

Section-D

8. What is the concept of concurrent engineering, discuss in detail and explain the same. 20
9. Discuss the steps of design of piston or as per your choice. 20

B. Tech. 5th Semester (AUE) F. Scheme Examination,
December-2017

DESIGN OF MECHANICAL SYSTEM

Paper-AUE-301-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions. Question number 1 is compulsory and selecting at least one question from each section. Design data book is permitted and assume suitable data whenever required.

1. (a) What is Endurance limit ? Explain with suitable example. 4
- (b) What is Bearing ? Write short note on hydrostatic Bearings. 4
- (c) What is Gear ? How can you classify the Gears ? 4
- (d) What is a clutch ? Draw the figure of centrifugal clutch. 4
- (e) What is the difference between the clutch and flange coupling ? 4

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Section-A

2. What is the difference between the shaft and an axle ?
How can you classify the shafts ? Explain the various causes of shaft failure. 20
3. (a) A multiple Disk clutch, steel on bronze, is to transmit 3.60kW at 750 rev/min. The inner radius of contacts is 38 mm and outer radius of contact is 70mm. The clutch operates in oil with an expected co-efficient of friction 0.10. The average pressure is 0.35N/mm² maximum. Determine (i) total disks of steel and bronze required (ii) axial force required. 15
- (b) Write short note on centrifugal clutch. 5

Section-B

4. (a) What are Gears ? How can you classify the gears ?
Explain how the selection of gears is done. 15
- (b) Write short note on Gear Tooth Failure. 5
5. A pair of spur gears with 20° full depth involute teeth consists of a 20 teeth pinion meshing with a 41 teeth gear. The module is 3mm while the face width is 40mm. The material for the pinion as well as for the gear is steel with an ultimate tensile strength of 600N/mm². The gears

are heat treated to a surface hardness of 400BHN. The pinion rotates at 1450rpm and the service factor for the application 1.75. Assume that velocity factor accounts for the dynamic load and the factor of safety is 1.5. Determine the rated power that the gears can transmit.

20

Section-C

6. (a) Why are ball and roller bearings called anti friction bearings ? 5
- (b) How Selection of Bearings is done from manufacturer's catalogue. Explain. 10
- (c) Write the various Lubricants used in bearing and name their specific properties. 5
7. A single-row deep groove ball bearing is subjected to a radial force of 8kN and a thrust force of 3kN. The values of X and Y factors are 0.56 and 1.5 respectively. The shaft rotates at 1200 rpm. The diameter of shaft is 75 mm and bearing No. 6315(C=112000N) is selected for this application
- (a) Estimate the life of this bearing, with 90% reliability.
- (b) Estimate the reliability for 20000 hr life. 20