IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Digital Signal Processing
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Find the sponse of the system IIT ibed b e difference equation
$y(n) - 0.1\ y(n-1) - 0.12\ y(n-2) = x(n) - 0.4\ x(n-1)$,
if $y(-1) = y(-2) = 2$ and $x(n) = (0.4)^n u(n)$.   7M

   b) List out the properties of ROC of Z Transform.   7M

OR

2. Find 4 point DFT and IDFT of the sequence x(n) = {1,1,1,1 } and plot their magnitude and phase responses.   14M

UNIT–II

3. a) Determine DFT of a given sequence x(n) = { 2,1,4,6,5,8,3,9 } using DIT FFT algorithm.   7M

   b) Discuss about In-place computation and bit reversal method.   7M

OR

4. Find out DFT of a sequence x(n) = {1,2,3,4,4,3,2,1} using DIF FFT algorithm and also obtain the same sequence using Inverse DIF FFT algorithm.   14M

UNIT–III

5. a) Differentiate between Analog and Digital filters.   7M

   b) Realize the given difference equation y(n) = 0.5y(n-1) – 0.25 y(n-2) + x(n) + 0.4 x(n-1) in direct form I method.   7M

OR

6. Design a digital Butterworth / pass filter whose trans f tion given by 0.7 $IH(e^{jw})I$ 1,for 0 $\omega \le 0.2\pi$ and $IH(e^{jw})I$ 0.3 for 0.6 $\pi \le \omega \le 0.2\pi$ is using Impulse Invariant technique.   14M

UNIT–IV

7. a) Compare FIR and IIR Filters.   7M

   b) Discuss in brief about design of FIR digital filters using Windowing techniques.   7M

OR

8. Design a linear phase FIR filter with an anti symmetric impulse response and even length.   14M

UNIT–V

9. With neat diagrams explain speech recognition and speech synthesis.   14M

OR

10. a) Explain about oversampling A/D converter.   7M

    b) Explain about Digital music synthesis.   7M

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R-14

Code: 4G271

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Fundamentals of HVDC & FACTS Devices
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Explain the typical layout of HVDC converter station with help of neat sketch   7M

   b) Discuss the analysis of 3 – phase bride circuit with and without overlap.   7M

OR

2. a) Compare AC and DC transmission with respect to technical and economic aspects.   7M

   b) Explain the 12 pulse converter with help of neat circuit diagram and wave forms.   7M

UNIT–II

3. a) Explain the principle of DC link control in HVDC system   7M

   b) Explain the hierarchy control system of HVDC system   7M

OR

4. Explain the current and extinction angle control with help of neat schematic wave forms.   14M

UNIT–III

5. a) Explain the modeling of AC network converters in HVDC system.   7M

   b) What are the constraint that limits the power flow and discuss the ways to overcome these limits.   7M

OR

6. a) Explain brief description and definitions of FACTS controllers, give the symbolic representation and their relative importance.   7M

   b) Explain power flow in parallel path and meshed system with help of neat diagrams.   7M

UNIT–IV

7. a) Discuss the objectives and requirements of shunt compensation   7M

   b) Explain indirect output voltage control of STATOM with help of neat block diagram.   7M

OR

8. a) Explain the principle operation of FC – TCR with the help of power diagram and waveforms.   7M

   b) Explain basic principles and different modes of operation of TCSC with help of neat diagrams.   7M

UNIT–V

9. a) Explain basic principles of UPFC with help of neat schematic diagram.   7M

   b) Explain conventional transmission control capabilities of the UPFC with phasor diagrams and derive necessary equations   7M

OR

10. Explain independent real and reactive power flow control of UPFC.   14M

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IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Instrumentation
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Discuss the difference between accuracy and precision.   6M
   b) Describe the various static characteristics of instrument·   8M

OR

2. a) Describe the pulse modulation and pulse code modulation.   7M
   b) Briefly describe the statistical analysis of random errors.   7M

UNIT–II

3. a) Describe in details the pulse amplitude modulation system as used for telemetry. 9M
   b) What is the significance of Bessel functions in FM?   5M

OR

4. a) List the different types of data transmission. Explain the block diagram of a
      general telemetry system.   7M
   b) Explain land line telemetering system and describe the advantages.   7M

UNIT–III

5. Explain the generalized diagram of a digital data acquisition system and give the
   uses of data acquisition system.   14M

OR

6. List and explain different types of multiplexing systems.   14M

UNIT–IV

7. With neat sketch describe the principle and operation of Linear variable
   differential transformer.   14M

OR

8. Write short notes on
   a) Photo conductive cell.
   b) Thermistor.   14M

UNIT–V

9. a) Describe the ultrasonic flow transducer and also list the advantages.   7M
   b) Explain toothed rotor variable reluctance tachometer with neat sketch?   7M

