

**B. Tech. Sem - III (Production Engg.) (2014 COURSE) (CBCS) :
WINTER - 2018**

SUBJECT: APPLIED THERMODYNAMICS

Day: Monday
Date: 03/12/2018

Time: 10.00 AM TO 01.00 PM
Max. Marks: 60

W-2018-2319

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Use of steam table is allowed.
- 5) Assume suitable data if necessary.

Q.1 State Clausius and Kelvin-Planck statements. Heat pump is used to maintain house at 23°C . The house is losing heat to outside air through walls at 60,000 KJ/hr. While energy generated in house by various appliances is 4000 KJ/hr. For a C.O.P. of 1.5. Find required power input in Kw supplied to the heat pump. **(10)**

OR

Q.1 Name any 3 mountings and 3 accessories. Explain function and location of different boiler mountings and accessories (three each) with the help of line sketch or block diagram. **(10)**

Q.2 Draw the layouts of a Vapour compression refrigerating system. State the function of each of the component and show the thermodynamic processes on a pressure-enthalpy diagrams. **(10)**

OR

Q.2 Explain four important factors for comfort air conditioning. Explain construction and working of summer air conditioning system with neat sketch. **(10)**

Q.3 A single stage, single acting air compressor has a bore of 200 mm and stroke 300 mm. It runs at 420 r.p.m. and has a clearance ratio of 0.065. The index of compression can be assumed as 1.3. The intake pressure is 1 bar and intake temperature is 27°C . Delivery pressure is 500 kpa determine. **(10)**

- i) FAD at NTP in m^3/hr
- ii) Volumetric efficiency
- iii) Delivery air temperature
- iv) Power required and
- v) Isothermal efficiency

OR

Q.3 Explain classification of rotary compressors. Give comparison between Reciprocating compressor and rotary compressor. **(10)**

P.T.O.

Q.4 Give assumptions of air standard cycles. Derive an expression for the ideal efficiency of otto cycle with the help of P-V and T-S diagram. **(10)**

OR

Q.4 Give comparison of otto, diesel and dual cycle. what are the various losses which make the operation of actual engine cycle differ from that of air standard cycle. **(10)**

Q.5 Discuss the requirements of an ideal injection system. Draw the labeled layout of fuel systems in C.I. engine. **(10)**

OR

Q.5 Enlist and explain the various factors affecting carburetion .Explain with neat sketch splash and pressure feed system of lubrication. **(10)**

Q.6 Derive the derivation for solution of differential equation for different boundary conditions having constant cross section area. **(10)**

OR

Q.6 Explain NTU method for parallel and counter flow heat exchangers. **(10)**

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