St. Michael Polytechnic College
St. Santhiyagappar Nagar
Kalayarkoil-630 551.

College Code : 769

DEPT: MECHANICAL   **YEAR/SEMESTER**: III / V

SUB.NAME: **DESIGN OF MACHINE ELEMENTS**

UNIT- 1   DESIGN OF JOINTS & FASTENERS (NV Publications)

PART-A

5Marks

1. Write down the procedure for design of machine elements.

2. Name the type steel with its composition designated as XT72W18 CR 14 V1

3. Define any five mechanical properties.

4. Write down the factors affecting the selection of materials.

5. Describe different types of cast iron.

6. How the engineering materials are classified?

7. How the HSS is designated?

PART-B

1. A mild steel supports a tensile load of 50KN. If the stress in the rod is limited to $100N/mm^2$, find the size of the rod when the unit section is 1) circular 2) Square 3) Rectangle with width= 3xThickness (10 Marks)

2. Two plates of 16mm thick are joined by a double riveted lap joint. The rivets are 25mm in dia. Find the crushing stress induced between the plate and the rivet of the maximum tensile load on the joint is 48KN. (10 Marks)

3. Calculate the force required to punch a circular block 60mm dia. in plate 5mm thick. The ultimate shear stress of the plate is $350N/mm^2$ (10 Marks)

4. Calculate the smallest size of hole to be punched in a sheet of 15mm thick. Ultimate steam stress $330N/mm^2$ and crushing stress $1200N/mm^2$ (10 Marks)

5. Design a sleeve & cotter joint to withstand a tensile load of 60KN. All parts are made up of same material. The permissible stresses are given below (15 Marks)

i.   ft = $60N/mm^2$ fc = $125N/mm^2$ fs = $70N/mm^2$

6. Design a knuckle joint to transmit load of 60KN. Take allowable stresses as 60mpa in tension 75mpa in compression and 40mpa in shear.   (15 Marks)