OR

10. a) Derive the expression of gauge sensitivity for strain gauge.   6M
    b) Describe the working of anemometer when used for measurement of flow of liquids. 8M
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R-14

Code: 4GA71

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Management Science
(Common to EEE & CSE)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
****

UNIT–I

1.   Define management. Explain nature and significance of Management science.

OR

2.   Explain the principles of management as outlined by Henry Fayol.

UNIT–II

3.   a)   Analyze the features of different methods of production.

   b)   The following information is about the shock observers used by automobile work shop. Annual demand 4800 units, Unit price Rs 300 Cost of placing an order Rs.50, Storage cost 3 Percent per annum

   Calculate: (i) EOQ (ii) Number of orders to be placed

OR

4.   What is product life cycle? Describe each stage in PLC with the strategies to adopt in each stage

UNIT–III

5.   How the term recruitment different from selection? What are the sources of recruitment?

OR

6.   What is human resource planning? Explain the human resource planning process

UNIT–IV

7.   Discuss the factors influence on working capital requirements of a firm.

OR

8.   Various activities involved in project are given below

Activity	Optimistic time (To)	Most likely time (Tm)	Pessimistic time (TP)
1-2	3	7	9
1-3	5	9	13
2-4	2	5	7
2-5	1	3	6
3-4	8	12	14
3-6	6	9	8
4-7	3	6	11
5-7	4	7	9
6-7	6	9	11

   a) Draw a PERT network diagram

   b) Find out the probability of complete the project in 30 days.

   c) Find out the project duration at 95 per cent probability.

UNIT–V

9.   a) Explain the concept and significance of ERP.
   b) Explain the Importance of the TQM in organization.

OR

10.   What is MIS? Explain characteristics and benefits of MIS

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Code: 4G278

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Optimization Techniques
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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1. a) What do you mean by local optimum and global optimum?   4M
   b) Maximize: $f = 8x_1 + 4x_2 + x_1x_2 - x_1^2 - x_2^2$
      Subject to: $2x_1 + 3x_2 \quad 24$
                    $-5x_1 + 12x_2 \quad 24$
                              $x_2 \quad 5$
      by applying Kuhn-Tucker conditions.   10M

OR

2. a) What are the necessary and sufficient conditions for minimum / maximum?   4M
   b) Maximize: $f = 9 - 8x_1 - 6x_2 - 4x_3 + 2x_1x_2 + 2x_1x_3 + 2x_1^2 + 2x_2^2 + x_3^2$
      Subject to: $x_1 + x_2 + 2x_3 \quad 3$
      by using Lagrange's multiplier method.   10M

3. a) What is the principle of Simplex method?   4M
   b) Explain the Simplex algorithm.   10M

OR

4.   Solve the following LPP:
      Maximize: $f = 3x + 2y$
      Subject to: $21x - 4y \quad -36$
                    $x + 2y \quad 6$
                    $6x - y \leq 72$
            and $x, y \quad 0$ 14M

5.   GC auto has three plants in Bangalore, Hyderabad and Chennai, and two
      major distribution centers in Nagpur and Vizag. The capacities of the three
      plants during the next quarter are 1000, 1500, and 1200 scooters. The
      quarterly demand at the two distribution centers are 2300 and 1400 scooters.
      The transportation cost per scooter (in Rupees) on different routes between
      the plants and the distribution centers are given below. Design an optimum
      transportation schedule.

	Vizag	Nagpur
Bangalore	80	215
Hyderabad	100	108
Chennai	102	68

14M

OR

6. a) Define convex and concave functions.   4M
   b) Examine whether the following functions are convex or concave.
      $f(x) = 3x_1^2 - 6x_2^2$
      $f(x) = 4x_1^2 + 3x_2^2 + 5x_3^2 + 6x_1x_2 + x_1x_3 - 3x_1 - 2x_2 + 15$.   10M

UNIT–IV

7. a) What is meant by gradient of a function?   4M

    b) Minimize: $f = 2x_1^2 + x_2^2$

   by using the steepest descent method with the starting point (1,2)   10M

OR

8. a) Define conjugate directions.   4M

    b) Find the value of x in the interval (0,1) which minimizes the following function:

        $f = x^2 - 1.5x$ to within ± 0.05 by Fibonacci method.   10M

UNIT–V

9. a) Explain the basic approach to Penalty function method.   7M

    b) Minimize: $f = 3x_1^2 + 4 x_2^2$

        Subject to: $x_1 + 2x_2 = 8$

        using an exterior penalty function method.   7M

OR

10. a) State Bellman's principle of Optimality.   4M

    b) Find the shortest highway route between cities 1 and 7, shown in the road
        network, by DP backward recursive approach.

