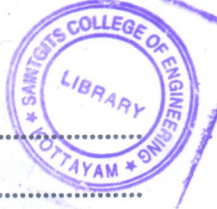


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Reg. No.....

Name.....



B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Seventh Semester

Branch : Automobile Engineering/Mechanical Engineering

AU 010 701 }
ME 010 701 } DESIGN OF MACHINE ELEMENTS (AU, ME)

(New Scheme—2010 Admission onwards—Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

1. What are the different factors affecting design process ? Explain with the help of an example.

Or

2. Explain in detail any *three* theories of failure.
3. Determine the efficiency of a single riveted lap joint having a rivet diameter of 29 mm., pitch 80 mm. and a plate thickness of 12.5 mm.

Or

4. Determine the safe useful load for a M 36 × 4C bolt, 110 mm. long, made of mild steel, for three conditions :
 - (a) Static load.
 - (b) Sudden change of load from zero to maximum.
 - (c) Impact action resulting from a variable load when the nut is unscrewed 1/16th turn.
5. Determine the maximum torsional moment that a 55 mm. dia solid steel shaft welded to a flat plate can sustain when the leg of the fillet weld is 12.5 mm. The allowable shear stress in the weld material under static conditions is not to exceed 75.0 N/mm².

Or

6. A truck weighing 20 kN and moving at 25 km/hr. has to be brought to rest by a buffer. Find how many springs each of 15 coils will be required to store the energy of motor during the compression of 150 mm. The available size of the wire is 20 mm. The mean radius for the coils is 100 mm.
7. A machinery shaft supplied a bearings 2.4 m. apart is to transmit 187.5 kW at 200 r.p.m. It is subjected to a bending load of 5000 N located at a distance of 0.66 m from one bearing. Safe stress in shear is 42 MPa and in bending 84 MPa. Determine
 - (a) The shaft dia for steady loading.
 - (b) The shaft dia if the transverse load is steady and the torsional load is suddenly applied.

Or

Turn over

8. Design a rigid sleeve coupling to connect two shafts transmitting 18.75 kW at 1000 r.p.m. The allowable shear stress in the material of the shaft is 55 N/mm^2 . The material of the key and the shaft is same and the coupling is required to transmit 20 % over load. The material of the sleeve is cast iron, the allowable shear stress for which is 16 N/mm^2 . Make a neat sketch of the designed sleeving coupling showing the side view and sectional elevation.

(4 × 25 = 100 marks)

