

P. Pages : 3

Time : Three Hours

**AW - 3073**

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answer necessary with the help of neat sketches.
 4. Use of slide rule logarithmic tables, Steam tables, Mollier's Chart, Drawing instrument, Thermodynamic table for moist air, Psychrometric Charts and Refrigeration charts is permitted.
 5. Use of cell phones is not permitted.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) What are the factors which governs the selection of material for a machine component? **7**
b) What is meant by 'Hole basis system' and 'Shaft basis system'? Which one is preferred and why? **6**

OR

2. a) Explain : **6**
i) Ductility
ii) Fundamental deviation.
b) State briefly unilateral system of tolerances covering the points of definition, applications and advantages over the bilateral system. **7**
3. a) How are the keys classified? Draw neat sketches of different types of keys and state their applications. **6**
b) Describe the working with neat sketch and explain when and where it is used. **8**
i) Oldham's Coupling
ii) Splines.

OR

4. a) Design a cast iron flange coupling to connect two shaft in order to transmit 20 kW at 250 rpm and having allowable shear stress of 40N/mm^2 . The working stress should not exceed 30N/mm^2 . Assume that same material is used for shaft and key. The crushing stress is twice value of shear stress. The maximum torque is 25% greater. **10**
b) What is the purpose of bearing lubrication? **4**
5. a) Describe the different types of failures of rivetted joint. **6**
b) What do you understand by the term welded joint? How it differs from rivetted joint? **7**

OR

6. a) What do you understand by term 'efficiency of riveted joint'? 4
- b) Fig (A) shows a lap diamond joint. Determine the strength and efficiency of the joint. Alternatively if the rivets are placed such that there are three rivets in each row, what would be the strength and efficiency of joint? The allowable stresses are 120 MPa in tension, 80 MPa in shear and 210 MPa in crushing. Assume hole diameter equal to the rivet diameter. 9

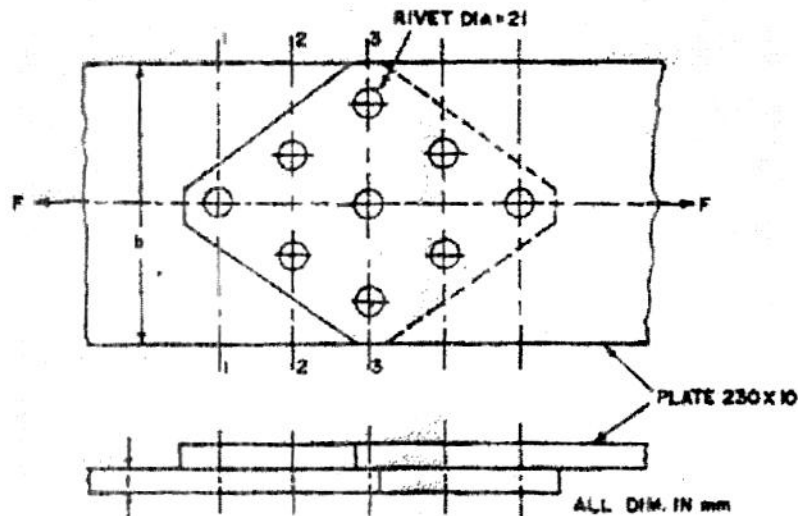


Fig. (A)

SECTION - B

7. a) What do you understand by simplex, duplex and triplex chains. 7
- b) State the advantages and disadvantages of the chain drive over belt drive. 7

OR

8. a) Explain with its effect on power transmission : 4
- i) Initial tension
- ii) Centrifugal tension
- b) A belt 100 mm wide and 10 mm thick is transmitting power at 1000 meters/min. The net driving tension is 1.8 times the tension on the slack side. If the safe permissible stress on the belt section is 1.6 MPa, calculate the maximum power, that can be transmitted at this speed. Assume density of the leather as 1000 kg/m^3 . 10
- Calculate the absolute maximum power that can be transmitted by this belt and the speed at which this can be transmitted.
9. a) How are the gear classified and what are the various terms used in spur gear terminology? 7
- b) What are the various forces acting on worm and worm gears. 6

OR

- i) Tooth thickness
- ii) Circular pitch
- iii) Pitch point

b) Explain the different causes of gear tooth failures and suggest possible remedies to avoid such failures. 7

11. a) What are the important points to be considered while designing a pressure vessel? 6

b) Distinguish between circumferential stress and longitudinal stress in a cylindrical shell, when subjected to an internal pressure. 7

OR

12. a) Describe with sketches, the various types of pipe joints commonly used in engineering practice. 6

b) A cast steel cylinder of 350 mm inside diameter is to contain liquid at a pressure of 13.5 N/mm^2 . It is closed at both ends by flat cover plates which are made of alloy steel and are attached by bolts. 7

1. Determine the wall thickness of the cylinder if the maximum hoop stress in the material is limited to 55 MPa.
2. Calculate the minimum thickness necessary of the cover plates if the working stress is not to exceed 65 MPa.
