

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018

Subject Code:2161902

Date:20/11/2018

Subject Name:Internal Combustion Engines

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

MARKS

- Q.1 (a) State the function of following I.C.engine components. 14**
- 1 Cylinder head
 - 2 Spark plug
 - 3 Fuel pump
 - 4 Radiator
 - 5 Flywheel
 - 6 Dynamic oil seal
 - 7 Supercharger
 - 8 Governor
 - 9 Piston pin
 - 10 Piston rings
 - 11 Combustion chamber
 - 12 Cam & follower set
 - 13 Carburetor
 - 14 Injector
- Q.2 (a) Define Air standard, Fuel air and Actual cycle. 03**
- (b) Explain with a neat sketch the working of two stroke engine. 04**
- (c) Explain with neat sketch actual valve timing diagram of diesel engine for low and high speed. 07**
- OR**
- (c) Explain with P-V diagram the effect of variable specific heat on Otto, Diesel and Dual cycle. 07**
- Q.3 (a) List assumptions for fuel air cycle. 03**
- (b) List the losses in actual fuel-air cycle and explain any three in detail. 04**
- (c) Draw a schematic diagram of Bosch type fuel pump and explain its working. 07**
- OR**
- Q.3 (a) Define Rich, Lean and Stoichiometric A:F mixture. 03**
- (b) Compare Battery and magneto ignition systems. 04**
- (c) Describe the construction and explain the working of Junkers' gas calorimeter. 07**
- Q.4 (a) Explain detonation in C.I. engine. 03**
- (b) Give the various types and applications of lubrication and cooling system in I.C.engine. 04**
- (c) Explain stages of combustion in C.I. engines. 07**

OR

- Q.4** **(a)** Compare liquid and air cooled systems. **03**
- (b)** State the different methods of supercharging and discuss any one of them with figure. **04**
- (c)** Design the size of the fuel orifice to give an air fuel ratio 13:1. The venturi throat is 3.5 cm in diameter and the vacuum at the venturi is 6.5 cm of Hg. Take $C_{da} = 0.92$ and $C_{df} = 0.95$. The air temperature and pressure at the carburetor entrance are 1 bar and 293 K. The fuel orifice is at the same level as that of the float chamber fuel level. Take density of fuel as 750 kg/m^3 . **07**
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- Q.5** **(a)** What are the major difficulties to be faced if a single jet carburetor is used? **03**
- (b)** State two merits and two demerits of diesel engine power plants. **04**
- (c)** A 4-cylinder, 4-stroke petrol engine 6 cm bore and 9 cm stroke was tested at constant speed. The fuel supply was fixed to 0.13 kg/min and plugs of 4-cylinders were successively short-circuited without change of speed. The power measurements were as follows: **07**
- With all cylinder working=16.25 kw
- With No.1st –cylinder cut-off =11.55 kw
- With No.2nd –cylinder cut-off =11.65 kw (BP)
- With No.3rd –cylinder cut-off =11.70 kw (BP)
- With No.4th –cylinder cut-off =11.50 kw (BP)
- Find (a) The IP of engine (b) Mechanical efficiency (c) Indicated thermal efficiency if CV of fuel used is 42000 kj/kg.
- Assume clearance volume 60 cu.cm.

OR

- Q.5** **(a)** Write a short note on air pollution due to IC engines. **03**
- (b)** Explain the method of obtaining I.P. of multi-cylinder engine by Morse Test. **04**
- (c)** Explain and draw up the heat balance sheet with necessary equations to represent the heat distribution on minute and percentage basis. **07**