                                                                                            10M

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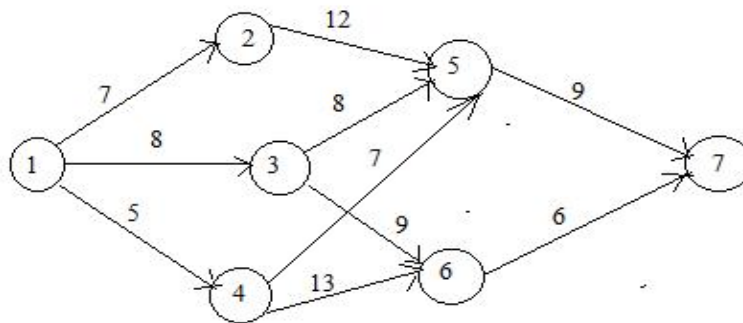
IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Reliability Engineering & Applications to Power Systems
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
****

| UNIT–I |

1. a) Derive an expressions for expected value and standard deviation for binomial distribution and exponential distribution.   7M

    b) An electronic circuit consists six transistors each having a failure rate of 1×10^{-6} failures/hr, four diodes each having a failure rate of 0.5×10^{-6} f/hr, three capacitors each having a failure rate of 0.2×10^{-6} f/hr, ten resistors each having a failure rate of 5×10^{-6} f/hr and two switches having a failure rate of 2×10^{-6} f/hr.

    i.   Evaluate the equivalent failure rate of the system and the probability of serving for 1000hrs.
    ii. If 2 such circuits are connected in parallel. Find the probability of serving for 1000hrs if only one of the circuit is required for system success.   7M

OR

2. a) The probability density function of a component is characterized by mathematical function is given by $f(t) = 3t^2/10^9$, where, $0 \le t \le 1000$ hr.

    (i) Determine the probability of failure with in 100hr (ii) Compute MTTF

    (iii) Find the design life for a reliability of 0.95. (iv) Find B1 life period   7M

    b) Show that the Mean=Mode=Median of a normal distribution   7M

| UNIT–II |

3. a) Draw and explain the bathtub curve with neat sketch indicating all life periods.   6M

    b) Determine the reliability of the following linked system shown in Figure 1 using decomposition method.

Fig. 1
                                                                                          8M
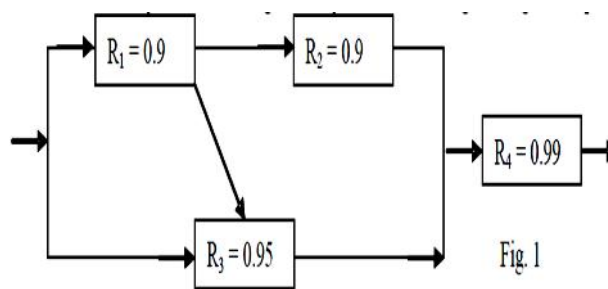
OR

4   a) Compute the symbolic unreliability expressions for the following network shown in Figure 2 using network partitioning approach:

Figure 2   8M
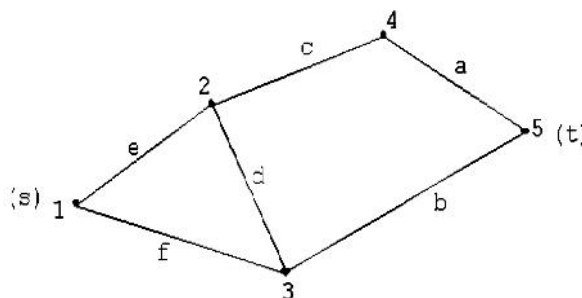
    b) What do you mean by (i) Fully redundant system and (ii) partially redundant system? How are their reliabilities evaluated?   6M

UNIT–III

5. a) For the following state-space diagram shown in below Figure 3, the transitional rates are marked. (i) Determine the limiting state probability of each state. (ii) the average number of time intervals spent in each state if state 3 is defined as an absorbing state
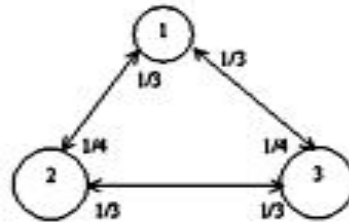
Figure 3   10M

b) Describe the Reliability evaluation of repairable systems   4M

OR

6. a) Develop the expressions for limiting state probabilities of two non-identical components repairable model using STPM approach also draw state diagram.   8M

b) A system consists of two components A and B with independent failure and repair rates. From the state space analysis derive the expression for steady state probability of occurrence of each state of the system. Given that $\lambda_A = \lambda_B = 0.3$, $\mu_A = \mu_B = 9.7, 0.4$. Compute STPM and state probabilities.   6M

