10	<p>A horizontal force of 200 N is applied at 'A' to lift the weight 'W' at C as shown in the given figure. The value of weight 'W' will be</p> 
Option A	200 N
Option B	400 N
Option C	600 N
Option D	800 N

Q11	What is/are common property/properties between Resultant and Equilibrium forces
Option A	Magnitude
Option B	Direction
Option C	Neither magnitude and direction
Option D	Both magnitude and direction
Q12	Which is a valid condition of equilibrium in the case of a given concurrent force system.
Option A	$\Sigma F_x = 0$ and $\Sigma M = 0$
Option B	$\Sigma M_1 = 0$ and $\Sigma M_2 = 0$
Option C	$\Sigma F_y = 0$ and $\Sigma M = 0$
Option D	$\Sigma F_x = 0$ and $\Sigma F_y = 0$
Q13	Kinetic Friction witnessed by an object (while it is in motion) is _____ Static Friction.
Option A	Equal to
Option B	Smaller than
Option C	Negligible than
Option D	Greater than
Q14	The coefficient of friction depends on
Option A	area of contact
Option B	shape of surfaces
Option C	strength of surfaces
Option D	nature of surface
Q15	What will be the effect on the body in the following situation? A rigid body of 100 kg kept on a horizontal rough surface with coefficient of friction equal to 0.4 is acted upon by a horizontal pull force of 350N.
Option A	Body will be on the verge of moving
Option B	Insufficient data
Option C	Body will move
Option D	Body will not move
Q16	Limiting force of friction is the
Option A	tangent of angle between normal reaction and the resultant of normal reaction and limiting friction
Option B	ratio of limiting friction and normal reaction
Option C	the friction force acting when the body is just about to move
Option D	the friction force acting when the body is in motion
Q17	A body was thrown vertically down from a tower and travels 40 m, during its 4th second of its fall. Determine the initial velocity of the body. Take $g = 9.8 \text{ m/s}^2$
Option A	$u = 6.7 \text{ m/s}$
Option B	$u = 7.7 \text{ m/s}$
Option C	$u = 5.7 \text{ m/s}$
Option D	$u = 8.7 \text{ m/s}$
Q18	For a particle moving along a straight line, position x is expressed by $x = t^4 - 2t^3 + 1$ where x is in m and t is in second. The velocity attained by the particle at 1.5 s will be
Option A	Minimum
Option B	Maximum
Option C	Zero

Option D	None of the above
Q19	The velocity of the particle is expressed as $v = t^2 - 8t + 12$ , where $v$ is in m/s and $t$ is in s. Determine the time at which velocity is zero.
Option A	6 s
Option B	2 s
Option C	2 and 6 s.
Option D	None of the above
Q20	A body weighing 350 N runs up a flight of 30 steps each 200 mm height. The work done is
Option A	2100 J.
Option B	17500 J
Option C	7000 J
Option D	None of the above
Q21	A 10 kg body is moving with constant acceleration of $2 \text{ m/s}^2$ starting from rest. What is Kinetic Energy of the body after 2 s?
Option A	8 J
Option B	80 J
Option C	0.8 J
Option D	800 J
Q22	If a body hits the ground from a height $h_1$ and rebounds to a height $h_2$ after having inelastic collision with the ground then the coefficient of restitution is
Option A	$e = h_2/h_1$
Option B	$e = h_1/h_2$
Option C	$e = \sqrt{h_2/h_1}$
Option D	$e = \sqrt{h_1/h_2}$
Q23	If mass of moving body is much greater than the mass of the body at rest then the approximate velocity of the moving body after head on collision is
Option A	Same and in same direction.
Option B	Same and in opposite direction
Option C	Different and in same direction
Option D	Different and in opposite direction
Q24	A 10 kg body is moving with a constant acceleration of $5 \text{ m/s}^2$ . If the initial velocity of the body is 2 m/s, determine the change in momentum in 5 s.
Option A	50 Ns
Option B	250 Ns
Option C	200 Ns
Option D	100 Ns
Q25	A rifle of 5 kg fires a bullet of 10 gm mass at a velocity of 300 m/s. Determine the velocity with which the rifle recoils
Option A	0.1 m/s
Option B	0.3 m/s
Option C	0.6 m/s
Option D	0.9 m/s