

No. of Printed Pages : 4

Roll No.

180331/120331/31731

3rd Sem. / Automobile Engineering

Subject : Strength of Material

Time : 3 Hrs.

M.M. : 100

SECTION-A

Note: Objective types questions. All questions are compulsory (10x1=10)

(Course Outcome/CO)

- Q.1 Define live load. (CO-1)
Q.2 Define ultimate stress. (CO-1)
Q.3 Define proof resilience. (CO-3)
Q.4 What do you mean by second moment of area? (CO-4)
Q.5 What is UDL? (CO-5)
Q.6 In which beam point of contraflexure occur? (CO-5)
Q.7 Define pure bending. (CO-6)
Q.8 Define buckling load. (CO-8)
Q.9 Define torque. (CO-6)
Q.10 Define spring index. (CO-9)

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SECTION-B

Note: Very Short answer type questions. Attempt any ten parts 10x2=20

- Q.11 Define creep. (CO-1)
Q.12 Define impact load. (CO-3)
Q.13 What is section modulus? (CO-4)
Q.14 Write the theorem of parallel axis. (CO-4)
Q.15 Define sagging bending moment. (CO-5)
Q.16 Write the difference between UDL and UVL (CO-5)
Q.17 Define moment of resistance. (CO-6)
Q.18 Write Euler's formula for calculating buckling load. (CO-8)
Q.19 Define equivalent length. (CO-8)
Q.20 Define torsional rigidity. (CO-6)
Q.21 Write the expression for power transmitted by the shaft. (CO-7)
Q.22 Define solid length of spring. (CO-9)

SECTION-C

Note: Short answer type questions. Attempt any eight questions. 8x5=40

- Q.23 Define factor of safety. Write the factors on which it depends. (CO-1)

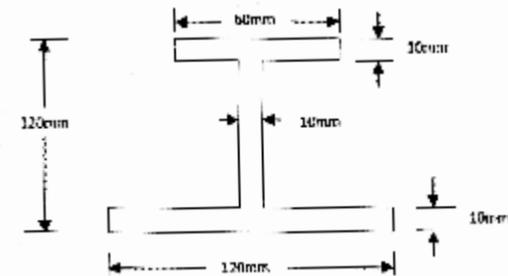
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- Q.24 Draw stress strain curve for a ductile material. (CO-1)
- Q.25 Derive the expression for strain energy stored due to gradually applied load. (CO-3)
- Q.26 Draw the SFD and BMD for a simply supported beam carrying a UDL over the whole span. (CO-5)
- Q.27 State any four assumptions made in the theory of simple bending. (CO-6)
- Q.28 A symmetrical section 200mm deep has a moment of inertia of $2.26 \times 10^{-5} \text{ m}^4$ about its centroidal axis. Determine the longest span over which, when simply supported, the beam would carry a uniformly distributed load of 4 KN/m run without the stress due to bending exceeding 125 MN/m^2 . (CO-4)
- Q.29 Differentiate between strut and column. (CO-8)
- Q.30 A solid round bar 60mm in diameter and 2.5m long is used as a strut. One end of the strut is fixed, while its other end is hinged. Find the safe compressive load for this strut using Euler's formula. Assume $E=200 \text{ GN/m}^2$ and factor of safety=3. (CO-8)
- Q.31 What is spring? How are they classified? (CO-9)
- Q.32 A close coiled helical spring carries a load 120N and the mean coil diameter is 8 times the wire diameter. Calculate the wire diameter, if the maximum stress is 90 N/mm^2 . (CO-9)

SECTION-D

Note: Long answer type questions. Attempt any three questions. $3 \times 10 = 30$

- Q.33 A concrete cylinder of diameter 150mm and length 300mm when subjected to an axial compressive load of 20KN resulted in an increase of diameter by 0.127mm and a decrease in length of 0.28mm. Compute the value of Poisson's ratio and modulus of elasticity. (CO-1)
- Q.34 Find the moment of inertia about the horizontal axis through the Centre of Gravity of the section shown in figure. (CO-4)



- Q.35 A beam AB of 10m long has supports at its ends A and B. It carries a point load of 2.5KN at 3m from end A and a point load of 2.5KN at 7m from A and a uniformly distributed load of 0.5KN/m between the point loads. Draw the shearing force and bending moment diagram of the beam. (CO-5)
- Q.36 Derive the torsion equation for the solid shaft. (CO-6)

(Note: Course outcome/CO is for office use only)

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