Enrolment No._____

HASMUKH GOSWAMI COLLEGE OF ENGINEERING, VAHELAL

MID SEMESTER EXAMINATION, SEPTEMBER-2016

Subject Code: 2151907 **Date: 26/9/2016**

Subject Name: DME **Sem: 5TH**

Time: 10:00 TO 10:50 **Total Marks: 20**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

QUE.1 **(A)** What are the major principles in the design of casting? **5**

QUE.2 **(A)** A machine component is subjected to fluctuating stress that varies from 40 to 100 MPa. The corrected endurance limit stress for the machine component is 270 MPa. The ultimate tensile strength and yield strength of material are 600 and 450 MPa respectively. Calculate the factor of safety using 1. Gerber theory 2. Soderberg line and 3. Goodman line. **5**

OR

(A) A rotating bar made of steel 45C8 (S_{ut} = 630 MPa) is subjected to a completely reversed cycle bending stress. The corrected endurance limit of the bar is 315 MPa. Calculate the fatigue strength of the bar for a life of 90000 cycle. **5**

QUE.3 **(A)** What is thick cylinder? When do you use Lame's equation for cylinder wall thickness. **5**

(B) Design a helical compression spring from the following data: Minimum load = 100 N; Maximum load = 225.6 N; Compression of spring = 10 mm; Permissible shear stress for spring material = 440 MPa; Spring end – square and ground ends; Modulus of rigidity for spring material = 0.80 x 10^5 MPa. **5**

OR

(A) A high pressure cylinder consists of a steel tube with 20 mm and 35 mm as inner and outer diameters respectively. It is jacketed by outer steel tube with 50 mm outer diameter. The tubes are assembled by shrinking process in such a way that the maximum tensile stress induced in any tube is limited to 100 N/mm^2. Calculate the shrinking pressure and original dimensions of the tubes. E = 2.0x10^5 N/$mm^{2.}$ **5**

(B) Explain the following terms. **5**
1) Spring index 2) Free length 3) Solid length 4) Pitch 5) Clearance

********** ALL THE BEST **********