

7. (a) Discuss in what respects the SI engines are superior to CI engines. 10

(b) Explain different categories of SI emissions. Also explain various factors affecting exhaust emission. 10

SECTION - D

8. Explain the root and vane blower with neat sketch. 20

9. Explain the methods that can adopted for improvements of the basic gas turbine cycle. 20

Roll No.

24260

B. Tech. 5th Semester (ME) (Common with Special Chance) Examination - December, 2019

INTERNAL COMBUSTION ENGINE AND GAS TURBINES

Paper : ME-307-F

Time : Three Hours] [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all. Question number *one* is *compulsory* and select *one* question from each Section.

1. (a) What do you mean by engine and how I. C. engines are classified ? 4

(b) What are the various Assumptions made in various air standard cycle ? 4

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(4)

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- (c) What is rich mixture ? 4
- (d) What do you mean by BHP and IHP ? 4
- (e) Explain choking. 4

SECTION - A

2. (a) State the essential requirement of a diesel injection system. 10
- (b) Derive an expression for the calculation of air fuel ratio for the carburetor. 10
3. An engine working on Dual cycle takes air at 1 bar and 20°C. The maximum pressure of the cycle is limited to 70 bar. The compression ratio of the engine is 15. Find out air standard efficiency and MEP of the cycle. Assume heat added at constant volume is equal to heat added at constant pressure. 20

SECTION - B

4. What is cooling system ? Mention its types. What are disadvantages of overcooling ? 20

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5. (a) Explain the combustion stages of C. I. engines. 10
- (b) Name various theories of detonation. Explain the Pre-Ignition with neat sketch. 10

SECTION - C

6. A two stroke diesel engine was motored when meter reading was 1.5 kW. Then the test on the engine was carried out for one hour and following observations were recorded.
1. Brake torque=120 Nm,
 2. RPM=600,
 3. Fuel used = 2.5 kg,
 4. C.V. of fuel = 40.3 MJ/kg,
 5. Cooling water used = 818 kg,
 6. Rise in cooling water temperature = 10°C,
 7. Exhaust gas temperature = 345°C,
 8. Room temperature = 25°C,
 9. A : F used = 32 : 1

Take $C_{eg} = 1.05 \text{ kJ/kg}$. K. Determine (a) B. P., I. P. and mechanical η and indicated thermal η (b) Draw up heat balance on minute and percentage basis. 20

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