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R18

Course Code: A30237



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: HVDC TRANSMISSION

(Electrical & Electronics Engineering)

Date: 24.04.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. State the advantages and disadvantage in HVDC Transmission system. 2 M
2. Write any three HVDC Transmission systems in India. 2 M
3. What is the principle of dc link control? 2 M
4. What are the sources of Reactive Power in HVDC Transmission system? 2 M
5. What is the Purpose of Power Flow Analysis? 2 M
6. What is the P.U. System for DC Quantities? 2 M
7. Write a short note on the Smoothing reactor. 2 M
8. What is the corona? 2 M
9. What are the effect of Pulse number on harmonics? 2 M
10. State the harmful effects of AC and DC harmonics. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain various types of DC Links in HVDC Transmission system. 10M
- OR**
11. B). Compare AC and DC power transmission system based on Economic aspects, technical performance and reliability. 10M
12. A). Discuss equidistant pulse firing angle control scheme with its relative merits and demerits. 10M
- OR**
12. B). Write about current and extinction angle control methods in HVDC Transmission system. 10M
13. A). Why is Power Flow Analysis essential for ensuring the stability and reliability of electrical power systems? 10M
- OR**
13. B). What are the main components of a DC Link and how do they facilitate power transmission? 10M
14. A). Explain the different types of faults occurred in HVDC converter station. 10M
- OR**
14. B). Explain the effect of corona on dc lines and audible noise space charge field and radio interference. 10M
15. A). Explain the objectives in designing the size and branches of harmonic filters and dc harmonic filters in a HVDC substation. 10M
- OR**
15. B). Explain the types of AC filters and design of single tuned filters and high pass filters. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: **SWITCHED MODE POWER SUPPLY**

(Electrical & Electronics Engineering)

Date: 24.04.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all **TEN** questions (Compulsory)

Each question carries **TWO** marks.

10x2=20M

1. What is the primary function of reactive elements such as inductors and capacitors? 2 M
2. Define the term "turns ratio" as it applies to transformer design in power electronics. 2 M
3. Define DC-DC converters and briefly explain their significance in SMPS. 2 M
4. State the advantages of SMPS. 2 M
5. Define zero voltage switching (ZVS) and its importance in power electronics. 2 M
6. What are the advantages of using resonant switches in converter designs? 2 M
7. What is the primary difference between a forward converter and a fly-back converter? 2 M
8. What is the significance of zero-current switching in quasi-resonant half-bridge converters? 2 M
9. Explain the role of DC filters in power systems. 2 M
10. Explain the primary function of a power conditioner in an electrical system. 2 M

PART-B

Answer the following. Each question carries **TEN** Marks.

5x10=50M

- 11.A). Explain the design procedure for transformers, addressing aspects such as regulation, efficiency, and thermal management. 10M
- OR**
11. B). Describe the role of capacitors in power electronics circuits and their importance in energy storage, filtering, and voltage regulation. 10M
12. A). Describe the different modes of operation in an SMPS, such as continuous conduction mode (CCM) and discontinuous conduction mode (DCM). 10M
- OR**
12. B). Analyze the design considerations for selecting and sizing components in an SMPS to achieve the desired performance and efficiency. 10M
13. A). Describe the basic configuration and components of load resonant converters. 10M
- OR**
13. B). Compare and contrast series-resonant, parallel-resonant, and series-parallel resonant converters. 10M

(P.T.O.)

