

22438

22232

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) List any four inversions of single slider crank mechanism.
- (b) Define incompletely constrained motion & successfully constrained motion.
- (c) State the necessity of drawing velocity & acceleration diagram of a mechanism.
- (d) State any four applications of cams and followers.
- (e) State the bad effects of improper balancing of rotating parts.
- (f) List applications of clutches.
- (g) State the reason why roller follower is preferred over knife edge follower.



- 2. Attempt any THREE of the following : 12**
- (a) Draw a neat labelled sketch of elliptical trammel. Explain in brief.
 - (b) Compare Belt drive & gear drive. (any four points)
 - (c) Explain with neat sketch method of drawing displacement diagram for uniform acceleration & retardation.
 - (d) An I.C. engine is developing power of 10 kW, to be transmitted to a M/c by flat belt. A 0.8 m. diameter pulley is fitted on engine shaft & rotates at 300 rpm. The angle of lap is 175° & μ between pulley & belt is 0.30. Determine tensions in the belt.
- 3. Attempt any THREE of the following : 12**
- (a) Explain the working of Beam engine with neat sketch.
 - (b) Differentiate between machine & structure.
 - (c) Write any two functions and applications of brakes.
 - (d) Write the classification of cams. Draw sketch of any one.
 - (e) Draw & explain turning moment diagram of four stroke cycle I.C. engine.
- 4. Attempt any TWO of the following : 12**
- (a) Draw the construction of crank & slotted lever quick return mechanism.
 - (b) A cam is to be designed for knife edge follower with following data :
Cam lift 50 mm during 120° of cam rotation with uniform velocity, Dwell for 30° , during return stroke 90° of cam rotation by SHM & remaining is dwell.
Draw the cam profile.
 - (c) Explain Klein's construction to determine velocity & acceleration of different links in single slider crank mechanism.

5. Attempt any TWO of the following :**12**

- (a) Explain with neat sketch compound type gear train and write its equation for finding velocity ratio of gear train.
- (b) In reciprocating engine, crank is 200 mm., long & connecting rod is 800 mm. long. The crank rotates at 150 rpm. Find velocity & acceleration of piston & angular velocity & angular acceleration of connecting rod when crank makes an angle of 30° to IDC use analytical method.
- (c) Draw neat labelled sketch of centrifugal governor & explain its working.

6. Attempt any TWO of the following :**12**

- (a) Differentiate between flywheel & governor.
 - (b) Draw the sketch of single plate clutch & explain its working.
 - (c) Two pulleys, one 450 mm. diameter & other 200 mm. diameter are mounted on parallel shaft is 2 m. apart & are connected by cross belt drive. Find the length of belt required & angle of contact between the belt & each pulley. Also calculate power transmitted by belt, when larger pulley rotates at 200 rpm. If maximum permissible tension in the belt is 1000 N, & $\mu = 0.25$.
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