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**Question Paper Code : 91006**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Fifth/Seventh Semester

Aeronautical Engineering

OAT 551 — AUTOMOTIVE SYSTEMS

(Common to Aerospace Engineering/Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and Instrumentation Engineering/Industrial Engineering/ Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Material Science and Engineering/Mechanical Engineering/Mechanical Engineering (Sandwich)/Mechanical and Automation Engineering/Mechatronics Engineering/Production Engineering/Robotics and Automation/Bio Technology/Food Technology/Pharmaceutical Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the function of a crankshaft.
2. List down any two merits of a Transistorized Coil Ignition system.
3. Elucidate upon the monocoque construction.
4. Enumerate the aerodynamic forces and moments.
5. State any two benefits of an overdrive.
6. List any two limitations of fluid coupling.
7. Compare and contrast leaf spring and coil spring suspension.
8. Mathematically express the stopping distance of a vehicle.
9. Give the composition of Liquefied Petroleum Gas.
10. Comment upon the cardinal function of a turbocharger.

PART B — (5 × 13 = 65 marks)

11. (a) With aid of illustrative sketches, describe the constructional details and working principle of the four-stroke SI engine.

Or

- (b) With aid of an illustrative sketch, describe the working principle of a Common Rail Direct Injection system.
12. (a) With aid of an appropriate sketch, obtain an expression for the condition for the true rolling motion of a four-wheeler.

Or

- (b) With aid of a suitable sketch, explain the constructional details of a fully floating rear axle.
13. (a) With aid of a neat sketch, elaborate upon the constructional details and working principle of a multi-plate clutch.

Or

- (b) With aid of a neat sketch, elaborate upon the constructional details and working principle of a differential.
14. (a) With aid of a pertinent sketch, explicate the constructional details and working principle of a Mcpherson strut with coil spring suspension.

Or

- (b) With aid of a relevant sketch, explicate the constructional details and working principle of an Anti-lock braking system.
15. (a) With aid of a neat layout, summarize the constructional details of an electric four-wheeler.

Or

- (b) With aid of an illustrative sketch, synopsise the working principle of a three-way catalytic converter.

PART C — (1 × 15 = 15 marks)

16. (a) With aid of an illustrative sketch, appraise the constructional details and working principle of a three-stage torque converter.

Or

- (b) With aid of an illustrative sketch, review the constructional details of a tubeless radial tyre.