Reg. No. :

Question Paper Code : 21004

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Fifth/Seventh Semester

Aeronautical Engineering

OAT 552 — INTERNAL COMBUSTION ENGINES

(Common to Aerospace Engineering/Industrial Engineering/Industrial Engineering and Management/Manufacturing Engineering/Marine Engineering/Material Science and Engineering/Mechanical Engineering/Mechanical Engineering (Sandwich)/ Mechanical and Automation Engineering/Mechatronics Engineering/Production Engineering/Robotics and Automation)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the types of IC engines based on the method of ignition.
2. Mention any two fuel properties.
3. What is the function of carburetor?
4. How knocking occurs in petrol engines?
5. What is Sauter mean diameter of fuel spray droplet?
6. What is the effect of turbocharging in diesel engine?
7. How air cooling is achieved for small displacement engines?
8. What is the need for lubrication in engines?
9. What is HCCl combustion?
10. What is variable compression ratio engine?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss in detail the differences between Air standard and actual cycle.

Or

(b) Describe the need for Octane and Cetane rating of fuels.

12. (a) Describe about the working of electronic port injection system with a neat sketch. Also mention any two advantages and disadvantages.

Or

(b) Draw the layout of a typical electronic ignition system and explain briefly about its working.

13. (a) Discuss the operation of inline injection pump with supporting sketches.

Or

(b) Explain the stages of combustion in Diesel engines using a typical Pressure vs Crank angle graph.

14. (a) Describe about the construction of forced circulation cooling system with suitable sketches.

Or

(b) Describe about the operation of pressurised wet sump lubrication system with a neat illustration.

15. (a) With a neat sketch, brief about the construction of Common Rail Direct Injection system.

Or

(b) Describe about the operation of fuel cells used in automobiles with a neat sketch.

PART C — (1 × 15 = 15 marks)

16. (a) An engine can be made to deliver different levels of power by varying its valve timing. Illustrate with schematics, how this can be achieved by cam phasing mechanism.

Or

(b) Brief about the principle of operation of a hybrid electric vehicle which can run in series mode and parallel mode depending on the input conditions.

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