Even Semester Examination 2017-18

B.TECH. (SEMESTER-VI)

MACHINE DESIGN-II

Time: 03:00 Hours **Max Marks : 100**

1. Attempt any **two** questions:- 10×2=20

   (a) A 80 mm long journal bearing supports a load of 2800n on a 50 mm dia shaft. The bearing has a radial clearance of 0.05 mm and the viscosity of the oilo is 0.021 kg/m-s at the operating temperature. If the bearing is capable of dissipating 80 j/s determine the maximum safe speed

   (b) What are journal bearing .give a classification of these bearing.

   (c) Explain wedge film and squeeze film journal bearing.

2. Attempt any **two** questions:- 10×2=20

   (a) Determine the dimension of I section of connecting rod for a petrol engine from the following data

   Dia of piston =110mm; Mass of the reciprocating parts =2 Kg; length of the connecting rod centre to centre =325mm; stroke length= 150mm; rpm = 1500 with possible over speed of 2500; compression ratio=4:1; maximum explosion pressure=2.5N/mm^2

   (b) Design a plain carbon steel centre crank shaft for a single acting four stroke single cylinder engine for the following data

   Bore=400mm; stroke=600mm; engine speed=200rpm ;mean effective pressure=0.5N/mm^2; max combustion pressure= 2.5N/mm^2; weight of flywheel used as a pulley= 50KN total belt pull=6.5KN

When the crank has turned through 35^0 from the top dead centre, the pressure on the piston is 1 N/mm2 and the torque on the crank is max. the ratio of the connecting rod length to the crank radius is 5

(c) Explain the bearing characteristic number and bearing modulus for journal bearings

3. Attempt any **two** questions:- 10×2=20

(a) Define the terms used in hydrodynamic journal bearing.

(b) State the function of following for an internal ic engine

a. Ribs b. Piston ring C. Piston skirt d. Piston pin

(c) Explain the various stress induced in the connecting rod

4. Attempt any **two** questions:- 10×2=20

(a) What are rolling cotact bearing discuss their advantage over sliding size contact bearing?

(b) How do you express the life of bearing? What is an average medium life.

(c) Design a self-align bowl bearing for the radial load of 7000 N and a thrust load of 2100 N. The desire life of bearing is 160 millions of revolution at 300 rpm. Assume uniform & steady load.

5. Attempt any **two** questions:- 10×2=20

(a) A shaft rotating at a constant speed is subjected to a variable load. The bearing supporting the shaft are subjected to stationary equivalent radial load of 3 KN for 10 percent of time, 2 kN for 20 percent of time, 1 KN for 30 percent of time and no load for remaining time of cycle. If the total life expected for the bearing is 20×10^6 revolutions at 95 per cent reliability, calculate dynamic load rating of the ball bearing.

(b) A four stroke diesel engine has the following specification

Brake power =5 KW; Speed=1200RPM; Indicated mean effective pressure=0.35N/mm^2 Mechanical efficiency=80%

Determine 1.bore and length of the cylinder; 2.thickness of the cylinder head; 3.size of studs for the cylinder head?

c) Design a cast iron piston for a single acting four stroke engine for the following data

Cylinder bore=100mm; stroke= 125mm; max gas pressure= 5N/mm^2; indicated mean effective pressure =0.75N/mm^2; mechanical efficiency= 80 %

Fuel consumption =0.15kg per brake per hour; higher calorific value of fuel = 42x10^{3}KJ/KG; Speed=2000rpm

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