B.E. (Mechanical Engineering) Eighth Semester (C.B.S.)

Elective-III : Advance I. C. Engine

P. Pages : 2 **NRJ/KW/17/4730**

Time : Three Hours * 0 3 2 0 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Name the various important parts of reciprocating I.C. engine. With neat sketch write basic function at Engine block, Crank shaft and connecting rod. **7**

b) Explain four stroke C.I. engine operating cycle using P.V. and Valve timing diagram. **7**

OR

2. a) Explain forced circulation engine cooling system with its merits & demerits. **7**

b) Write the object of lubrication system. Describe any one type of wet sump lubrication system with neat sketch. **7**

3. a) What are the desirable properties of S. I. engine Fuel. Explain them in brief. **7**

b) What are the alternative fuel used for I. C. engine. Describe Ethanol as alternative Fuel. **7**

OR

4. a) A single jet simple carburettor is to supply 6.11 kg/min of air, 0.408 kg/min of petrol, density $768\,kg/m^3$. The air initially at 1.027 bar and 15.5 ºC. Calculate the throat diameter of the venturi, if the speed of air is 97.5 m/sec. Assuming the velocity coefficient 0.84. Assume adiabatic expansion and r = 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at throat, calculate the orifice diameter, assuming a coefficient as 0.66. **7**

b) Describe briefly MPFI system with neat sketch. **7**

5. a) Describe the stages of combustion in S. I. engine. **7**

b) What do you mean by Abnormal combustion? Explain phenomenon of knock in S. I. engine with pressure Crank angle diagram. **6**

OR

6. a) With neat sketch explain battery ignition system. Write its merit & demerit over magneto Ignition system. **7**

b) Explain various factor that influence flame speed in S. I. engine. **6**

7. a) Explain delay period in C. I. engine. **6**

b) Name various type of combustion chamber used in C. I. engine. Explain one type of combustion chamber. **7**

OR

8. a) Explain turbocharging in C. I. engine. What are the advantages and limitation of turbocharging in C. I. engine. **7**

b) Compare Abnormal combustion in S. I. and C. I. engine. **6**

9. a) Explain the effect of engine modification on pollutants from S. I. engine. **7**

b) What are the causes of diesel smoke. What are the ways of controlling diesel smoke. **6**

OR

10. a) With neat sketch explain EGR system. **7**

b) Explain with neat sketch working of stratified charge engine. **6**

11. a) Define : **6**

a) Brake power

b) Mechanical efficiency

c) Specific fuel consumption of I. C. engine.

b) Name the various method use to determine engine friction. With neat sketch explain Morse test. **7**

OR

12. A six cylinder 4 stroke cycle diesel engine of 33.75 cm bore and 37.5 cm stroke gave the following reading when rested at half full load conditions $BP = 142\,kw, RPM = 350,$ $IMEP = 3.72\,bar$ $mf = 44 kg/hr, C.V. of\ fuel = 448.00\,kJ/kg.$ Air consumed $= 38.6\,kg/min,$ Jacket water $= 60.2\,kg/min$ with rise in temperature = 31ºC, piston cooling oil $= 34.96\,kg/min$, $C_p\,(oil) = 2.1\,kJ/kg-k$. Rise in cooling oil temp = 20 ºC, Exhaust gas temp=188 ºC and ambient temp=20 ºC $Cp_g = 1.05\,kJ/kg-k$ fuel contain 14% H_2 by mass. Draw heat balance sheet on minutes and percentage basis. Also calculate I. P. and specific fuel consumption. **13**

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