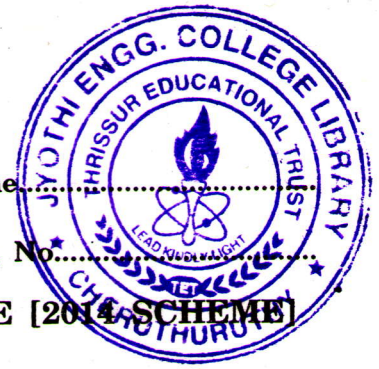


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Name.....

Reg. No.....



**SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME]
EXAMINATION, NOVEMBER 2017**

Mechanical Engineering

ME 14 702—MACHINE DESIGN—II

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

1. (a) Design a pair of spur gears to transmit 20 kW at a pinion speed of 1,400 r.p.m. The transmission ratio is 4. The material for pinion and gear are 15 Ni2 Cr1 Mo 15 and C45 respectively. The pressure angle of gear and pinion is 20°.

Or

- (b) A pair of straight bevel gear consist of a 24 teeth pinion meshing with a 48 teeth gear. The module at the outside diameter is 6 mm, while the face width is 50 mm. The gears are made of grey cast iron FG 220 (sut = 220 N/mm²). The pressure angle is 20°. The teeth are generated and assume that the velocity factor account for the dynamic load. The pinion rotates at 300 rpm and the service factor is 1.5.

2. (a) A multi-disk clutch consist of five steel plates and four bronze plates. The inner and outer diameter of friction disks are 75 and 150 mm respectively. The co-efficient of friction lining to 0.3 N/mm². Assuming uniform wear theory, calculate.

- (i) The required operating force.
(ii) Power transmitting capacity of 750 r.p.m.

Or

- (b) Select a flat-belt drive for a compressor running at 720 r.p.m, which is driven by a 25 kW, 1,440 r.p.m. motor. Space is available for a centre distance of 3 m. The belt is open type.

3. (a) Explain the classification of sliding contact bearings and compare with their applications.

Or

- (b) In a journal bearing application an oil of kinematic viscosity at 100°C corresponding to 46 seconds as found from Saybolt viscometer is used. Determine its absolute viscosity and corresponding oil in SAE and ISO VG grades.

Turn over

4. (a) Design an automotive plate clutch to transmit a torque of 550 N-m. The co-efficient of friction is 0.25 and the permissible intensity of pressure is 0.5 N/mm^2 . Due to space limitations, the outer diameter of the friction disc is fixed as 250 mm. Using the uniform wear theory, calculate : The inner diameter of the friction disc the spring force required to keep the clutch in engaged position.

Or

- (b) A multiple-disc wet clutch is to be designed for transmitting a torque of 85 N.m. Space restriction limit the outside disk diameter to 100 mm. Design values for the molded friction material and steel disks to be used are $f = 0.06$ (wet) and $p_{\max} = 1400 \text{ kPa}$. Determine appropriate values for the disc inside diameter, the total number of discs, and the clamping force.

(4 × 25 = 100 marks)