

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Sem Examination, June 2021

Course: Smart & Micro Grid	Semester: II
Programme: M.Tech Energy System & M.Tech REE	Max Marks:100
Course Code: EPEC 8005	Duration : 3 Hrs.

S. No.		Marks	CO
	Section A		
	Short Answer Question. Each Question carries 5 marks		
Q.1	a) Which parameters are defined for Load Bus b) Which parameters are defined for Generator Bus c) What is property of Slack Bus	1+1+3	CO1
Q.2	List any five constrains associated with Load Dispatch.	5	CO1
Q.3	Match the pair for Lithium Ion Batteries: A) CT P) Isolating Circuit (A) = (?) B) PT Q) Successive Approximation (B) = (?) C) Opto-coupler R) Secondary Short Circuited (C) = (?) D) ADC S) Variable Gain (D) = (?) E) Modulation T) step Down Transformer (E) = (?)	1*5	CO2
Q.4	Choose the correct relationship, related to load curve (P=Good Utilization factor, Q=Load Factor, R=Energy Consumed, S=Load Curve, T=Peak Load) A) Area under curve B) Flat curve C) Attentive Part D) Ratio of avg load to peak load: E) Reference tool for DSM (A=?, B=?, C=?, D=?,E=?)	1*5	CO2
Q.5	List five objective of IT infrastructure in Smart Grid.	5	CO3
Q.6	Comment on why PSK is most preferred mode of digital modulation in the area of Cellular Mobile phone.	5	CO3
	Section B		
	Each Question carries 10 marks		
Q.1	With neat block diagram, explain 132kV/33kV sub station automation system with the major equipment.	10	CO4
Q.2	Describe in details with associated diagram, the communication infrastructure used for AMI in Smart Grid	10	CO2

Q.3	'Smart Grid can be an effective and precise technological solution' justify the statement with associated challenges with present distribution system in India								10	CO1	
Q.4	A) With the help of a general load curve, write various challenges with Peak Load B) Explain the various types of ways of ToD metering and pricing.								5 5	CO4	
Q.5	Describe the need of cyber security for smart grid and basic encryption mechanism.								10	CO3	
Section 'C'											
Long Answer Question (20 Marks)											
Q 1	A textile industry with contract demand of 500 kW has the daily load curve as following:								20 M	CO5	
	Duration	0-3	3-5	5-9	9-12	12-15	15-18	18-22			22-24
	kW	160	185	215	300	250	290	320			300
	The Electricity tariff is flat tariff rate of Rs. 5/- Per unit, however the ToD rate varies as follows:										
	Time	% Rate Variation			Remark						
	0 to 6.00	Discount of 20%			Please note: Premium charges are 'Zero' if company is operating at below 50 % of Contract demand.						
	5.00 to 10.00	Premium of 5%									
	10.00 to 16.00	Flat Rate									
	16.00 to 18.00	Premium of 20%									
	18.00 to 20.00	Critical Premium of 30%									
	20.00 to 24.00	Premium of 10%									
<p>The industry has various equipment and processes which requires Hot Water (28 kW for 20 hours a day), Compressor (45 kW for 09 hours a day), Spinning Spindles (55 kW, for 24 Hours), Power Looms (90 kW, 24 Hours), Bleaching Machines (20 kW for 12 hours a day), Cloth dryers (45 kW for 12 hours a day), Coloring equipment (20 kW for 4 hours a day), Lighting load (30 kW for 24 hours) etc. Company also have potential of 'possible waste heat recovery system', which can produce 30 kW (Maximum availability for 6 hours) @ cost of Rs. 5,00,000/-.(Neglect maintenance cost)</p> <p>Company has recruited you minimize of paying extra premium and possible bill minimization.</p> <p>Draft a Hypothetical proposal for same to be presented in front of management.</p> <p>Note: Graphpaper is not mandatory for load curves, use normal paper For reference the prevailing market rates are: 1) Solar Power plant: Rs. 45,000/- Per kWp for grid interactive</p>											

	<p>2) Solar Power Plant: Rs. 70,000/- per kWp with battery backup (Max. full load backup for 4 hours).</p> <p>3) The wind mill cost: Rs. 75,00,000/- for 50 kW machine.</p> <p>4) The diesel generation will cost Rs. 6,00,000/- for 100 kW, Cost of Generation will be Rs. 11.00 per unit.</p>		
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