UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, Dec 2020

Course: Demand Side Management   Semester: VII
Program: B. Tech. Electrical & PSE   Time 03 hrs.
Course Code: EPEG 4007   Max. Marks: 100

SECTION A
1. **Each Question will carry 5 Marks**
2. **Instruction: Complete the statement / Select the correct answer(s)**

S. No.	Question	CO

Q 1	Measurement has revealed the following information on an operations system. Design capacity was 84 units per hour, planned losses were 12 units per hour, and actual output was 65 units per hour. What were the utilization and efficiency of the operation respectively?
	  a. 77% and 90%
	  b. 78% and 90%
	  c. 77% and 84%
	  d. 78% and 84%
		CO1

Q2	The fuel cost functions of the two power plants are:
	      Plant 1: $0.05P_1^2 + AP_1 + B$
	      Plant 2: $0.10P_2^2 + 3AP_2 + 2B$
	Where, P_1 and P_2 are the generated powers of two plants of two plants and A,B are the constants. If the two plants optimally share 1000 MW load at an incremental fuel cost of 100 Rs/Mwh, the ratio of load shared by plants P_1 and P_2 is:
	  a. 4:1
	  b. 2:3
	  c. 3:1
	  d. 1:4
		CO2

Q3	SCADA system encompass the transfer of data between a central host computer and a number of ---and /or PLC and the central host and the operator terminals. a. DCS b. Remote Terminal Units c. Microcontroller d. None of above	CO1

Q4	The rules of a particular electricity supply system provision for metering, earthing and for other installation matters are in accordance with the electricity supply act of:
	  a. 1947
	  b. 1948
	  c. 1956
	  d. 1958
		CO3

Q5	The cost of generation is theoretically minimum if : a. The system constraints are considered. b. The operational constraints are considered. c. Both (a) and (b) d. The constraints are not considered	CO2

Q6	Write down some differences between unit commitment and the economic load dispatch.	CO2

SECTION B
1. **Each question will carry 10 marks**
2. **Instruction: Write short / brief notes**

Q 7	Define AT&C losses. Also, explain the procedure for the calculation of AT&C losses.	CO4
Q 8	Why frequency regulation and voltage control in power plant is important? What are the various methods are available to restrict the frequency and voltage within safe range?	CO3
Q 9	Explain the function of distribution utility and the electricity regulatory commission.	CO3
Q 10	A 210 MVA, 50 Hz turbo alternator operates at no load at 3000 rpm. A load of 75 MW is suddenly applied to the machine and the steam valves to the turbine commence to open after 1 sec due to the time lag in the governor system. Assuming inertia constant H of 5 kW-sec per KVA of generator capacity, calculate the frequency to which the generated voltage drops before the steam flow commences to increase to meet the new load.	CO4
Q 11	What is ancillary services? Explain the various EPRI identified ancillary services OR Derive the equation for economic scheduling with the inclusion of transmission losses.	CO4

Section C
1. **Each Question carries 20 Marks.**
2. **Instruction: Write long answer.**

| Q12 | a)   Derive and explain how the dynamic programming solve the problem of optimal unit commitment.
 b)   Draw the complete structure of deregulated industry. Also, compare the two-market structure.

 OR

 a) A 230 kV line is fed through 33/230 kV transformer from a constant 33 kV supply. The impedance of the line and transformer at 230 kV is (30+j 80) ohms. Both the transformers are equipped with tap changing facilities which are so arranged that the product of the two off nominal settings is unity. If the load on the system is 150 MW at 0.9 p.f. determine the settings of the tap changers required to maintain the voltage of the load bus bar at 33 kV.
 b) Draw the schematic diagram of communication in SCADA. Also, explain the steps used in communication between MTU-RTU. | CO3

 OR

 CO3 |