

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)

B.Tech.Sem - VI MECHANICAL :SUMMER- 2022

SUBJECT : INTERNAL COMBUSTION ENGINES

Day : Wednesday

Time : 02:30 PM-05:30 PM

Date : 15-06-2022

S-13451-2022

Max. Marks : 60

N.B. :

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Assume suitable data if **NECESSARY**.
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Q.1 Drive the expression for air standard efficiency of diesel cycle and also draw P-V and T-S diagrams for the same. Explain the assumptions used in air standard cycles. **(10)**

OR

Q.1 Explain two stroke petrol engine with neat block diagrams. **(10)**
In an Otto cycle, the temperature at the beginning and end of isentropic compression are 315^0 K and 600^0 K. What is the compression ratio and air standard efficiency of cycle? Take $\gamma=1.4$

Q.2 Explain the fuel feeding system for diesel engine. Explain Bosch fuel pump with neat sketch. **(10)**

OR

Q.2 Explain the functions of fuel pump and explain working of MPFI system for I.C. engine. **(10)**

Q.3 Explain with neat sketch construction and working of battery ignition system. Give the classification of cooling system used for I.C. Engines. **(10)**

OR

Q.3 What is the need of lubrication system? Explain with neat sketch fully pressurized wet sump lubrication system. **(10)**

Q.4 Explain motoring test method for friction measurement. **(10)**

In a test of 4-cylinder, 4-stroke engine, with 75 mm of bore and 100 mm of stroke length. The following result were obtained at full throttle at particular constant speed and with fixed setting of fuel supply of 6.0 kg/hr.

B.P. with all cylinders working = 15.6 kW

B.P. with cylinder no. 1 cut off = 11.1 kW

B.P. with cylinder no. 2 cut off = 11.03 kW

B.P. with cylinder no. 3 cut off = 10.88 kW

B.P. with cylinder no. 4 cut off = 10.66 kW

If calorific value of fuel is 83600 kJ/kg and clearance volume is 0.0001 m^3 ,

Calculate : 1) Mechanical efficiency

2) Indicated thermal efficiency

3) Air standard efficiency

OR

P.T.O.

- Q.4** The following observations are made during a trial on an oil engine. **(10)**
Motor power to start the engine = 10 kW
R.P.M. = 1750,
Brake torque = 327.5 Nm.
Fuel used = 15 kg/hr
C.V. of fuel used = 42 MJ/kg
Air supplied = 4.75 kg/min.
Room temperature = 20.8⁰ C
Temperature of cooling water at inlet = 20.8⁰ C
Temperature of cooling water at outlet = 65.8⁰ C
Mass flow rate of cooling water = 16 kg/min.
Exhaust gas temperature = 400⁰ C
Take, $C_{pw} = 4.2 \text{ kJ/kg.k}$ and $C_{pg} = 1.25 \text{ kJ/kg.k}$
Determine:
1) Brake power 2) Mechanical efficiency 3) BSFC
4) Draw a heat balance sheet on kW basis and percentage basis.

- Q.5** Explain effect of engine variables on ignition lag and flame propagation in S.I. Engines. Explain diesel knocking and its effect. **(10)**

OR

- Q.5** Explain with neat sketch any five combustion chambers in C.I. engines. **(10)**

- Q.6** Explain NDIR technique for CO measurement and Bosch meter for smoke measurement. **(10)**

OR

- Q.6** Explain with neat sketch the concept of hybrid vehicle. Explain alternative fuels used for I.C. Engines. **(10)**

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