

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

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|------------|---|-----------|
| 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**
- 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:
 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**
