

8E1814

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8E1814**B.Tech. VIII Sem. (Main/Back) Examination, June - 2022****Electrical Engg.****8EE4-11 HVDC Transmission System****Time : 3 Hours****Maximum Marks : 120****Min. Passing Marks : 42****Instructions to Candidates:**

Attempt all ten questions from Part A, five questions out of Seven from Part B and Four questions out of Five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. What is the function of smoothing reactor?
2. What are the application of dc transmission?
3. Define extinction angle control?
4. What are the causes of harmonics in HVDC?
5. Differentiate between line commutated converters (LCC) and voltage source converter (VSC)?
6. Define reactive power and its control methods?
7. Write problems in HVDC transmission system?
8. What are the types of MTDC system?
9. What is the principle of DC link control in HVDC transmission system?
10. Explain commutation overlap in converters of HVDC system?

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PART - B

(Analytical/Problem solving questions)

Attempt any **five** questions.

(5×8=40)

1. Discuss the various kinds of d.c. links used in HVDC transmission.
2. State the advantages of HVDC transmission over EHV AC transmission for bulk power transmission.
3. Explain basic scheme and equipment of Converter station.
4. Explain sinusoidal pulse width modulation and also discuss how harmonics is eliminated by PWM technique.
5. With circuit diagram explain the principle of dc link control.
6. Explain the operation of a 12 pulse bridge rectifier with the help of circuit diagram and waveforms.
7. Discuss about various types of Ac filters employed in HVDC systems for harmonic suppression.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions.

(4×15=60)

1. What do you mean by Multi - terminal DC system? What are the different types of MTDC systems? Explain each type of MTDC system with relevant schematic diagram.
 2. Why reactive power control is required for HVDC stations? Discuss about conventional control strategies for reactive power control in HVDC link.
 3. Distinguish between delay in firing angle (α) and extinction angle (γ) of an HVDC converter. Explain the operation of a converter when working as an inverter, and state the necessary conditions required for inverter operation.
 4. What are different types of converter control characteristics? Explain each type with supporting waveform.
 5. Explain power system Angular, voltage and frequency stability and also discuss difference between Synchronous and asynchronous links.
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B.Tech. VIII Sem. (Main/Back) Examination, June - 2022

Electrical Engg.

8EE4-13 Advanced Electric Drives

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates

Attempt all TEN questions from Part A, Five questions out of Seven from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination (As mentioned in form No. 205)

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory

(10×2=20)

1. What are the different topologies for three level inverter?
2. Analyse different harmonic elimination techniques in AC drives.
3. Discuss the concept of direct and indirect vector control in AC Drives. Also explain how flux vector is estimated in each method in detail?
4. Explain VSI fed BLDC motor drive briefly
5. Explain the difference between the VSI fed AC motor drive and CSI fed AC motor drive.
6. What are the different control techniques in induction motor drives?
7. Explain in detail about the different types of permanent magnet motors?

8. Explain how speed control can be done in a set of multiple synchronous motors
9. Draw the block diagram of microprocessor based control of permanent magnet synchronous motor drive.
10. With a block diagram explain the variable frequency control of SM drive in Selfcontrol mode.

Part - B

(Analytical/Problem solving questions)

Attempt any five questions

(5×8=40)

1. With schematics explain the principle of space vector modulation.
2. Draw and explain the speed torque characteristics of a variable stator voltage controlled induction motor. Why stator voltage control is not suitable for speed control of induction motor with constant load torque.
3. Explain power and torque capability curves of a synchronous motor drive. In variable frequency control of synchronous motor drive, why V/f ratio is maintained constant up to base speed and voltage constant above base speed.
4. Explain the frame transformation from three phase to psynchronous reference frame. What is its significance in induction motor drive?
5. Explain the Park's transformation.
6. Draw and explain any two power converter circuit for Switched reluctance motors.
7. Explain in detail DSP based Brushless Direct Current Motor Drive system with block diagram.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any FOUR questions

(4×15=60)

1. Explain V/F method for controlling speed of induction motor.
2. Explain the operation principle of switched reluctance motor drive and discuss about its speed and torque control methods.
3. Explain in detail H bridge as a 4-Q drive.

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4. Draw and explain the back-emf waveforms of a three phase BLDC motor.
 5. Explain in detail the architecture of a DSP-Controller with block diagram.
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B.Tech. VIII Sem. (Main/Back) Examination, June - 2022

Open Elective - II

8EE6-60.1 Energy Audit and Demand Side Management

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Four questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory

(10×2=20)

1. Define the term Load Factor.
2. Differentiate between energy conservation and energy efficiency.
3. What is an energy audit?
4. What is the significance of knowing the energy cost?
5. Define term Power Factor.
6. What do you mean by Energy conservation.
7. What is the Scope of Demand side Management.
8. Write short note on Energy Security.
9. List down the Instrument use for Speed Measurement.
10. What are the precautions to be taken in the case of energy efficient motor application?

