ICOE/Lib/ BE/Sem VII/ Elect/ PLCM/ 14/06/2024

Paper / Subject Code: 42281 / Institute Level Optional Course-I: Product Lifecycle Management

B.E/Sem-VII / Electrical / May-2024

Date :- 14/06/2024

Duration: 3 Hours **Maximum Marks: 80**

N.B.: -

1. Question No 1 is Compulsory
2. Solve any three questions from remaining questions
3. Assume suitable data if required and mention it clearly
4. Figures to right indicate full marks

Q1		Solve any four of following	
	[A]	With respect to Product Life Cycle Management explain opportunities to Globalization.	5
	[B]	Explain concept of organization and decomposition in Product design	5
	[C]	Explain importance of Product Data Management System	5
	[D]	Explain need for life cycle environmental strategies.	5
	[E]	How will you develop PLM vision and PLM Strategy	5
Q2	[A]	Explain useful life extension strategies with suitable example	10
	[B]	Explain general framework for LCCA	10
Q3	[A]	Explain various barriers to PDM implementation	10
	[B]	Explain concept of digital mock-up in detail	10
Q4	[A]	Provide financial justification for PDM implementation	10
	[B]	Explain phases of LCA in ISO standards	10
Q5	[A]	What do you mean by design for X? Explain choice of Design for X tools and their use in design process	10
	[B]	Explain various Product Life Cycle phases with suitable example	10
Q6		Write short notes on:-	
	[A]	Concurrent Engineering	10
	[B]	Modelling and Simulation in Product Design	10

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ICOE/ Lib/ BE/ Sem-VII / Elect/ MIGSG/ 12/06/2024

Paper / Subject Code: 42277 / Microgrid and Smart-grid (DLOC - IV)

B.E/Sem-VII/Electrical/May-2024

Date:- 12/06/2024

(3Hrs) Marks: 80

N.B.

1. **Question No.1 is Compulsory.**
2. Answer any three out of remaining five questions
3. Assume any suitable data wherever required but justified the same
4. Illustrate answer with sketches wherever required

Q 1	Answer any four from the following questions.	(20)
a.	Illustrate the voltage control method of control power conditioning units.	
b.	Illustrate the concept of grid synchronization as one of the important Microgrid function.	
c.	Compare AC Microgrid with DC Microgrid.	
d.	Explain the term, substation automation and feeder automation.	
e.	Illustrate the impact of grid integration of renewable energy resources on existing power system in terms of power quality issues.	
Q 2 a)	Illustrate any three communication network used for Microgrid.	(10)
b)	Illustrate the power sharing and coordinated control of Microgrid.	(10)
Q 3 a)	Give importance of islanding in case of grid connected micro grid. Also give the proper sequence of operation for successful islanding.	(10)
b)	Enlist different renewable technologies. Explain the operation of any one technology in detail.	(10)
Q 4 a)	Draw a block diagram on centralized control and explain its working, advantages and limitations.	(10)
b)	Describe the active and reactive power control in a grid connected mode of Microgrid	(10)
Q 5 a)	Illustrate different technologies used in the operation of smart grid.	(10)
b)	Describe the resilience and self-healing characteristics of smart grid	(10)
Q 6 a)	Illustrate the IEEE 1547 as a regulatory framework for the operation of Distributed Generations.	(10)
b)	Describe the concept of smart grid. What is the necessity of smart grid? Explain the functions of smart grid.	(10)

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I cc6/Lib/BE/Sem-VII/ Elect/ HVDC/ 10/06/2024

Paper / Subject Code: 42274 / HVDC Transmission Systems (DLOC - III)

B.E/ Sem-VII / Electrical / May-2024 Date- 10/06/2

TIME: 3HRS MAX MARKS 80

NOTE:

1. **Question number 1 is compulsory**
2. **Attempt any three from the remaining**
3. **Figures to right indicate full marks**
4. **Assume suitable data if necessary and mention the same**

Q1		Attempt Any Four	20
	a.	Compare HVAC and HVDC Transmission.	
	b.	Explain the classification of HVDC links.	
	c.	Draw a six pulse SCR circuit and compare with IGBT based circuit.	
	d.	Explain the protection methods used in HVDC system.	
	e.	Explain the types of filters used in HVDC Converter Station.	
Q2	a.	Explain different causes of Harmonics, types of Harmonics and its effect.	10
	b.	A bipolar two terminal HVDC link is delivering 1000 MW at ±500 kV at the receiving end. The total losses in the DC circuit are 50 MW. Calculate the following a. Sending end power b. Sending end voltage c. Power in the middle of the line Voltage at the middle of the line	10
Q3	a.	Explain in details the operation of A SIX PULSE IGBT converter circuit.	10
	b.	Define the Valve rating, Transformer rating & Utilization Factor.	10
Q4	a.	Explain IPC types of Firing Scheme.	10
	b.	Explain different types of faults takes place in converter station.	10
Q5	a.	With the waveforms ,Explain 12-Pulse Converter operation.	10
	b.	Explain with characteristics power reversal and the importance of current margin .	10
Q6	a.	Write down the Components of HVDC Converter Station.	10
	b.	Derive the equation for direct current Id for a six pulse converter with grid control and overlap angle less than 60 degrees.	10

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Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q1. Answer any Four from the following [20]

a. Draw and explain heat rate curve and input-output curve in power system?

b. What are the methods to improve transient stability power limit?

c. What are the assumptions made in fast decoupled load flow studies?

d. What is control area? Draw block diagram of single area control system.

e. Draw and explain the interconnection between each operating state in a power system

