Program: FE (All Branches)

Curriculum Scheme: CBSGS (Revised 2012) 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.

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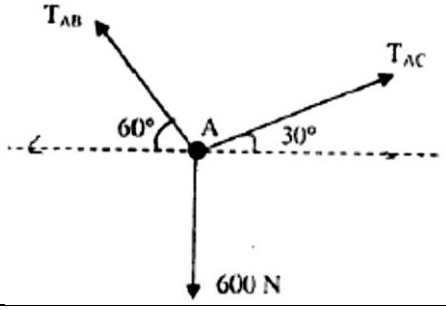
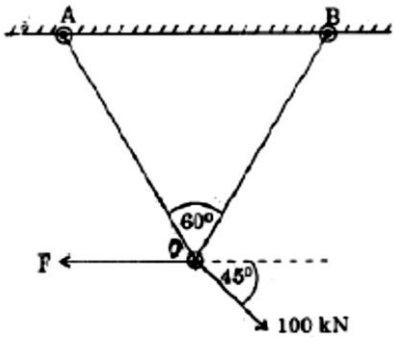
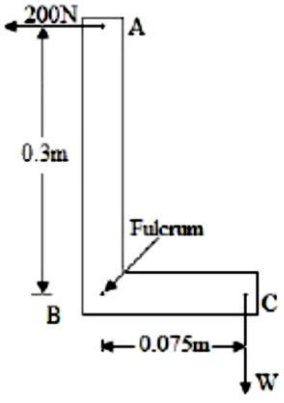
|---|---|
| Q1 | If two forces of magnitude 10 kN and 20 kN act on a body, then their minimum resultant is |
| Option A | 20 kN |
| Option B | 30 kN |
| Option C | 50 kN |
| Option D | 10 kN |
| | |
| Q2 | The splitting of a force into two perpendicular directions without changing its effect is called |
| 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 | If point A is in equilibrium under the action of the applied forces, the values of tension $T_{AB}$ and $T_{AC}$ are respectively   |
| 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 | 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   |
| Option A | 70.7 N |
| Option B | 100 N |
| Option C | 141.4 N |
| Option D | 168 N |
| | |
| Q10 | 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   |
| 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 | $\Sigma Fx = 0$ and $\Sigma M = 0$ |
| Option B | $\Sigma M1 = 0$ and $\Sigma M2 = 0$ |
| Option C | $\Sigma Fy = 0$ and $\Sigma M = 0$ |
| Option D | $\Sigma Fx = 0$ and $\Sigma Fy = 0$ |
| | |
| 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?<br>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 | If for a trull $m > 2j-3$ (m=-number of members and j – number of joints) then the truss is assumed to be ---------- truss |
| Option A | perfect |
| Option B | imperfect |
| Option C | redundant |
| Option D | deficient |
| | |
| Q18 | All the members of the truss are _____ force members |
| Option A | Zero |
| Option B | One |
| Option C | Two |
| Option D | four |
| | |

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| Q19 | The velocity of the particle is expressed as v = t2 – 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 m/s2 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 m/s2. 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 |