EME-505 **Roll No.** | | | | | | | | | | |

B.Tech.
(SEM V) SEMESTER EXAMINATION 2015-16
I.C. ENGINES & COMPRESSORS

[Time: 2 hrs.] **[Max. Marks: 50]**

Note- 1.*Attempt All Questions.*
2. Assume suitably, any missing data.

Q1. Attempt any two of the following. 7x2=14

a) The power output of a six cylinder four stroke engine operating with diesel ($C_{16}H_{34}$))is absorbed by a dynamometer for which the law is WN/20000 where w is brake load in newton and N is RPM. The air consumption is measured by Air box method. The following readings were observed,

Ambient pressure and temperature = 1 bar and 27 ºC

Orifice dia = 30 mm, pressure drop across orifice = 16 cm of Hg, C_d of orifice = 0.6

Engine bore = 100 mm, stroke = 110 mm, RPM = 2400, brake load = 560 N

Mechanical Efficiency= 90%

fuel density = 831 kg/m^3, time taken for 50 ml fuel consumption = 10 sec,

Find isfc, volumetric efficiency and bmep.

b) List the various losses considered in the analysis of the actual cycle. Show the effect of equivalence ratio on the power output and efficiency ratio of a constant volume fuel air cycle.

c) Define Octane no, and how it is measured, A diesel engine having compression ratio 16, operates on A/F ratio of 50:1. The temperature and pressure of air at the beginning of compression is 37 ºC and 1 bar. Find the efficiency and mean effective pressure of engine, assume engine works on air standard cycle, C.V. of fuel is 42 MJ/kg, $Cp_{,air}$ = 1.004 kJ/kg

Q2) Attempt any two of the following. 6x2=12

a) Derive an expression to calculate the A/F ratio for a simple carburetor neglecting the compressibility of air. What are the limitations of single jet carburetion system?

b) Discuss battery ignition system with neat sketch. What are its drawback?

c) Describe with suitable sketch the combustion phenomenon in SI engine. Discuss the effect of F/A ratio, engine load and engine speed on flame propagation.

Q3) Attempt any two of the following. 6x2=12

a) What do you understand by ignition delay? Discuss the effect of cetane no., injection advance, supercharging, engine load and engine speed on delay period in CI Engine.

b) Discuss the requirements of an ideal injection? Explain common rail fuel injection system.

c) Discuss the causes of HC emissions from SI engine.

Q4) Attempt any two of the following. 6x2=12

a) What are the objectives of super-charging. Draw and discuss the thermodynamic cycle of a super-changed I.C. engine and compare it with thermodynamic cycle of a naturally aspirated engine

b) A two stage reciprocating air compressor, compresses air from 16^0C and 1 bar to 60 bar. The air is cooled in intercooler to 30^0C and intermediate pressure is 7.3 bar. The stroke for both cylinders is 115 mm and low pressure cylinder has diameter of 100mm. Assuming index of compression 1.35 and that the volume of air at atmospheric conditions drawn in, per stroke is equal to low pressure cylinder swept volume, calculate power requirement of compressor when running at 250 rpm.

c) Discuss the functions of lubricants in engine. Discuss the wet sump lubrication system with neat sketch.