REGISTRATION NUMBER | | | | | | | | | | |

SRINIX COLLEGE OF ENGINEERING

2nd INTERNAL EXAMINATION-2021-22

Subject-**MOS** Semester-**3rd** Branch-**CE+ME**

Full Mark-**100** Time-2.30 Hrs

TYPE A - <u>SHORT QUESTION</u> **[2×10]**

1. Differentiate between columns and strut and define slenderness ratio of a column.
2. If a solid shaft of diameter d is subjected to a torque T,What is the maximum shear stress?
3. What do you mean by *equivalent length* of a column?
4. Write different types of supports of the beam along with free body diagrams.
5. What do you mean by principal planes and principal stresses.
6. What is pure bending?Explain with example
7. What is complimentary shear stress? What is its significance?
8. What do you mean by composite beams? What is its utility?
9. How flexural strength is related to strength of any beam? Give the order of strength of different cross-sections?
10. What is Mohr's stress circle? How is it useful in the solution of stress analysis problems?

TYPE B **[6×8]**

1. A bar 500mm long having square cross section of size60mmx60mm.If the bar is subjected to an axial load of 100KN and a lateral compression of 500KN in faces of size 60mmx500mm, find the change in size and volume. Take E=200GPa,μ=0.3
2. A hollow shaft is to transmit 200KW as 80rpm.If the shear stress is not to exceed 60 Mpa and internal diameter is 0.6of the external diameter. Find the diameter of the shaft.
3. A solid round bar60mm 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=200GNm2 and factor of safety=3
4. A beam of triangular cross section having base width of 100mm and height of 150mm is subjected to a shear force at 13.5 KN. Find the value of maximum shear stress and sketch the shear stress distribution along the depth at beam.

5. A thin cylinder 4m long 1.2m in diameter having thickness of 12mm is subjected to an internal pressure of 1.5MPa.Calculate the change in dimensions of the shell and the maximum intensity of shear stress induced. Give that $E=2x10^5$MPa and Poisson's ratio=0.3
6. Distinguish between torsional rigidity andflexural rigidity.
7. Derive pure bending equation with usual notations.
8. Draw the SFD and BMD of a cantilever beam subjected to concentrated load at free end

TYPE C <u>LONG QUESTIONS</u> **[16×2]**

1. A)A horizontal girder which is freely supported at its ends and has a span of 9m supports a uniformly distributed load of 20 KN /m run over the whole span and also two concentrated loads 30KN and 40KN at points6m and 7.5m respectively from the left support. Draw the bending moment and shearing force diagrams and state the values of the maximum bending moment and maximum shear force.

   B) A hollow cylinder 3m long,400mm outer diameter and thicknessof metal 50mm issubjectedto a compressive loadof 30KN.Find the stress,strain deformation and stiffness. If E=100GPa.
2. A) Define the term factor of safety.

   B) A close-coiled helical spring absorbs 72Nm of energy when compressed through 60mm. There 8 coils in the spring.The coil diameter is 10 times the then wire diameter.Find the diameter of the coil and maximum shear stress.Use G= 82GPa.