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M.E./M.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017
SECOND SEMESTER
INTERNAL COMBUSTION ENGINEERING
IC16010 - FLOW VISUALISATION TECHNIQUES FOR I.C. ENGINES
(Regulation 2016)

Q. Code: 955226

Time: Three Hours

Maximum : 100 Marks

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. Write the names of velocity probes used to find velocity accurately at a point.
2. Why laser source is used in flow visualisation?
3. Differentiate between the synthetic method and schlieren photography.
4. Write the different types of optical materials used for optical engine.
5. Can a conventional photographic camera be used for flow visualisation? Justify.
6. State the necessity of flow visualisation of in cylinder flow.
7. What features are to be met by cameras used in combustion visualisation?
8. Write briefly about Mie Scattering technique used in advanced camera systems.
9. Write the difference between direct and geometric flow visualisation methods.
10. Describe the interference phenomena in light waves.

PART B - (5 X16 = 80 Marks)

11. (a) (i) Explain the optical techniques employed for flow visualisation process in I.C. Engines to measure particle size. (8)
- (ii) With a neat sketch explain the illuminated Particle Visualisation Holography. (8)

(OR)

(b) Describe with suitable sketch the working of Laser Doppler Velocimeter for flow visualisation in I.C. Engines. (16)

12. (a) (i) Explain the optical techniques for determining dynamic material properties in optical engine. (8)

(ii) Explain the various methods of optical access in combustion chamber used in I.C. engines. (8)

(OR)

(b) Discuss in detail the thermal properties of materials used for optical engines. (16)

13. (a) Explain the visual experiment of in-cylinder flow by using laser light method. (16)

(OR)

(b) Discuss with a neat sketch the intake flow visualisation by colour layer examination technique. (16)

14. (a) With neat sketches, explain the various types of fiber optic tools used in I.C. engines and write down the application of fiber optic tools. (16)

(OR)

(b) Explain in-cylinder imaging diagnostics with highly efficient UV-transparent endoscopes used in I.C. engines. (16)

15. (a) (i) Explain the texture based flow visualisation techniques applied to I.C. engines. (8)

(ii) Describe the surface flow visualisation used in I.C. engines. (8)

(OR)

(b) (i) Explain the direct flow visualisation used in I.C. engines. (8)

(ii) Describe the dense geometric flow visualisation technique as applied to I.C. engines. (8)