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(Pages : 2)

Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2014**

**Fourth Semester**

Branch : Mechanical Engineering

**THEORY OF MACHINES—I (M)**

(Old Scheme/Supplementary/Mercy Chance)

[Prior to 2010 admissions]

Time : Three Hours

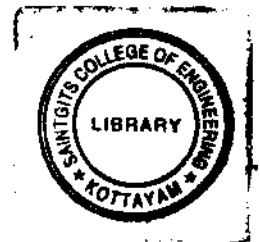
Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 4 marks.*

1. What are the techniques for estimating efficiency of a machine ?
2. Discuss any *one* inversion of a double slider crank mechanism.
3. Distinguish between type synthesis and number synthesis.
4. What are the criteria for selection of precision points ?
5. Briefly discuss the application of any one quick return mechanism.
6. Sketch and explain the working of a pantograph.
7. What is the application of a dynamometer in load test of IC engines ?
8. Compare the performance of a single plate and multiple plate clutch.
9. Define and explain contact ratio of a gearing.
10. Discuss the importance of helix angle in a helical gearing.



(10 × 4 = 40 marks)

**Part B**

*Answer all questions.*

*Each full question carries 12 marks.*

11. With neat diagrams, explain any three spatial mechanisms. Discuss their features and analytical treatment.

Or

Turn over

12. Derive expressions for the :

- |                   |  |
|-------------------|--|
| (i) Displacement. | (ii) Angular displacement.                 |
| (iii) Velocity.   | (iv) Acceleration of a slider crank chain. |

Discuss its application to engines.

(12 marks)

13. Discuss the procedure for synthesis of linkages. Explain all the steps involved in overlay method.

*Or*

14. Discuss any three methods of approximate kinematic synthesis. What is the change in the procedure if exact synthesis method is to be used ?

(12 marks)

15. Explain the crank and slotted lever quick return mechanism, with line diagrams. Discuss the application of this mechanism to a shaper.

*Or*

16. Derive the velocity and acceleration equation in a Hooke's joint. Discuss all the applications of a Hooke's joint.

(12 marks)

17. What are the different types of clutches ? Derive the equations governing the braking action in a centrifugal clutch.

*Or*

18. Explain :

- (i) Epicyclic train.
- (ii) Pony brake.



(6 + 6 = 12 marks)

19. Explain the adverse effects of interference of gears. Explain the phenomenon and compare this effect in :

- (i) Spur ; and (ii) Helical gears.

*Or*

20. Discuss the forces acting in different parts of a gear in :

- (i) Bevel gear.
- (ii) Hypoid gear.
- (iii) Spiral gear.

Suggest a method for controlling these forces to avoid damage of the gear.

(12 marks)

[5 × 12 = 60 marks]