

Code No: **R32035****R10****Set No. 1****III B.Tech II Semester Supplementary Examinations, November - 2017****DESIGN OF MACHINE MEMBERS- II****(Code book is permitted)****(Mechanical Engineering)****Time: 3 hours****Max. Marks: 75****Answer any FIVE Questions****All Questions carry equal marks****\*\*\*\*\***

- 1 a) Distinguish the “Hydrodynamic” and “Hydrostatic Bearings” with figures and suitable applications. [8M]  
b) A bearing is required to carry 4500 N stationary radial load. The shaft rotates at 1000 rpm and the life desired is 30000 hrs. The running conditions are steady, no shock loading select a suitable bearing. [7M]
- 2 A connecting rod is required to be designed for a high speed four stroke I.C engine. [15M]  
The following data are available diameter of piston=88 mm. Mass of reciprocating parts=1.6Kg. Length of connecting rod (centre to centre) =300mm, stroke =125 mm. The RPM =2220 (when developing 50KW) possible over speed =3000rpm; Compression ratio =6.8:1 (approximately); probable maximum explosion pressure (assumed shortly after dead centre say at about  $3^\circ$ ) =3.5N/mm<sup>2</sup> Draw fully dimensioned drawings of the connecting rod showing the provision for the lubrication.
- 3 A four stroke internal combustion engine has following specifications: Break power = 7.5KW, speed =1000rpm, indicated mean effective pressure =0.35N/mm<sup>2</sup> maximum gas pressure =3.5N/mm<sup>2</sup>, mechanical efficiency =80%. Determine [15M]  
i) The dimensions of the cylinder, if the length of stroke is 1.4 times the bore of the cylinder.  
ii) Wall thickness of the cylinder, if the hoop stress is 35MPa.  
iii) Thickness of the cylinder head & the size of studs when the permissible stress for the cylinder head & stud materials are 45MPa and 65MPa respectively.
- 4 A crane hook is of trapezoidal cross-section having inner side 80 mm, outer side 30 mm and depth 120mm. The radius of curvature of the inner side is 80 mm. If a load of 100KN is applied to the hoop passing through the center of curvature, determine the maximum tensile and compressive stresses at the critical cross-section. [15M]

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