R16

Code No: 135BP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November/December - 2018
THERMAL ENGINEERING – I
(Mechanical Engineering)

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)	What is heat loss factor?	[2]
b)	What do you understand by supercharging?	[3]
c)	What are the different types of combustion chambers used in SI engine?	[2]
d)	Define specific fuel consumption.	[3]
e)	Draw the P-v and T-s diagram for a single acting reciprocating air compressor.	[2]
f)	What is heat balance sheet?	[3]
g)	What is the difference between rotary and reciprocating compressor?	[2]
h)	Differentiate between centrifugal compressor and axial flow compressor.	[3]
i)	What do you understand by effective room sensible heat factor?	[2]
j)	Distinguish sensible and latent heat loads.	[3]

PART - B

(50 Marks)

2.a) Discuss the various important qualities of a good ignition system.
   b) Explain the differences between actual and ideal fuel air cycles of C.I. engines.   [5+5]

OR

3.a) Derive an expression for air fuel ratio of a simple carburetor.
   b) With a neat sketch, explain the battery ignition system.   [5+5]

4.a) Discuss the desirable characteristics of a good combustion chamber for an SI engine.
   b) Classify and explain the CI engine combustion chambers.   [5+5]

OR

5.a) Discuss the various methods for improving the anti-knock quality of an SI engine.
   b) Explain and discuss the phenomenon of diesel knock in CI engines and compare the same with detonation in SI engines.   [5+5]

6.a) Explain Rope brake dynamometer to determine the brake power of an engine.
   b) A six cylinder, four-stroke gasoline engine having a bore of 90 mm and stroke of 100 mm has a compression ratio 7. The relative efficiency is 55% when the indicated specific fuel consumption is 300gm/kW h. Estimate (i) the calorific value of the fuel and (ii) corresponding fuel consumption, given that imep is 8.5 bar and speed is 2500 rpm.   [5+5]

OR

7.a) Enumerate the various engine efficiencies. Explain.

b) A gasoline engine working on four stroke develops a brake power of 20.9 kW. A Morse test was conducted on this engine and the brake power (kW) obtained when each cylinder was made inoperative by short circulating the spark plug are 14.9, 14.3, 14.8 and 14.5 respectively. The test was conducted at constant speed. Find the indicator power, mechanical efficiency and bmep when all the cylinders are firing. The bore of the engine is 75 mm and the stroke is 90 mm. The engine is running at 3000 rpm. [5+5]

8.a) List out various rotary compressor. Write the advantages of rotary compressors over reciprocal compressors.

b) Explain the principle of operation of centrifugal compressor with neat sketch. [5+5]

OR

9. Explain the following terms for dynamic compressors.
   a) Power input factor
   b) Pressure coefficient
   c) Adiabatic coefficient. [10]

10. A four rows coil with a face velocity of 150 m/min has a contact factor of 0.85. Calculate the contact factors for the following cases:
    a) Face velocity 200 m/min and four rows.
    b) Face velocity 100 m/min and four rows
    c) Face velocity 150 m/min and eight rows
    d) Face velocity 150 m/min and two rows. [10]

OR

11.a) A stream of moist air at 2^0C dry bulb and 80 per cent relative humidity mixes with another stream of moist air at 30^0C dry bulb and 10^0C dew point in the ration by mass of one part of the first to two parts of the second. Calculate the temperature and specific humidity of the air after mixing.

b) Explain about year –round air conditioning system with a neat labelled diagram. [5+5]

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