Seat No.

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# OCT-NOV 2025 WINTER EXAMINATION

## 11731 Bachelor of Technology (NEP-2.0)

## Sub. Name: Applied Thermodynamics

## Sub. Code: 114412/112341

**Day and Date: Thursday ,18-12-2025** **Total Marks: 60**

**Time: 02:30 PM To 05:00 PM**

**Instructions:**
1. **All questions are compulsory**
2. **Assume suitable data wherever necessary and mention it boldly**
3. **Draw neat labelled diagrams wherever necessary**
4. **Figures to the right indicate full marks**

**Special Inst.:** **Use of steam table and mollier chart allowed**

**Q1)** Solve any three (5x3=15) **[15]**

**a.** Write a note on heat Engine, Refrigerator, Heat pump **[5]**

**b.** Write a note on properties of steam. **[5]**

**c.** Write down types of steam condenser and explain with neat sketch any one **[5]**

**d.** Write a note on Steam table and Mollier chart **[5]**

**Q2)** Solve any three (5x3=15) **[15]**

**a.** Define nozzle efficiency, velocity coefficient, coefficent of discharge, degree of under cooling **[5]**

**b.** What is function of nozzle? Explain different types of nozzles **[5]**

**c.** Derive the expression for maximum discharge through nozzle **[5]**

**d.** Steam enters group of nozzles of steam turbine at 12 bar and 220 degrees Celsius and leaves at 1.2bar.the steam turbine develops 220 KW with a specific steam consumption of 13.5kg/KWh. If the diameter of nozzle at throat is 7mm, calculate the number of nozzles. **[5]**

**Q3)** Solve any three (5x3=15) **[15]**

**a.** Explain Pressure Compounding of Steam turbine **[5]**

**b.** Classify the turbine and compare impulse turbine with reaction turbine **[5]**

**c.** Define :1. Diagram efficiency 2. blade velocity coefficient **[5]**
3. Speed ratio 4. stage efficiency

**d.** Steam at 5bar and 200 degree Celsius is first made to pass through nozzles. It is then supplied to an impulse turbine at the rate of 30Kg/minute. The steam is finally exhausted to a condenser at0.2bar.The blade speed is 300m/s. The nozzle are inclined at 25 degree with direction of motion of blades and the outlet angle is 35 degree. neglecting friction, find the theoretical power developed by turbine. **[5]**

**Q4)** Solve any three (5x3=15) **[15]**

**a.** What are methods of governing of steam turbine explain any one in detail. **[5]**

**b.** Define degree of reaction for steam turbine show it is 50% for Parson's turbine. **[5]**

**c.** A parson reaction turbine while running at 400rpm consumes 30 tons of steam per hour. The steam at a certain stage is at 1.6 bar dryness fraction of 0.9 and the stage develops 10 K Watt .The axial velocity of flow is constant and equal to 0.75 of blade velocity .Find mean diameter of drum and the volume of steam flowing per second .Take blade tip angles at inlet and exit as 35 degree and 20 degree Respectively **[5]**

**d.** The following data refer to a particular stage of parson's reaction turbine **[5]**
Speed of turbine =1500rpm
Mean diameter of rotor =1meter
Stage efficiency=80% Blade outlet angle = 20 degree
Speed ratio=0.7
Determine available isoentropic enthalpy drop in the stage

# End Of Question Paper

**Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -**
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (11731) Bachelor of Technology (NEP-2.0) (112341) Applied Thermodynamics Part 2 SEM 3
2] (1154) B.Tech. CBCS (114412) Applied Thermodynamics Part 2 SEM 3