Part - B

(Analytical/Problem solving questions)

Attempt any Five questions

(5×8=40)

1. Write in few words about the various reforms in the energy sector.
2. Why energy conservation is important in the prevailing energy scenario?
3. List down the objective of energy Management, Explain in detail.
4. Explain briefly the difference between preliminary and detailed energy audit?
5. What are the benefits of bench making energy consumption?

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6. A process plant consumes of 12,500 kwh per month at 0.9 power factor (P.F). What is the Percentage reduction in distribution losses per month if PF is improved up to 0.96 at load end?
 7. What are total harmonic distortion (TDM) and its effects on electrical system?

Part - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **four** questions

(4×15=60)

1.
 - a) Explain working and principle of VFD.
 - b) The efficiency at various stages from power plant at end use is given below. Efficiency of power generation in a power plant is 30%. The T&D losses are 23%. The distribution loss of the plant is 6%. Equipment end use efficiency is 65%. What is the overall system efficiency from generation to end-use?
 2.
 - a) Explain how maximum demand control works.
 - b) What are the precautions to be taken in the case of energy efficient motor application?
 3.
 - a) Explain the working of a soft starter and its advantage over other conventional starters.
 - b) What are the various steps in the implementation of energy management in an organization?
 4. Explain Data Logger and Data Acquisition system.
 5.
 - a) How to lighting control system works, explain in detail.
 - b) Write note on General Energy savings tips applicable to New as well as Existing Buildings.
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8E1850**8E1850****B.Tech. VIII Sem. (Main/Back) Examination, June - 2022****Open Elective - II****8EE6-60.2 : Open Elective-II Soft Computing****Time : 3 Hours****Maximum Marks : 120****Min. Passing Marks : 42****Instructions to Candidates:**

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Four questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A**(Answer should be given up to 25 words only)****All questions are compulsory****(10×2=20)**

1. Define the aims of Soft Computing.
2. Give Applications of Fuzzy Sets.
3. Define Union Fuzzy Operation.
4. Define Artificial Neural Network.
5. Define Search Space and Optimization.
6. Define Fuzzy logic.
7. Define Genetic Operator-Crossover and Mutation.
8. Define Fuzzy Neural Networks.
9. Define Genetic Algorithms.
10. Define Neuro-Fuzzy Identification.

PART - B**(Analytical/Problem solving questions)****Attempt any Five questions****(5×8=40)**

1. Describe Fuzzy Operations discussing following with examples.
 - i) Inclusion
 - ii) Equality
 - iii) Complement
 - iv) Intersection

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2. Discuss and compare Supervised, Unsupervised and Reinforcement Learning in connection with Artificial Neural Network (ANN).
 3. Discuss Radial Basis Neural Network along with its advantages.
 4. Discuss Adaptive Resonance Theory (ART) along with its advantages.
 5. Explain and contrast Conventional and Genetic Search Algorithms.
 6. Describe Genetic Algorithm based Optimization. Also explain Genetic Algorithm with mutation.
 7. Discuss learning and architecture of Neuro-Fuzzy Systems.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **four** questions

(4×15=60)

1. Explain Fuzzy Sets along with its properties. Also discuss Fuzzy Relations.
 2. Explain the following architectures of Artificial Neural Networks (ANN) along with their advantages and disadvantages.
 - i) Single Layer Feed Forward Neural Networks.
 - ii) Multi-Layer Feed Forward Neural Networks.
 - iii) Recurrent Neural Networks.
 3. Explain Particle Swarm Optimization (PSO) and its application in engineering.
 4. Write short note on :
 - i) Fuzzification in Neuro-Fuzzy Systems.
 - ii) Defuzzification Neuro-Fuzzy Systems.
 5. Write short note on any two :
 - i) Neural Network Toolbox in MATLAB.
 - ii) Fuzzy Logic Toolbox in MATLAB.
 - iii) Genetic Algorithm and Directed Search Toolbox in MATLAB.
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B.Tech. VIII Sem. (Back) Examination, June - 2022
Electrical & Electronics Engineering
8EX1 A EHV AC/DC Transmission

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

Unit - I

1. a) What is the need for EHV AC transmission system also write the various problem associated with EHV transmission lines.
b) Write short note on
 - i. Electrostatic field of EHV line and their effects.
 - ii. Corona losses.

(OR)

1. a) Compare the EHV AC and EHV DC transmission system also define the surge impedance loading.
b) What is Bundled conductor also define the Geometric mean radius of Bundled conductor by taking a suitable configuration of an bundled conductor.

Unit - II

2. a) Derive the expression for power flow in a transmission line are

$$P_R = \frac{V_S V_R}{X} \sin \delta$$

$$Q_R = \frac{V_R}{X} [V_S - V_R]$$

Where

P_R and Q_R are Receiving end real and reactive power, V_S , V_R are sending and Receiving end voltage, δ is power angle and X is line reactance.

- b) Explain the flat tie line and tie line load bias control scheme.

