

Printed Pages: 3

284

NME-309

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID :140304

Roll No.

Set-I

MCA-DD

(SEM. III) THEORY EXAMINATION, 2015-16

THERMAL & HYDRAULIC MACHINES

[Time:3 hours]

[Maximum Marks:100]

Section-A

Note: Attempt all parts. All parts carry equal marks. Write answer of each part in short. $2 \times 10 = 20$

- Q.1
- What is Thermodynamic equilibrium?
 - Distinguish between (i) Open System & closed System (ii) Path function & point function.
 - Define reheat factor?
 - What is Inter-cooling in gas turbine?
 - What is scavenging in 2 stroke engine?
 - Differentiate between Four stroke engine and two stroke engine.
 - Define velocity of the flow and velocity of whirl and explain their significance.

- (h) On what factors does not no. of jets depend in case of Pelton wheel?
- (i) Explain the function of spiral casing for a centrifugal pump?
- (j) Explain nested queries.

Section-B

Note: Attempt any five questions from this section.

$$10 \times 5 = 20$$

- Q2. Explain the method of steam turbine governing and control.
- Q3. Describe Zeroth, 1st & 2nd laws of thermodynamics.
- Q4. With the help of graphical representation explain stages of formation of steam.
- Q5. Atmosphere air at 1 bar & 45° C is compressed isothermally to 15 bar & then it is Q(1) expanded back adiabatically without friction to its initial pressure. Determine its final temp. net work done and the net heat transfer with its surroundings. Assume $\gamma=1.4$, $R=287 \text{ Nm/KgK}$ & $C_v=717.5 \text{ Nm/KgK}$.
- Q6. Prove that for moving flat plate, work done $w=pA(V-U)^2U$.
- Q7. Define Priming and Cavitation in pump.
- Q8. Give the differences between centrifugal and reciprocating pump.

- Q9. Explain the indicator diagram of a reciprocating pump. Show the effect of acceleration of piston on the indicator diagram.

Section-C

Note: Attempt any two questions from this section.

(15×2=30)

- Q10. (a) Describe air standard Otto, Diesel, Brayton cycles by drawing diagrams.
- Q11. Describe methods of improving Rankine cycle efficiency by
- (a) Super heating of steam, increase steam, pressure inlet to turbine and
 - (b) Reheat & regenerative cycles.
- Q12. In Parson's reaction turbine running at 600 rpm with 50% reaction develop 90 kw/kg/s of steam. The exit angle of the blades is 20° and steam velocity is 1.4 times the blade velocity determine:
- (a) Blade velocity
 - (b) Inlet angle of the blades.

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