

(4 Hours)

[Total Marks : 100



- N. B. :** (1) Question No. 1 is **compulsory**.
 (2) Solve any **four** from **remaining** questions.
 (3) Use of **PSG** design data book is **permitted**.
 (4) Assume **suitable** data wherever **necessary**.

1. Write on :— 20
 (a) Preferred Series and Numbers.
 (b) Advantages and disadvantages of welded joints.
 (c) Wahl stress factor for coil spring.
 (d) Cross-section of Vee Belt.
2. (a) Write on design considerations for casting and forging. 6
 (b) Design turnbuckle to resist pull of 40 kN. Select suitable materials and stresses. 14
3. (a) Design Screw and Nut for screw press for load of 120 kN and 400 mm height adjustment. 12
 (b) Discuss in detail on Goodman design criteria. 8
4. A solid shaft is transmitting 40 kW at 960 rpm is supported on two bearings, 1 m apart and has two spur gears keyed on it. The pinion is having 200 mm PCD and is located 150 mm to the left of RH bearing and tangential force acts horizontally on it. The gear is having 500 mm PCD and is located 250 mm to right of LH bearing, and the tangential force acts vertically downwards on it. 20
 Select suitable material and find diameter from maximum shear stress theory and normal stress theory.
5. (a) A semielliptical laminated spring has to carry a central load of 4000 N and consists of six leaves, two of the leaves extending to full length. The spring is having 900 mm length and central band is 80 mm wide. Select suitable material and find —
 (Take $b/t = 4$) :—
 (i) Thickness (t) and width (b) of leaves 6
 (ii) Camber of Spring 2
 (iii) Length of leaves 4
 (iv) Radius of leaves in free condition. 2
 (b) Write on static and fatigue stress concentration factor. 6
6. Design Flat Belt drive with shafts and pulleys, to transmit 20 kW at 1440 rpm. The centre distance is 2.5 m and velocity ratio = 2. Select suitable materials. 20
7. (a) What are various types of keys ? Explain design procedure for key. 8
 (b) Discuss on various fatigue cycles. 6
 (c) Write on factors affecting selection of materials. 6