.. / Mech. Engg/ Prod./ G.E/ CAD CAM/ CNC/ METALLURGY/ PRINT MAKING TECH./ AMT/ Mech. Engg (Fabrication Tech.)

Subject : Machine Design and Drawing

Time : 3 Hrs. M.M. : 100

SECTION-A

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

Q.1 Define load.

Q.2 Write SI unit of stress.

Q.3 Give the angle between the planes of maximum shear to the principal planes.

Q.4 Define shaft.

Q.5 Give formula for polar moment of inertia for a solid shaft.

Q.6 Give the relation between width of taper sunk key and diameter of shaft.

Q.7 Name two types of keys.

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Q.8 The innermost portions of thread is called _____ (Fill in the blank).

Q.9 Give the maximum value of pressure angle of cam.

Q.10 Define pitch circle.

SECTION-B

Note: Very short answer type questions. Attempt any ten questions out of twelve questions. 10x2=20

Q.11 Write types of machine design.

Q.12 Define shear strain.

Q.13 State Hook's Law.

Q.14 What are principal planes?

Q.15 What is normal stress theory?

Q.16 Names the various type of shafts.

Q.17 Name any two materials used for high strength shafts?

Q.18 Describe the taper sunk key.

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Q.19 Describe keyway.

Q.20 Define screw thread.

Q.21 Define truncation.

Q.22 Define circular pitch.

SECTION-C

Note: Short answer type questions. Attempt any two questions out of three questions. 2x20=40

Q.23 (i) Define stress concentration and give the various methods to reduce it.

(ii) Explain in detail the characteristics of a good designer.

Q.24 Draw four involute teeth of a gear having 25 teeth of 10mm module and 20° pressure angle.

Q.25 A solid circular shaft is subjected to a bending moment of 3000 N a torque of 10000 Nm. The shaft is made of 45 C8 steel having ultimate tensile stress of 700 MPa, ultimate shear stress of 500 M pa, Assuming factor of safety as 6, determine the diameter of the shaft.

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SECTION-D

Note: Long answer type questions. Attempt any one questions out of two questions. 1x30=30

Q.26 A rectangular sunk key is 16mm wide, 12mm thick and 80mm long is required to transmit a torque 25kNm from a 100mm diameter shaft. Find the shear and crushing stress induced in key.

Q.27 A cam, with a minimum radius of 40mm, rotating clockwise at a uniform speed is required to give a knife edge follower, the motion as describe below :

(i) To move outward through 50mm during 100° rotation of the cam,

(ii) To dwell for the next 80°,

(iii) To return to its starting position during next 90°,

(iv) To dwell for the rest period of a revolution i.e. 90°.

Draw the profile of the cam. The displacement of the follower is to take place with uniform acceleration and deceleration.

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