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7. What are catalytic converters ? How do they help in reducing HC, CO and NOx emissions ? 15

Unit-IV

8. Discuss briefly the methods employed for improvement of thermal efficiency of open cycle gas turbine plant. Also describe with neat diagram a closed cycle gas turbine. State also its merits and demerits. 15
9. Explain the various types of rotary compressors. 15

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B. Tech. (ME) (Elective-I) 6th Semester
(G Scheme) Examination, July-2022

INTERNAL COMBUSTION ENGINES AND

GAS TURBINES

Paper-PEC-ME-320-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Attempt five questions in all, selecting one question from each unit. Question No. 1 is compulsory. All questions carry equal marks.

1. (i) Classify engine.
(ii) Assumptions made in air standard cycles.
(iii) Properties of lubricating oil
(iv) Octane rating of fuels
(v) Explain BSFC, ISFC.
(vi) Chocking and stalling 6 x 2.5=15

Unit-I

2. Compare Otto, Diesel and Dual cycles for the : 15
- (i) same compression ratio and heat input
(ii) same maximum pressure and heat input
(iii) same maximum pressure and temperature
(iv) same maximum pressure and work output

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3. Explain : 15
- (i) individual pump and nozzle system
 - (ii) unit injector system
 - (iii) common rail system
 - (iv) distributor system

Unit-II

4. Bring out clearly the process of combustion in CI engines and also explain the various stages of combustion. Explain the phenomenon of knock in CI engines. 15

5. Explain the following : 15

- (i) **thermosyphon cooling system**
- (ii) **forced circulation cooling system**
- (iii) **evaporative cooling system**
- (iv) **pressure cooling system**

Unit-III

6. The power output of a six cylinder four-stroke engine is absorbed by a water brake for which the law is $W/N/20000$ where the brake load, W is in Newton and the speed, N is in rpm. The air consumption is measured

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by an air box with sharp edged orifice system. The following readings are obtained. Orifice diameter = 30 mm
Bore = 100 mm
Stroke = 120 mm
Brake load = 560 N
Speed = 2400 r.p.m.

C/H ratio by mass = 83/17

Coefficient of discharge = 0.6

Ambient pressure = 1 bar

Pressure drop across orifice = 14.5 cm of Hg

Time taken for 100 cc of fuel consumption = 20 s

Ambient temperature = 27°C

Fuel density = 831 kg/m³

Calculate :

- (i) the brake power
- (ii) the torque
- (iii) the brake specific fuel consumption
- (iv) the percentage of excess air and
- (v) the volumetric efficiency.

15

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