

Seat
No.

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सठ - 070

ELECTIVE - I
Advanced Machine Design (New)
(1252)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Figures to the right indicates full marks.
5. Use of non-programmable electronic calculator is allowed.
6. Use of design data book is allowed.
7. Assume suitable data if necessary.
8. Solve **any two** subquestion from each unit.

UNIT - I

1. a) Explain in detail Johnson's method of optimum design ? 10
- b) Prove that for a given helical spring minimum weight for given condition occurs when the spring is so designed that maximum load on it is equal to twice the initial load ? 10
- c) Derive the equation for optimum design of spur gear with minimum power transmitting capacity ? 10

UNIT - II

2. a) Explain value engineering approach to solve the design problems ? 10
- b) Derive an equation for dynamic response of a lumped system ? 10
- c) Derive an expression $K = a^2 K_A$ for modelling the elasticities. 10

UNIT - III

3. a) Derive an equation for displacement velocity and acceleration for 3 – 4 – 5 polynomial cam ? 10

- b) Due to inertia of follower beyond a particular speed during a part of cam rotation, the follower may loose contact with cam, prove that

$$w_j < \sqrt{\frac{2ke + P}{m_e}}$$

to avoid the loose contact. Explain the phenomenon ?

10

- c) Explain in detail forces on cam & follower ?

10

UNIT - IV

4. a) Explain in detail design steps of valve gear mechanism ?

10

- b) A four stroke diesel engine has following specifications.

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Brake power = 5kw

speed = 1200rpm

Indicated mean effective pressure = 0.35 N/mm^2

mechanical efficiency = 80%

Determine :

i) Bore and length of cylinder.

ii) Thickness of cylinder head.

iii) Size of studs for cylinder head.

- c) Explain in detail design of Crankshaft.

10

UNIT - V

5. a) Explain stresses in curved beams.

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- b) Explain in detail design of crane hook.

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- c) Explain design of hoisting chains & drums.

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