14. A). Describe the operating principle of a forward converter and its basic components, with neat sketches and waveforms. 10M

OR

14. B). Explain the fundamental operation and waveform characteristics of a half-bridge switching converter. 10M

15. A). Describe various types of power line disturbances encountered in electrical systems. 10M

OR

15. B). Explain the applications where current filters are essential for reducing harmonic currents and improving power quality. 10M



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: High Voltage Engineering
(Electrical & Electronics Engineering)

Date: 26.04.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. State the Paschen's Law. 2 M
2. What are the applications of insulating materials? 2 M
3. Explain the term 'Ripple factor'. 2 M
4. What are the disadvantages of single phase half wave rectifier circuits? 2 M
5. What are the requirements of a sphere for measurement of high voltages? 2 M
6. What are the advantages for high voltage measurements? 2 M
7. Draw the Volt-time curves of gaps for positive and negative polarity in over voltage protection. 2 M
8. List out two major drawbacks of the worm gap. 2 M
9. What is IEC standards? 2 M
10. What are the safety precautions in H.V. labs? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss various factors which affect breakdown of gases. 10M
- OR**
11. B). Describe briefly various mechanisms of breakdowns in solids. 10M
12. A). Describe the construction of various components used in the development of an impulse generator. 10M
- OR**
12. B). Draw a typical impulse current generator circuit and explain its operation and application. 10M
13. A). Discuss various resistance potential dividers and compare their performance of measurement of impulse voltages? 10M
- OR**
13. B). Determine the breakdown voltage for air gaps of 2 mm and 15 mm lengths under uniform field and standard atmospheric conditions. Also, determine the voltage if the atmospheric pressure is 750 mm Hg and temperature 35^oc? 10M
14. A). Explain the i) Dart leader ii) Stepped leader. 10M
- OR**
14. B). Discuss the i) Lighting surges ii) Surge modifiers. 10M
15. A). Explain the procedure for testing string insulator. 10M
- OR**
15. B). Describe various tests to be carried at on a C.B. 10M

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R18

Course Code: A30242



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: **UTILIZATION OF ELECTRICAL ENERGY**

(Electrical & Electronics Engineering)

Date: 26.04.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. What is meant by electrical drives? 2 M
2. Mention the different factors for the selection of electric drives? 2 M
3. What are the advantages of electric heating? 2 M
4. What are the advantages of Ajax Wyatt furnace? 2 M
5. State the different types of electrical lamps used for illumination. 2 M
6. Define luminous efficiency. 2 M
7. Explain type of motor is used for electric traction? 2 M
8. Discuss the use of speed time curve. 2 M
9. What is meant by coefficient of adhesion? 2 M
10. Name the different stages of train movement. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the basic elements of an electric drive system? 10M

OR
11. B). Explain the classification of electric drives in detailed. 10M
12. A). Draw a neat sketch of induction furnace and generalize its working. 10M

OR
12. B). What are the types of heating? Explain about the induction heating. 10M
13. A). Discuss laws of illumination and its limitations in actual practice. 10M

OR
13. B). A workshop dimension 30 metre * 20 metre is illuminated by 30 Nos. of 400 Watts Metal Halide lamps. The luminous efficacy of metal Halide lamp is 90 lumens/Watt. The depreciation factor is 1.2 and utilization factor is 0.6. Calculate the illumination level of the working plane. 10M
14. A). Describe the different methods of traction motor control and explain. 10M

OR
14. B). Explain the recent trends in electric traction systems. 10M
15. A). Draw the speed – Time curve of a traction system. Also explain various periods and the action. 10M

OR
15. B). A train runs with an average speed of 50 kmph. Distance between stations is 4.5 km. Values of acceleration and retardation are 1.5 kmphs and 1.8 kmphs respectively. Calculate the maximum speed of the train assuming a trapezoidal speed time curve. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: FLEXIBLE AC TRANSMISSION SYSTEM DEVICES
(Electrical & Electronics Engineering)

