Question Bank (G-scheme)

Name of subject: Design of Machine elements Unit Test: I

Subject code: 17610 Course: ME6G

Semester: VI

Chapter 1(Introduction to Machine Design)

3 Marks

1) List the steps involved in general design procedure.
2) Name the different theories of failure and explain any one.
3) Draw stress-strain diagram for ductile material and brittle material.
4) Explain the following stresses-i) Transverse shear stress, ii) Bending stress, iii) Torsional shear stress.
5) Explain the terms- i) Aesthetics, ii) Ergonomics.
6) Explain the importance shape in aesthetic design.
7) What is stress concentration? Illustrate methods to reduce it with neat sketches.
8) State the following material specifications- i) FeE230, ii) FG200, iii) X20Cr18Ni2, iv) 35C8.
9) State any four factors that govern the selection of material while designing a machine component.
10) What do you mean by factor of safety? List four factors on which FOS depends?
11) What are the causes of stress concentration?

Chapter -2(DESIGN OF JOINTS, LEVERS AND OFFSET LINKS)

3 marks

12) Give any three applications of Cotter Joint.
13) Why taper is provided for cotter? What is its amount?
14) Give any three applications of Knuckle joint.

15) What are the applications of levers?

16) What are the types of levers?

17) Why levers are tapered?

18) Distinguish between Cotter Joint and Knuckle Joint.

Chapter -2(DESIGN OF JOINTS, LEVERS AND OFFSET LINKS)

8 marks

19) Design a knuckle joint for a tie rod of a circular section to sustain a maximum pull of 70KN. The ultimate tensile and shear strength of the pin material are 510MPa and 396MPa respectively. Take factor of safety as 6.

20) Design a cotter joint for a maximum load of 6KN. The permissible stresses are 60N/mm^2 in tension, 100N/mm^2 in compression and 40N/mm^2 in shear.

21) Write strength equations in the design of cotter joint with relevant sketches.

22) Draw neat sketch of turn buckle and write the design procedure.

23) Design a Turn buckle to carry a load of 100KN. The tie rod and nut are made from same material having permissible tensile stress as 75N/mm^2 and permissible shear stress as 30N/mm^2.

24) A hand lever has a length of 1100mm from the centre of shaft to the point of application of 400N load. The effective overhang from the nearest bearing is 150mm. If the permissible tensile stress and shear stress are 73 MPa and 60 MPa respectively. Find:- i) diameter of shaft, ii) dimensions of boss, iii) section of lever, if t/B = 0.5.

25) A foot lever is 1mt from centre of shaft to point of application of 800N load. Foot lever is 60mm from the centre of bearing and assume width of arm is 3 times thickness. Permissible tensile stress may be taken as 73N/mm2 and shear stress as 70N/mm2.

Find- :- i) diameter of shaft, ii) dimensions of boss, iii) dimensions of rectangular cross-section of lever.