

IV/SEM/MECH/2015(S)
NEW

THEORY OF MACHINE

[MET- 401]

Full Marks : 70

Time : 3 hours

Answer any five questions

figures in the right-hand margin indicate marks

- a) Define kinematic link. Mention its types. 2
- b) What do you mean by lower pair and higher pair? Give two examples from each. 5
- c) In a crank and slotted lever mechanism (quick return), the distance between the fixed centres is 180 mm and the driving crank is 90 mm long. Determine the ratio of the time taken on the cutting and return strokes. 7
- (a) What is angle of Repose? 2
- (b) Describe in brief about anti-friction bearing: 5
- (c) Derive an equation for total frictional torque on a flat Pivot bearing considering uniform pressure. 7

(Turn Over)

3. (a) What is the difference between a brake and a dynamometer ?

(b) Find out the length of belt in case of an open belt drive.

(c) Two parallel shafts 6 metres apart are provided with 300 mm and 400 mm diameter pulleys and are connected by means of a cross belt. The direction of rotation of the follower pulley is to be reversed by changing over to an open belt drive. How much length of the belt has to be reduced ?

4. (a) What is crowning of pulleys ?

(b) Mention various types of gear drives and their advantage over belt drives.

(c) Two parallel shafts are to be connected by spur gearing. The approximate distance between the shafts is 600 mm. If one shaft runs at 120 rpm and the other at 360 rpm find the number of teeth on each wheel if the module is 8 mm. Also determine the exact distance apart of the shafts.

(3)

5. (a) Write down the classification of governor. 2

(b) Explain the working of a porter governor. 5

(c) A vertical double acting steam engine develops 75 kW at 250 rpm. The maxm. fluctuation of energy is 30% of the workdone per stroke. The maxm. and minm. speeds are not to vary more than 1% on either side of the mean speed. Find the mass of the flywheel required if the radius of gyration is 0.6 m. 7

6. (a) What is the necessity of balancing of rotating mass? 2

(b) Differentiate between static and dynamic balancing. 5

(c) Four masses A, B, C and D revolve at equal radii and are equally spaced along a shaft. The mass B is 7 kg and the radii of C and D make angles of 90° and 240° respectively with the radius of B . Find the magnitude of the masses A, C and D and the angular position of A so that the system may be completely balanced. 7

(4)

7. (a) Define free vibration and forced vibration. 2
- (b) Describe with neat sketch the longitudinal and transverse vibration: 5
- (c) What are the causes and effects of vibration ? Describe in detail. 7
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