

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES  
End Semester Examination, July 2020

Course: Steam Turbine & its Auxiliaries  
Program: B. Tech- PSE  
Course Code: MEPD 3006

Semester: VI  
Time 03 hrs.  
Max. Marks: 100

**Instructions:**

1. Attempt all the questions (Theory, Numerical, Case study etc.) on A4 size blank sheets.
2. Attempt all questions serially as per question paper.
3. Answer should be neat and clean. Draw a free hand sketch for circuits/tables/schematics wherever required.
4. Scan the whole answer script and check the resolution carefully before upload on the blackboard. Note that answer scripts will be considered for evaluation only through Blackboard. No other mode of submission is acceptable.
5. You are expected to be honest about each attempt which you make to progress in life

**SECTION A [Case Based Study/design] 40 Marks**

S. No.		Marks	CO
Q 1	Explain the various types of losses in a Wet Cooling Tower. For a surface condenser used in a TPP, calculate the rate of flow of Cooling Water (CW) and the Cooling Ratio having the following parameters: <ul style="list-style-type: none"><li>• Turbine exhaust steam, Qty. = (17 + last digit of your enrollment number) Kg/sec</li><li>• Final condensate temperature = 25 Deg.C</li><li>• CW temperature at condenser I/L = 12 Deg.C</li><li>• CW temperature at condenser O/L = 20 Deg.C</li><li>• Enthalpy of steam at Condenser I/L = 2400 KJ/ Kg</li><li>• Consider, heat capacity of water = 4.19 KJ/ Kg/ Deg.C</li></ul>	20	CO3
Q 2	For an Impulse Turbine, the nozzle angle of 1 <sup>st</sup> stage is 20Deg, blade exit angle is 30 Deg, Mean Blade speed is 130 m/sec and steam velocity leaving nozzle is 330 m/sec. Consider Blade friction as 0.8 & nozzle efficiency as 0.85. Using the <b>graphical method</b> , calculate: 1) Work done in the 1 <sup>st</sup> stage/ Kg of Steam 2) Stage efficiency	20	CO4

**SECTION B [Numerical and Short/broad Answers] 60 Marks**

Q 3	Explain the most common method of starting a unit of a 2 X 600 MW TPP from cold condition having (2X100% TD-BFP) BFP configuration.	10	CO3
-----	---	----	-----

NOTE : The submission time of the Question Paper Answer Sheet is 24 Hrs from the scheduled time (exceptional provision due to extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas).

No Submission will be entertained after 24 Hrs

Q 4	Explain the method adopted in the operation of a steam turbine to counter the changing frequency condition due to load variation in the grid.	10	CO2
Q 5	Explain the procedure of 'On-load detection' of Air leakage in condenser shell.	10	CO3
Q 6	Explain the operation of HP-LP Turbine Bypass system operation during <b>Steam Turbine start-up</b> at cold condition along with appropriate <b>SLD (Single Line Diagram)</b> .	10	CO4
Q 7	Explain with the help of appropriate diagram the following: 1) Closed loop Cooling Water system 2) Open loop Cooling Water system	10	CO2
Q 8	Compare & contrast between 'LP-Heater' & 'HP-Heater' used in Turbine Condensate & Feed Water re-circulation system.	10	CO1

NOTE : The submission time of the Question Paper Answer Sheet is 24 Hrs from the scheduled time (exceptional provision due to extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas).

No Submission will be entertained after 24 Hrs