


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2022			
Course: B. Tech (ME) Program: Power Plant Engineering Course Code: MECH 4013		Semester: 6th Time: 03 hrs. Max. Marks: 100	
Instructions: Section-A Attempt all questions Section-B Attempt all questions, in Q9 answer any one Section-C Attempt all questions, in Q11 answer any one Make suitable assumptions whenever necessary			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	What do you understand by run-off river power plant?	04	CO1
Q 2	List out the major advantages of high pressure boilers in modern thermal power plants.	04	CO1
Q 3	What are the different fields where use of diesel power plant is essential?	04	CO1
Q 4	Discuss the non-conventional power generation.	04	CO1
Q 5	A chimney is 28 meters high and the temperature of hot gases inside the chimney is 320°C. The temperature of outside air is 27°C and furnace is supplied with 15kg of air per kg of coal burnt. Calculate: (a) Draught in mm of water (b) Draught height in meters of hot gases.	04	CO2
SECTION B (4Qx10M= 40 Marks)			
Q 6	What do you mean by pneumatic ash handling system? Explain the difficulties encountered in its design and operation. When this system is preferred over other system?	10	CO3
Q 7	Draw a neat line diagram of La Mont boiler and discuss its relative merits and demerits.	10	CO1

Q 8	Describe the working of a simple constant pressure open cycle gas turbine plant giving a neat sketch.	10	CO2																												
Q 9	Draw a neat diagram of CANDU type reactor and explain its working and give its advantages and disadvantages over other types. or What are the different types of nuclear wastes? Which are more dangerous and why?	10	CO2																												
SECTION-C (2Qx20M=40 Marks)																															
Q 10	<p>The runoff data of a river at a particular site is tabulated below:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Month</th> <th>Mean discharge in millions of cu m per month</th> <th>Month</th> <th>Mean discharge in millions of cu m per month</th> </tr> </thead> <tbody> <tr> <td>J (Jan)</td> <td>80</td> <td>J</td> <td>150</td> </tr> <tr> <td>F</td> <td>50</td> <td>A</td> <td>200</td> </tr> <tr> <td>M</td> <td>40</td> <td>S</td> <td>250</td> </tr> <tr> <td>A</td> <td>20</td> <td>O</td> <td>120</td> </tr> <tr> <td>M</td> <td>0</td> <td>N</td> <td>100</td> </tr> <tr> <td>J</td> <td>100</td> <td>D</td> <td>80</td> </tr> </tbody> </table> <p>(a) Draw a hydrograph and find the mean flow. (b) Also draw the flow duration curve. (c) Find the power in MW available at mean flow if the head available is 100m and overall efficiency of generation is 80%. Take each month of 30 days.</p>	Month	Mean discharge in millions of cu m per month	Month	Mean discharge in millions of cu m per month	J (Jan)	80	J	150	F	50	A	200	M	40	S	250	A	20	O	120	M	0	N	100	J	100	D	80	20	CO4
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Q 11	<p>A generating station has a maximum demand of 30MW, a load factor of 0.6, a plant capacity of 0.48, and a plant use factor of 0.82. Find:</p> <p>(i) The daily energy produced. (ii) The reverse capacity of the plant.</p>	20	CO3																												

	<p>(iii) The maximum energy that could be produced if the plant were running all the time.</p> <p>(iv)The maximum energy that could be produced daily, if the plant running according to operating schedule were fully loaded.</p> <p style="text-align: center;">or</p> <p>How would you make an economic analysis of the combined operation of the hydro and steam power plants?</p>		
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