BE VII Sem R-19 CS Scheme Electrical Q.P. code. 10066354

Time :(3 Hours) (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)	Write a short note on Hysteresis Band Current Control Technique	05
	(b)	Explain the term intermittent periodic duty.	05
	(c)	Explain the regenerative braking of induction motor	05
	(d)	Explain DQ Model of induction motor.	05
2	(a)	With one application explain with neat diagrams the multi quadrant operation of an electrical drive. Mention the speed torque conventions in all the four quadrants.	10
	(b)	A drive has the following equations for motor torque (T) and load torque (T_l). $T = 1+2\omega_m$; $T_l = 3\sqrt{\omega_m}$ where ω_m is the motor speed in rad/s. Obtain the equilibrium points and determine their steady state stability.	10
3	(a)	Explain Direct Torque and Flux Control using the Switching Table of Inverter Voltage Vectors in Induction motor Drive	10
	(b)	A constant speed drive has the following duty cycle. i. Load rising from 0 to 400 kW: 5 min ii. Uniform load of 500 kW: 5 min iii. Regenerative power of 400 kW returned to the supply: 4 min iv. Remain idle for: 2 min Estimate power rating of the motor. Assume losses to be proportional to $(\text{power})^2$	10
4	(a)	With a neat block diagram explain closed loop speed control with an inner current control loop in an electric drive.	10
	(b)	Draw the circuit diagram of a four-quadrant chopper drive for a DC separately excited motor and explain in detail its operation with necessary diagrams in forward motoring mode and regenerative braking mode.	10
5	(a)	A motor drives two loads. One has rotational motion. It is coupled to the motor through a reduction gear with a=0.1 and efficiency of 90%. The load has a moment of inertia of 10 kg-m^2 and a torque of 10 N-m. Other load has translational motion and consists of 1000 kg weight to be lifted up at a uniform Speed of 1.5 m/s. Coupling between this load and the motor has an efficiency of 85 %. Motor has inertia of 0.2 kg-m^2 and runs at a constant speed of 1420 rpm. Determine equivalent inertia referred to the motor shaft and power developed by the motor.	10
	(b)	With the speed torque characteristics explain V/f control of induction motor.	10
6	(a)	Draw the block diagram and explain the principle of vector control in AC drives.	10
	(b)	Derive Plugging slip formula and explain the plugging of three phase induction motor with speed torque characteristics.	10

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qp code: 10066531

BE Sem VII Electrical R-19 Cscheme

Duration: 3 hrs **[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. What is the significance of penalty factor in optimal load scheduling?

b. Explain the concept of equal area criterion for stability studies.

c. What are the various types of buses in power system and their significance load flow studies?

d. What is the necessity of load frequency control in power system?

e. Show interconnection between different operating states in power system and explain each state.

Q 2. A. A power system with two plants is connected by a tie line and load is located at plant 2. If 100 MW is transmitted from plant 1 to the load, a transmission loss of 10 MW is incurred. Find the required generation for each plant and the power received by load when the system λ is Rs 25/MWh. The incremental fuel costs of the two plants are given below: [10]

$IC_1 = 0.02P_1 + 16$ Rs/MWhr

$IC_2 = 0.04P_2 + 20$ Rs/MWhr

B. Consider a power system where a single machine tied to an infinite bus through two parallel lines. A sudden short circuit occurs at sending end of one of the parallel lines and the line is switched off. Explain equal area criteria for stability of the system. Comment on significance of critical clearing angle. [10]

Q 3. A. A 50 Hz, 4 pole, turbo generator, rated 100MVA, 11kV has an inertia constant of 8MJ/MVA. [10]

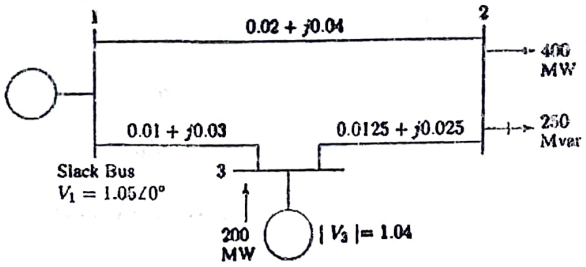
i) Find the stored Kinetic Energy in the rotor at synchronous speed.

ii) If the mechanical input is suddenly raised to 80MW for an electrical load of 50 MW find the rotor acceleration, neglecting mechanical and electrical losses.

iii) What will be change in the rotor torque angle and rotor speed in rpm at the end of acceleration period of part ii) maintained for 10 cycles.

