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B.TECH. DEGREE EXAMINATION, MAY 2015

Sixth Semester

Branch : Automobile Engineering/Mechanical Engineering (AU, ME)

AU 010 601/ME 010 601—MECHANICS OF MACHINES

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 marks.

1. Differentiate between Structure, Mechanism and Machine.

2. Define intensitiveness in a governor.

3. Discuss the variation in coefficient of fluctuation of speed.

4. List all the devices/machines working on the principle of gyroscopic couple.

5. Distinguish between Mechanical, Power and Air brakes.

                                                    (5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 marks.

6. How will you apply graphical method for force analysis ?

7. Discuss the inertia governors with neat sketches.

8. Explain the stages in drawing a turning moment diagram.

9. With neat sketch, explain the working of a shaft-disc system.

10. Clearly differentiate between a transmission dynamometer and absorption dynamometer, highlighting their fundamental principle.

                                                    (5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 marks.

11. Define and explain all the steps in matrix methods for static force analysis.

Or

                                                    Turn over

12. Discuss the dynamic force analysis of a slider crank mechanism. Derive expressions for velocities and accelerations in different points of the mechanism.

13. Explain the significance of "controlling force" of a governor. Discuss all the characteristics.

Or

14. Derive an expression for effort of a governor, from fundamentals. What is power of a governor ?

15. Derive an expression for turning moment. Explain the "T-θ" diagram for (i) single cylinder double acting steam engine ; (ii) single-cylinder four stroke engine ; and (iii) multi-cylinder engine.

Or

16. Explain the method for obtaining inertia force in reciprocating engines by graphical method.

17. A uniform disc having a mass of 8 kg. and a radius of gyration of 150 mm. is mounted on one end of a horizontal arm of length 200 mm. The other end of the arm can rotate freely in a universal bearing. The disc is given a clockwise spin of 250 r.p.m. as seen from the disc end of the arm. Determine the motion of the disc, if the arm remains horizontal.

Or

18. Explain all the aspects of stability of a four-wheeled vehicle. Discuss the effect of (i) gyroscopic couple ; and (ii) centrifugal couple.

19. Explain the working of the following :— (i) Internally expanding shoe brake ; and (ii) Centrifugal clutches.

Or

20. Discuss the principle of working of an epicyclic train, belt transmission and torsion dynamometer. Derive expression for effort and power of the dynamometer.

(5 × 12 = 60 marks)