MODEL EXAM - II

Time: 3 hrs **Register Number** | |

(Max. Marks 100)

[Note : (i)Answer all **TEN** questions in each **PART-A**

(ii) Answer division (a) or (b) of each question in **PART-B**

(iii)Each question carries **3 marks** in PART –A and **14 marks** in PART-B]

PART-A

1. Define machinability.

2 . What are the uses of steels?

3. Define stress and Poisson's ratio.

4. A steel rod of 10mm diameter and 3m long is subjected to an axial pull of 10 KN. Find the stress and strain in the bar if the Young's modulus is 200 KN/mm^2.

5. Define moment of inertia.

6. State parallel axis theorem.

7. State the advantages of hollow shafts over solid shafts.

8. How the springs are classified.

9.State the relationship between load, force and bending moment at section.

10. Write the formula for bending equation.

PART-B

11.A) i) Explain vickers hardness test with neat sketch.

ii) Explain any five market forms of steels.

(OR)

B) During the tension test on mild steel specimen the following observations were made diameter of mild steel specimen 12mm, gauge length 50 mm yield load 3.4KN, ultimate load 6.1KN breaking load 8 KN, calculate yield stress, ultimate stress and breaking stress.

12 A). A bar of length 150 mm and 50 mm in diameter it is subjected to an axial pull of 400 KN the extension in length and contraction in diameter were found to be 0.25 mm and 0.02 mm respectively. Determine the values of elastic constants.

(OR)

B i) Calculate the maximum stress and extension in a bar 2m long and 25 mm diameter when it is subjected to suddenly applied load of 50 KN and E= $2X10^5$ N/mm^2.

ii) A weight of 250 N is dropped on to a collar the lower end of a vertical bar 2 m long and 25 mm in diameter from a height of 100m above calculate the maximum instantaneous stress and extension produced in the section of the bar and E= $2X10^5$ N/mm^2.

13. A). An angle section of 100 mm wide and 120 mm deep overall both the flanges of the angles are 10 mm thick determine the position of centre of gravity of the section and calculate Ixx and lyy.

(OR)

B). i) In a boiler 3m internal diameter is subjected to a steam pressure of 5 bar find the hoop and longitudinal stresses if the thickness of the boiler plate is 14 mm.

ii) A cylindrical shell 3m long 500 mm in diameter is made up of 20 mm thick plate if the cylindrical shell is subjected to an internal pressure of $5N/mm^2$ find the resulting hoop stress longitudinal stress and changes in length, diameter and volume E= $25X10^5$ $N/mm^2$and 1/m = 0.3.

14. A) A shaft running at 180 RPM and to transmit 100 KW the shaft should not be stressed beyond 16 N/mm^2 and should not be twist more than one degree in a length of 3m select a suitable diameter of shaft take E = $0.8X10^5$ N/mm^2

(OR)

B) A closed coil helical spring is made out of 10mm diameter steel rod. The coil consists of 10 complete turns with a mean diameter of 120 mm. The spring carries an axial pull of 200 N. Find the maximum shear stress induced in the section of the rod. If C = 80 GN/mm^2, find the deflection in the spring, the stiffness and strain energy stored in the spring.

15. A.) A simply supported beam 5 m long carries concentrated loads of 70 KN, 90 KN, 50 KN and 80 KN at a distance 1 m, 3m, 4 m. and 4.5m respectively from the left and support find the support reactions and draw SFD and BMD.

(OR)

B. i). A cantilever beam of length 5m loaded by an udl of 2KN/m through the span with a point load of 1 KN at the free end. Draw the SFD and BMD.

ii). A simply supported beam of rectangular section carries a central load of 25 KN over a span of 6m the bending stress should not exceed 7.5 N/mm^2 the depth of the section is 400 mm calculate the necessary width of the section.