B. Compare Newton Raphson method with decoupled and Fast decoupled method for load flow analysis in a power system. [10]

Q 4 A. Figure below shows the single-line diagram of three-bus power system with generation at bus 1 and bus 3. The voltage at bus 1 is $V_1 = 1.05\angle 0^0$ per unit. The voltage magnitude at bus 3 is fixed at 1.04 per unit with a real power generation of 200 MW. The scheduled load on bus 2 is marked on the diagram. Line impedances are marked in per unit on a 100 MVA base. By using Gauss-Seidel method, determine V_2 and V_3 with an acceleration factor α=1.3 at the end of first iteration. [10]



B. With the help of complete block diagram, explain free governor action in load frequency control. Also explain droop characteristic for the generator. [10]

Q 5 A. A generator operating at 50Hz delivers 1.0 pu power to an infinite bus through a transmission circuit in which resistance is ignored. The maximum power transferred for prefault, during fault and post fault conditions are 1.8 pu, 0.4 pu and 1.3 pu respectively. Draw $P - \delta$ curves and determine the critical clearing angle. [10]

B. Derive exact coordination equation for economic load dispatch considering transmission losses. [10]

Q 6. A. Two generators rated 1000 MW and 800 MW are operating in parallel. The droop characteristics of their governors are 6% and 4%, respectively from no load to full load. Assuming that the generators are operating at 50 Hz at no load. When load is increased to 1000 MW, determine the system frequency at new load and load supplied by each generator. Assume free governor operation. [10]

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

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QPcode: 10057108

BE VII Sem R-19 C Scheme Electrical

Time : 3 Hours **Marks : 80**

1. Question no. 1 **compulsory.**
2. Answer any three questions out of remaining five
3. Attempt sub questions in order
4. Figures to the right indicate full marks.

1. Explore the following topics (**any 4**): **[20]**
   a) Evolving approaches to disaster management in India.
   b) Urban flooding: Implications for major cities.
   c) Leveraging technology for disaster preparedness.
   d) Global aid organizations in crisis response.
   e) Guidelines for earthquake safety.
   f) Human repercussions of natural calamities.

2. a) Outline the functions and duties of NIDM **[06]**
2. b) Evaluate the impact of disasters on infrastructure and their hindrance to developmental projects. **[06]**
2. c) Define early warning systems and illustrate their benefits through recent instances of flood, cyclone, and tsunami alerts. **[08]**

3. a) Examine NDMA's directives for disaster preparedness in India. **[06]**
3. b) Examine the collaborative efforts of government bodies and NGOs in disaster management. **[06]**
3. c) Explain Triage. Analyze the importance of initial response in disaster management. **[08]**

4. a) Investigate the contributions of international aid agencies during extreme crises. **[07]**
4. b) Explore the applications of GPS and GIS in drought mitigation strategies. **[07]**
4. c) Describe non-structural measures for pandemic containment. **[06]**

5. a) Assess the involvement of different stakeholders in mass casualty situations. **[06]**
5. b) Delve into the paradox of industrialization: economic progress versus the threat of industrial mishaps. **[08]**
5. c) Highlight the protective role of natural ecosystems against disasters, with examples **[06]**

6. a) Define liquefaction and debate the merits of retrofitting versus relocation in landslide-prone areas. **[06]**
6. b) Define vulnerability and its significance in disaster management. **[04]**
6. c) Enumerate preparedness measures for minimizing chemical disaster losses. **[05]**
6.d) Propose strategies for funding disaster relief efforts and discuss legal considerations **[05]**

QP code: 10068745

BE sem VII Electrical R-19 Cscheme

Time: 3 Hours | Total Marks: 80

N. B.:

1. **Question no. 1 is compulsory**
2. Attempt any **THREE Questions** from remaining **FIVE** questions.
3. Use illustrative diagrams wherever required.

Q1) Attempt any **FOUR** questions.

a) Give examples of energy conservation and energy efficiency. **05**

b) Define 1) Energy management 2) Energy audit. **05**

c) List energy Conservation opportunities possible at home. **05**

d) List thermal systems that require energy management practices on regular basis. **05**

e) Explain the importance of data collection in energy auditing? **05**

Q2) a) Distinguish between 'preliminary energy audit' and 'detailed energy audit'. **10**

b) What are advantages of NPV method over Simple Payback Period method? Calculate net present value (NPV) for an investment towards a LED Lamp having life of 2 years. The discount rate is 10% per year. The cost of lamp is ₹400/_. Due to investment, annual savings in first year and second year is ₹1000/_ each. **10**

Q3) a) What are the benefits of Power Factor (PF) improvement? **10**
During June-2019, the plant has recorded a maximum demand of 600 kVA and average PF is observed to be 0.82 lag, the minimum average PF to be maintained is 0.92 lag as per the independent utility supplier and every one % dip in PF attracts a penalty of Rs 10,000/in each month. Calculate **new kVA and the improvement in PF** for July-2019 by installing 100 kVAr capacitors.