(OR)

2. a) Describe the turbine speed governing system also find the block diagram representation of the same.
- b) A 200 MW unit with 0.05 PU turbine operates in parallel with a 400 MW unit of identification turbine regulation for a specified amount of power Demand increase, find the ratio of sharing of the load by the units, system frequency is 50 Hz.

Unit - III

3. a) At a 33 kV substation of a 3 phase 50 Hz power system, 3 MVAR reactive power generation is required during heavy loading to increase the voltage to the desired level, calculate capacitive to be connected in each phase to satisfy the requirement.
- b) Write down the various source of reactive power also discuss them briefly.

(OR)

3. a) Discuss the following methods of voltage control.
- i. Series capacitor.
 - ii. Synchronous compensators.
- b) Explain the various configurations of thyristorised static var compensator (SVC) briefly.

Unit - IV

4. a) Explain the circuit and working operation of thyristor controlled reactor (TCR) in detail.
- b) Describe the various benefits of utilizing FACTS devices.

(OR)

4. a) Explain the circuit and working operation of STAT COM in detail.
- b) Describe the various Applications of FACTS devices.

Unit - V

5. a) Explain the general layout of a converter station and various equipments used in it for the HVDC system.
- b) What are the Advantage and disadvantage of HVDC system.

(OR)

5. a) Explain the various types of DC links in HVDC system.
- b) Write short note on
- i. Ground Return.
 - ii. Multiterminal HVDC system.

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8E8042

B.Tech. VIII Sem. (Back) Examination, June - 2022
Electrical & Electronics Engg.
8EX2A Electric Drives and Their Control

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

Unit - I

1. a) Explain the various nature and classification of load torques. (8)
- b) What are the advantages and disadvantages of electric drives? (8)

(OR)

1. a) Explain load equilization in drives with necessary diagrams and derivations. (8)
- b) A 220 V, 200 A, 800 rpm dc seperately excited motor has an armature resistance of 0.06Ω . The motor armature is fed from a variable voltage source with an internal resistance of 0.04Ω . Calculate internal of voltage of the variable voltage when the motor is operating in regenerative braking at 80% of the rated torque and 600 rpm. (8)

Unit - II

2. a) Explain with suitable diagram chopper controlled DC drives. (8)
- b) State and explain the important features of various braking methods of dc motors. (8)

(OR)

2. What are different power limitation in armature voltage in DC drives. Also explain speed torque curve. (16)

Unit - III

3. a) Define the term 'starting'. Differentiate between regenerative braking, dynamic braking and plugging. (8)
- b) Explain in detail operation of voltage source inverter (VSI). (8)

(OR)

3. Explain the techniques of various frequency control from voltage source. (16)

Unit - IV

4. Discuss the operation and significance of current source inverter (CSI) control. (16)

(OR)

4. Write short note on :

- a) Static kramer drive. (8)
- b) Slip - power Recovery. (8)

Unit - V

5. a) Explain with suitable diagram the control of synchronous motor - separately controlled. (8)
- b) Write in detail about synchronous motor using current source inverter (CSI). (8)

(OR)

5. Explain with suitable diagram the dynamic and regenerative braking of synchronous motor with VSI. (16)
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B.Tech. VIII Sem. (Back) Examination, June - 2022
Electrical & Electronics Engg.
8EX3A Protection of Power System

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

Unit - I

1. a) Explain the basic concept of trip circuit of a circuit breaker. (8)
- b) By help of suitable diagram construction of a current transformer. (8)

(OR)

1. a) Explain the primary and backup protection system displayed in power system. (8)
- b) Explain the transient errors in capacitive voltage transformer. (8)

Unit - II

2. a) What is a HRC fuse? Explain its construction and operations also mentions its applications? (8)
- b) What are feeder? Explain function of a ring mains? (8)

(OR)

2. a) Explain working of Induction disc type relay? (8)
- b) An IDMT type over current relay is used to protect a feeder through 500/1A C T. The relay has a PS of 125% and TMS = 0.3 Find the time of protection of the stated relay if a fault current of 5,000 A flows through the feeder. Make use of following characteristic (8)

PSM	2	3	5	8	10	15
Time for unity TMS (100% current 1A)	10	6	4.5	3.2	3	2.5

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Unit - III

3. a) State the stator overheating protection for generator? (8)
b) Explain rotor protection against prime move failure? (8)

(OR)

3. a) Explain the unbalanced stator currents? (8)
b) Describe generator protection against stator inter - turn faults? (8)

Unit - IV

4. a) Describe the differential protection of busbars? (8)
b) Explain by help of neat diagram working of buchholz relay? (8)

(OR)

4. a) Explain high impedance relay scheme for busbar protections? (8)
b) Explain the percentage differential relay with harmonic restraint? (8)

Unit - V

5. a) Explain Mho relays? (8)
b) Explain the negative sequence voltage relays. (8)

(OR)

5. Write short note on any two : (8+8=16)
i. Electromagnetic impedance relay.
ii. Induction motor protection.
iii. 3 stepped distance protection of transmission line.
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