| M-409 | | 2 | |
|-------|--|---|----|
| 3. | (a) | A solid shaft is transmitting 1 mW power at 240 rpm. Determine the diameter of the shaft if the maximum torque transmitted exceeds the mean torque by 20%. Take the maximum allowable shear stress as 60 N/mm ² . | 7 |
| | (b) | Find the diameter of a solid steel shaft to transmit 20 kW at 200 r.p.m. the ultimate shear stress for the steel may be taken as 360 N/mm ² and a factor of safety as 8. If a hollow shaft is to be used in place of solid shaft, find the inside and outside diameters when their ratio is 0.5. | 8 |
| 4. | The shaft and the flange of a machine engine are to be designed for flange coupling in which the flange is forged on the end of the shaft. The following particulars are to be considered in the design: | | 15 |
| | (1) | Power of the engine = 3 mW. | |
| | (2) | Speed of the engine = 100 rpm | |
| | (3) | Permissible shear stress in bolt and shaft = 60 N/mm ² . | |
| | (4) | Number of bolts used = 8 | |
| | (5) | Pitch circle diameter = 1.6 diameter | |
| | (6) | Speed of the engine = 100 rpm Permissible shear stress in bolt and shaft = 60 N/mm². Number of bolts used = 8 Pitch circle diameter = 1.6 diameter Thickness of flange = $\frac{1}{3}$ dia of shaft. 1: (i) Diameter of the shaft (ii) Diameter of bolts (iii) Thickness of flange | |
| | Find | 1: | |
| | | (i) Diameter of the shaft | |
| | | (ii) Diameter of bolts | |
| | | (iii) Thickness of flange | |
| | | (iv) Diameter of flange | |
| | | SECTION - III | |
| 5. | (a) | What are the advantages of rope drives? | 4 |
| | (b) | Define the following related to gear : | 4 |
| | | (i) Pitch circle | |
| | | (ii) Diametric pitch | |
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| 360 | (b) | Explain with neat sketch the shoe brake. | 5 |
| | | | |

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