

(4)

3313

9. (a) What is self energizing brake ? When a brake become self locking. 7
- (b) How does function of brake differs from clutch ? List important factors upon which capacity of brake depends. 8

3313

B. Tech. (ME) 6th Semester (G Scheme)

Examination, July-2022

DESIGN OF MACHINE ELEMENT-I

Paper-PCC-ME-304-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Attempt five questions in all, selecting one question from each unit. Question No. 1 is compulsory. All questions carry equal marks.

1. Explain the following : 2.5×6=15
- (a) Environment feasibility with example
 - (b) Function of clutches
 - (c) Selection of Fits and tolerances
 - (d) Selection of belt
 - (e) Thermal considerations in brake designing
 - (f) Uses of flywheel

Unit-I

2. (a) What do you mean by feasibility study ? Explain various types of feasibility study in context of design philosophy. 10
- (b) Explain brain storming. 5

3313

3313-P-4-Q-9 (22)

[P. T. O.]

(2)

3313

3. (a) What are the key parameters for selection of engineering materials ? Explain them. 10
(b) Classify engineering materials. 5

Unit-II

4. Screw jack is to lift a load of 80 kN through a height of 400 mm. The elastic strength of screw material in tension and compression is 20 MPa and in shear 120MPa. The material for nut is phosphor - bronze for which the elastic limit may be taken as 100 MPa in tension, 90 MPa in compression and 80MPa in shear. The bearing pressure between the nut and screw is not to exceed 18N/mm². Design and draw the screw jack. The design should include the design of (i) Screw, (ii) Nut, (iii) Handle and cup and (iv) body. 15
5. Design a double riveted butt joint with two cover plates for the longitudinal seam of a boiler shell 1.5 m in diameter subjected to a steam pressure of 0.95 N/mm². Assume joint efficiency as 75% , allowable shear stress in the plate 90 MPa, Compressive stress 140 MPa and shear stress in the rivet 56MPa. 15

3313

(3)

3313

Unit-III

6. (a) What are the factors influencing power transmission through a belt ? Explain. 7
(b) Derive expression of length for a open belt drive. 8

7. Design a muff coupling which is used to connect two steel shaft transmitting 40 kW at 350 rpm. The material for shaft and key is plain carbon steel for which allowable shear stress and crushing stress may be taken as 40 N/mm² and 80N/mm² respectively. The material for the cast iron for which the allowable shear stress may be assumed as 15 N/mm². 15

Unit-IV

8. A centrifugal clutch is to be designed to transmit 15 kW at 900 rpm. The shoes are four in number. The speed at which engagement begins is 3/4th of the running speed. The inside radius of the pulley rim is 150mm. The shoes are lined with Ferrodo for which coefficient of friction may be taken as 0.25. Determine : (i) Mass of shoes and (ii) Size of the shoes. 15

3313

[P. T. O.]