G 546 (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]