Q 2. A. Explain conditions for steady state stability in power system. What is steady state stability power limit? [10]

B. Derive the expression for economic load dispatch considering transmission losses (Exact Coordination equation). [10]

Q 3. A. Compare NR and GS load flow methods in a power system. [10]

B. A single area consists of two generating units, rated at 400 and 800 MW, with speed regulation of 4 percent and 5 percent on their respective ratings. The units are operating in parallel, sharing 700 MW. Unit 1 supplies 200 MW and unit 2 supplies 500 MW operating at a frequency of 60 Hz. The load is increased by 130 MW. Find the steady-state frequency deviation and the new generation on each unit. [10]

Q 4 A. Derive Swing equation for a synchronous machine that describes rotor dynamics. [10]

B. Three generating units of a power system are having the following cost curves: [10]

$F_1 = 0.004P_1^2 + 7.2P_1 + 350 \quad Rs/Hr$

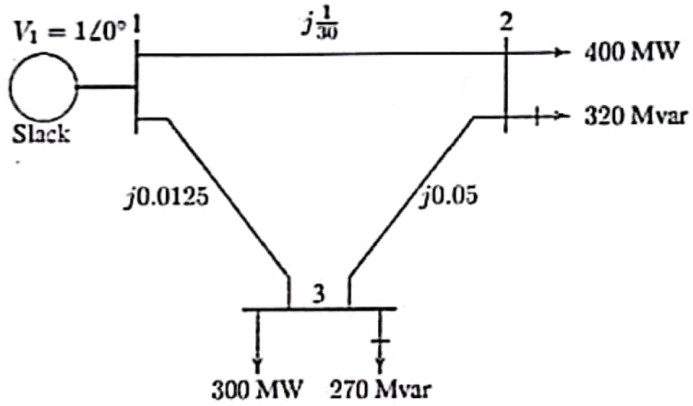
$F_2 = 0.0025P_2^2 + 7.3P_2 + 500 \quad Rs/Hr$

$F_3 = 0.003P_3^2 + 6.74P_3 + 600 \quad Rs/Hr$

P1, P2 and P3 are in MW. Determine the economic dispatch for the units for a total load of 450 MW, neglecting the transmission lines losses. Also find the savings for operation on Economic dispatch compared to equal load sharing.

Q 5 A. Explain the load frequency control by turbine speed governing system and draw complete block diagram of the speed governing model. [10]

B. Figure shows the one-line diagram of a simple three-bus power system with generation at bus 1. The voltage at bus 1 is $V_1 = 1.06\angle 0°$ per unit. The scheduled loads on buses 2 and 3 are marked on the diagram. Line impedances are marked in per unit on a 100 MVA base. Line resistances and line charging susceptances are neglected. Using Gauss-Seidel method determine V_2 and V_3 for first iteration assuming flat voltage start. [10]



Q 6. A. Explain the different types of energy transactions and interchanges in power system. [10]

B. Consider a power system where a single machine tied to an infinite bus through two parallel lines. If a sudden short circuit occurs at sending end of one of the parallel lines, explain equal area criteria for stability of the system. The maximum power transmitted under pre fault, during fault and post fault is P_{maxI}, P_{maxII}, P_{maxIII}. [10]

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ICOE/Lib/BE/Sem-VII/Elect/EDC/04/06/2024

Paper / Subject Code: 42271 / Electrical Drives & Control

BE/ Sem-VII/ Electrical/ May-2024

04/06/2024

Time:3 Hrs

Total Marks: 80

NB: (1) Question No. 1 is compulsory
(2) Answer any THREE questions out of the remaining FIVE questions.
(3) Assume suitable data if necessary and justify them
(4) Figure to the right indicates marks

1. (a) Derive equivalent values of torque and moment of inertia for different loads with rotational and translational motion. 5
(b) What are the main factors which decide the choice of an electrical drive? 5
(c) Draw the block diagram and explain the closed loop speed control of a drive. 5
(d) Explain with neat sketches, the components of load torque in Electrical Drives. 5

2. (a) Explain load equalization and derive the moment of inertia of the flywheel required for load equalization. 10
(b) A drive has following parameters: 10
J=10 kg-m^2, T=100−0.1N, N-m, Passive load torque T_l = 0.05N, N-m, where N speed in rpm. Initially the drive is operating in steady state. Now it is to be reversed. For this motor characteristics is changed to T= −100−0.1N, N-m. Calculate the time of reversal.

3. (a) Explain four quadrant operation of a motor driving a hoist load with suitable diagram. 10
(b) Illustrate with neat circuit diagram a chopper controlled dc separately excited machine in both motoring and regenerative braking mode. Also, draw the relevant voltage and current waveforms. 10

4 (a) Explain thermal model of motor for heating and cooling. 10
(b) A motor operates on a periodic duty cycle consisting of a loaded period of 20 min and a no load period of 10 min. The maximum temperature rise is 60°C. Heating and cooling time constant are 50 and 70 min respectively. When operating continuously on no load the temperature rise is 10°C. Determine 10
(i) Minimum temperature during the duty cycle
(ii) Temperature when the motor is loaded continuously.

5. (a) Explain plugging of three phase induction motor with relevant speed torque characteristics. 10
(b) Draw the relevant speed torque characteristics and explain variable frequency control of induction motor in both constant torque and constant power mode. Comment and compare the nature of the characteristics in both the regions. For speeds below base speed, V/f ratio is maintained constant, why? Why it is called as constant torque mode? 10

6. (a) Explain the principle of vector control and with a neat block diagram explain the direct vector control of induction motor. 10
(b) Draw the block diagram and explain the direct torque control of induction motor. 10

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