



- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Retain the construction lines.
 5. Illustrate your answer necessary with the help of neat sketches.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) Explain the basic procedure of 'Machine Design'. 7
b) Compare design synthesis with design analysis. 6

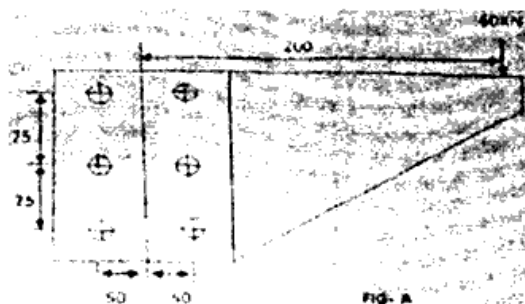
OR

2. a) Explain 6
i) Stress concentration.
ii) Selective assembly.
b) Determine the fundamental deviation, tolerance, limit of size and type of fit for hole and shaft assembly 'zoh7f8' type. 7
3. a) Design a muff coupling which is used to connect two steel shafts transmitting 37kW at 350rpm. The material for the shaft and key is plain carbon steel for which allowable shear and crushing stresses may be taken as 40N/mm² and 80N/mm², Respectively. The material for the muff is cast iron for which the allowable shear stress may be assumed as 15N/mm². 10
b) Explain 'Splines' with neat sketch. 4

OR

4. a) A line shaft is driven by means of a motor placed vertically below it. The pulley on the shaft is 1.5m. in diameter and has a belt tensions 5.4kN and 1.8kN on the tight side and slack side of the belt respectively. Both these tensions may be assumed to be vertical. If the pulley be overhang from the shaft, the distance of the center line of the pulley from the Centre line of bearing being 400mm. Find the diameter of the shaft. Assuming maximum allowable shear stress of 42MPa. 9
b) What are rolling contact bearing? Discuss their advantages over sliding contact bearing. 5
5. a) Explain the terms : Chain riveted joint, zig zag riveted joint and diamond riveted joint. 5

- b) A bracket is riveted to a column by 6 rivets of equal size as shown in fig. [A]. It carries a load of 60kN, at a distance of 200mm from centre of the column. If the maximum shear stress in the rivet is limited to 150MPa. Determine the diameter of rivet. 8



OR

6. a) Explain the advantages and disadvantages of welded joint. 7
b) Describe the different types of failures of riveted joint. 6

SECTION - B

7. a) Derive an expression for the length of an open belt drive. 8
b) Distinguish between the initial tension and centrifugal tension in a belt. 6

OR

8. a) State the advantages and disadvantages of chain drive over belt drive. 5
b) Leather belt is 9x250mm is used to drive cast iron pulley 900mm in diameter at 336 rpm. If the active arc on the smaller pulley is 120° and the stress in tight side is 2N/mm^2 . Find the power capacity of the belt. The density of leather belt may be taken as 980kg/m^3 and coefficient of friction of leather on cast iron is 0.35. 9
9. a) Explain the terms with sketches: Path of approach, path of recess and path of contact between two mating gears. 7
b) Explain the working principle of 'Epicyclic gear train' with neat sketch. 6

OR

10. a) Explain the different causes of gear tooth failures and suggest possible remedies to avoid such failures. 8
b) What are the different forms of tooth profile in gears? 5
11. a) Define thin cylinders. Name the stresses set up in a thin cylinder subjected to internal fluid pressure. http://www.sgbauonline.com 5
b) Describe with sketches, the various types of pipe joints commonly used in engineering practice. 8

OR

12. a) What are the different methods of reducing hoop stresses? 5
b) A water main 80cm. diameter contains water at a pressure head of 100m. If the weight density of water is 9810N/m^3 , find the thickness of the metal required for the water main. 8
Given the permissible stress as 20N/mm^2 .