b) Explain the features of "energy efficient motor". Why it is preferred over "standard motor"? **10**

Q4) a) Why dry saturated steam is preferred for heating applications? What are the uses of steam in the industry? **10**

b) List any **TEN** Energy Conservation opportunities possible in HVAC system. **10**

Q5) a) MSEB decided to replace 400 W lamp with 250 W lamp, 250 W lamp with 150 W lamp and 125 W lamp with 70 W lamps for same light output for 4500 hours of annual operation and consider Rs. 4.5 as per unit cost. Calculate **energy savings, cost savings and simple payback period** due to investment decision. **10**

b) The specifications of cooling water pump connected to boiler, are as follows: Discharge- Q = 12.5 lit/sec, head- H = 60m, Power consumption- P = 13.4 kW. **10**

As per the boiler manufacturer, required quantity is 12.5 lit/sec at 3.0 kg/cm^2. What type of energy conservation measure can be proposed and estimate the **reduction in power consumption**?

Assume operating efficiency of pump as 65% and motor efficiency as 90%.

Q6) a) What do you mean by **ECBC**? Enlist any **FIVE** energy saving measures possible in hospital building. **10**

b) What is LEED rating of a building? How it is implemented in India? **10**

BE/ SEM VIII/ C-Scheme R-19/ Electrical

QP-10066910
14/12/24

Time : 3 Hours

Total 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.

1		Attempt **ANY FOUR**	[20]
	a	State the essential components of micro-grid.	
	b	Define smart grid and elaborate it's need in current situation.	
	c	What is autonomy in renewable source?	
	d	Evaluate advantages and disadvantages of wind power system in micro-grid.	
	e	Draw a block diagram of smart meter.	
2	a	Draw schematic diagram of A.C. microgrid and elaborate it along with its advantages, disadvantages, and limitations.	[10]
	b	Elaborate the significance of Energy storage devices in micro grid.	[10]
3	a	Elaborate the procedure of islanding of micro grid under fault on the main grid side.	[10]
	b	Give importance of anti-islanding in case of grid connected solar system	[10]
4	a	Draw a block diagram on de-centralized control and elaborate its working, advantages and limitations	[10]
	b	What is black start. Elaborate role of micro grid in it.	[10]
5	a	Elaborate advanced metering system.	[10]
	b	Enlist various communication methods used for smart grid and elaborate any one in detail.	[10]
6	a	Elaborate the role of Electric vehicles in smart grid.	[10]
	b	Describe the resilience and self-healing characteristics of smart grid	[10]

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QP-10068160

BE/sem VII / C-scheme R-19/ Electrical

14/12/24

3 Hours **Total Marks: 80**

Note: 1. Question number 1 is **compulsory.**
2. Solve any **three** questions out of the remaining **five** questions
3. Assume suitable data if necessary.
4. Figure to the right indicates full marks.

Q.1 Solve **any Four** of the following.

(a) Draw a diagram of a Biological neural network, label all the terms and explain them in brief. **05**

(b) Calculate accuracy, precision, recall and F1-score for following confusion matrix **05**

		Predicted Class	
		No	**Yes**
True Class	**No**	55 (TN)	5 (FP)
	Yes	10 (FN)	30 (TP)

(c) Define Machine learning and different forms of learning in ML. **05**

(d) Describe data mining. **05**

(e) Describe overfitting and regularization. **05**

Q.2 **(a)** Describe McCulloch-Pitts Neuron Model and discuss its performance for the implementation of NOT, OR, and AND operations. **10**

(b) Describe Multilayer networks and the Back Propagation algorithm in brief. **10**

Q.3 **(a)** Explain following terms w.r.t Bayes' theorem with proper example **10**
(i) Independent probabilities
(ii) Dependent probabilities
(iii) Conditional Probability
(iv) Prior & Posterior probabilities

(b) Illustrate Basic Clustering Methods with examples for each. **10**

Q.4 (a) Why is dimensionality reduction an important issue? Describe the steps to reduce dimensionality using the principal component analysis method by clearly stating mathematical formulas used. 10

(b) Define SVM? Explain the following terms: hyperplane, separating hyperplane, margin, and support vectors with suitable examples. 10

Q.5 (a) Explain how AI is used in Schedule Maintenance of Electrical Power Transmission Networks. 10

(b) Explain in detail Application of Artificial intelligence in Static Security Assessment 10

Q.6 Write short notes on **any Four**

(a) Depth first search 05

(b) Basic Linear Algebra in Machine Learning Techniques 05

(c) Deep Learning and its applications 05

(d) Overfitting and stopping criterion 05

(e) Voltage stability assessment using machine learning 05