

M.E./M.TECH. DEGREE EXAMINATION, DECEMBER 2020

Second Semester

**IC18008-FLOW VISUALIZATION TECHNIQUES FOR IC ENGINE**

(Regulation 2018)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

**PART A - (8 X 2 = 16 marks)**

1. What parameters of flow can be studied by flow visualization process  
(a) Temperature (b) pressure (c) Velocity (d) All of the these (e) None of these
2. Numerical Flow visualization techniques can be visualized using?  
(a) Graphs (b) lines (c) arrow (d) All of the above
3. Doppler Global Velocimetry technique is used to measure the (a) one dimensional object  
(b) Two dimensional objects (c) three dimensional objects (d) None of the these
4. Which of the following plots are often used for checking randomness in time series?  
(a) Autocausation (b) Autorank (c) Autocorrelation (d) none of these
5. Why is laser source used in flow visualization? What are properties?
6. Describe the properties of material used in optical engine?
7. Can a conventional photographic camera be used for flow visualization? justify
8. Explain the principle of texture-based flow visualization techniques.

**PART B - (4 X16 = 64 marks)**

09. (a) Explain the optical techniques in flow visualization process to measure particle size and flow density **(16)**

**(OR)**

- (b) (i) Explain the principle of Schlieren Photography with sketches **(8)**  
(ii) Explain how schlieren used for aircraft in flight **(8)**

10. (a) (i) With a neat sketch explain the various methods of optical Access in combustion chamber used in I.C engines **(8)**  
(ii) With a neat sketch explain the steps followed for design of Optical Engine used diesel engine **(8)**

**(OR)**

- (b) Explain the photographic measurement techniques used in I.C.Engines using Doppler Global Velocimetry. What are the benefits of DGV techniques? **(16)**

11. (a) (i) With a neat sketch, explain the various types of fiber optics tools used in IC engines (8)

(ii) Explain the features of advanced camera used for combustion measurement used in IC engines (8)

**(OR)**

(b) (i) Explain the role of lasers in the diagnostics of flames used in IC engines (8)

(ii) Explain the different applications of endoscopes (8)

12. (a) (i) Explain the principle of Surface flow visualization techniques for measuring the oil in surface as applied I.C engine (8)

(ii) Describe the dense geometric flow visualization as applied to I.C engine (8)

**(OR)**

(b) Draw and explain the different types of numerical flow visualization used in I.C engine (16)