Date: 29.04.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Explain the objectives of FACTS controllers in the power system network. 2 M
2. What are the advantages of FACTS controllers? 2 M
3. Define voltage source converter. 2 M
4. What is meant by pulse width modulation? 2 M
5. Mention the objectives of Shunt compensation. 2 M
6. Define Voltage instability. 2 M
7. Define the term static VAR compensator 2 M
8. Define voltage stability 2 M
9. What is the effect of TCSC in SSR problem? 2 M
10. Define TSSC. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the relative importance of different types of FACTS controllers. 10M
- OR**
11. B). Explain dynamic stability considerations in interconnection of transmission systems. 10M
12. A). Explain the three phase full wave bridge converters transformer connections for 12 pulse operation. 10M
- OR**
12. B). Differentiate 12 pulse, 24 pulse and 48 pulse operation. 10M
13. A). Explain the principle of operation of variable impedance type static Var generator and briefly explain about TCR. 10M
- OR**
13. B). Describe the operation of hybrid Var generators. 10M
14. A). Compare the performance of SVC and STATCOM 10M
- OR**
14. B). Explain principle, working and characteristics of SVC. 10M
15. A). Explain the concept of series capacitive compensation. 10M
- OR**
15. B). Discuss the functional requirements of GSC and TSSC. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: **RELIABILITY ENGINEERING**

(Electrical & Electronics Engineering)

Date: 29.04.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

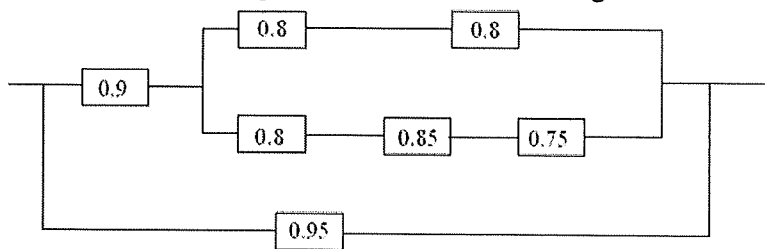
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|---|-----|
| 1. Write short notes on Normal distribution. | 2 M |
| 2. What is the effect of Preventive maintenance on Reliability? | 2 M |
| 3. Define Cutset. | 2 M |
| 4. Develop an expression for Reliability of Series System. | 2 M |
| 5. Explain the term MTTF. | 2 M |
| 6. What is Redundant system? | 2 M |
| 7. Illustrate the Concept of STPM. | 2 M |
| 8. Discuss an absorbing State. | 2 M |
| 9. What are the Applications of Cutset Approach? | 2 M |
| 10. Explain Common Mode Failures. | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | |
|--|-----|
| 11.A). Illustrate the correlation between Poisson Distribution and Binomial Distribution. | 10M |
| OR | |
| 11. B). Develop the expression for reliability function in terms of Hazard rate. | 10M |
| 12. A). Evaluate the reliability of the system given in Fig. Also derive the expression used. Reliability of each component is indicated in the Fig. | 10M |



OR

- | | |
|---|-----|
| 12. B). Determine the expression for reliability evaluation of series and parallel systems. | 10M |
| 13. A). Explain the Reliability Evaluation of Parallel system with an example. | 10M |

OR

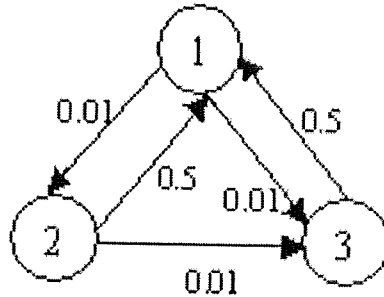
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| 13. B). A system is composed of three components. Component 1 is in series with the parallel combination of components 2 and 3. Given $\lambda_1=2$ failures per year and $\lambda_2=\lambda_3=3$ failures/year. Calculate the reliability and MTTF of the system for a mission time of 1000 hours. | 10M |
|---|-----|

(P.T.O..)

14. A). Develop an expression for number of time intervals the system has been spent in various states before reaching absorbing state. 10M

OR

14. B). The state space diagram and transition rates in f/yr of a continuous Markov process is shown in Fig. Evaluate the steady state probability (Limiting state Probability) of each state. 10M



15. A). Using frequency balance approach, derive the expressions for frequency of encountering states in Two component repairable model. 10M

OR

15. B). Estimate the basic probability indices of Series-Parallel system shown in Fig. using Network reduction method. Assume Failure rate and repair time of each component as 0.5 f/hr, 5 hrs respectively 10M