UNIT–IV

7. a) A generating station consists of two units of 40 MW and 60 MW with forced outage rates of 0.08 and 0.05 respectively. The MTTR of either unit is 20 days. Calculate LOLP, if it has to deliver a steady load of 50 MW.   7M

b) Explain how sequential method is used to develop cumulative capacity outage probability table for unit addition/ removal, with suitable expressions   7M

OR

8. a) In a generating system there are 3 units, 2 units are of 25MW capacity each and 1 unit of 50MW respectively. Each unit has a failure rate of 0.01 f/day and repair rate of 0.49 r/day. Determine the capacity outage cumulative probability table using sequential addition algorithm. Also draw the state diagram.   7M

b) Explain about the Two level representation of daily load modeling   7M

UNIT–V

9. a) Explain the weather effects on transmission systems using necessary expressions   7M

b) Discuss the common mode failures in power system   7M

OR

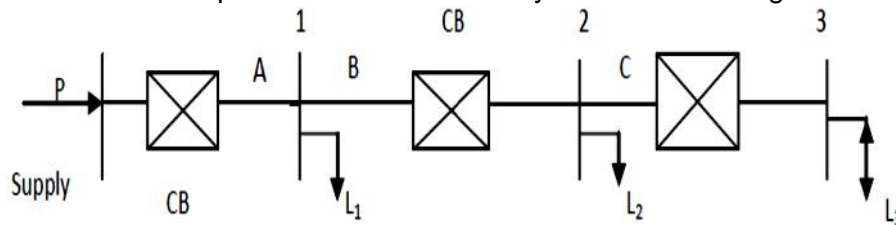10. Consider a three load point radial distribution system shown in Figure 4.

Figure 4

Component data of the system is as follows:

Line Id.	λ f/yr.	R in hrs.	No.of customers (N_u)	Average load demand in KW	Load point Id.
A	0.2	6	200	1000	L1
B	0.1	5	150	700	L2
C	0.15	8	100	400	L3

Evaluate:
(a) Load point reliability indices.
(b) Various customer oriented load and energy oriented indices of the system.   14M

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IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Renewable Energy Sources
(Electrical & Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Calculate the sun's altitude and azimuth angle at 10.30 AM solar time on march 20 for a location at 40 ^{0}N latitude.   7M

   b) What is solar radiation? Explain how solar radiation is measured using Pyranometer.   7M

OR

2. a) Differentiate renewable energy sources with non-renewable energy sources.   7M

   b) With neat sketches, explain about different measuring solar radiation instruments.   7M

UNIT–II

3. a) Explain the working of forced circulation water heating system.   7M

   b) What are the advantages and disadvantages of concentrated plate collector?   7M

OR

4. a) Suggest suitable energy storage methods for solar energy.   7M

   b) With neat sketches, list out the components of flat plate and concentrated plate collector.   7M

UNIT–III

5. a) Explain the significance of Yaw control in a wind mill.   7M

   b) Derive the expression for Torque coefficient and thrust coefficient for a wind mill.   7M

OR

6. a) Name the different types of ocean thermal energy conversion systems.   7M

   b) What are the advantages & disadvantages of tidal energy?   7M

UNIT–IV

7. a) Classify biomass conversion technologies and explain briefly about each of them.   7M

   b) With a neat sketch, explain the working of any bio-mass digester.   7M

OR

8. a) Explain about the different types of thermo electric energy conversions.   7M

   b) What are the advantages and disadvantages of bio mass energy?   7M

UNIT–V

9. Explain the principle of:
   (a) Seebeck effect and   7M
   (b) Peltier effect with relevant equations   7M

OR

10. a) With a neat sketch, explain the principle of operation and working of a closed cycle MHD power plant.   7M

    b) What is the need of Direct Energy Conversion? Mention some of its limitations.   7M

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Code: 4G276

R-14

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Soft Computing Techniques
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
****

UNIT–I

1. a) Draw a simple artificial neuron and discuss the operations of biological neural networks.   7M
    b) Compare and contrast feed-forward and feedback networks.   7M

OR

2. a) Explain why McCulloch-Pitts neuron widely used in logic function.   7M
    b) Draw a neat flowchart of training algorithm of Hebb network.   7M

UNIT–II

3. a) What is supervised learning? How does learning take place in supervised learning? Explain it.   7M
    b) Explain briefly about error function for delta rule.   7M

OR

4. a) Explain the training algorithm used in Adaline network.   7M
    b) Write a short notes on "*overfitting*" and "*overlearning*"   7M

UNIT–III

5. a) Explain the relations of classical set.   7M
    b) Consider two given fuzzy sets $A = \left\{ \frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8} \right\}$ and $B = \left\{ \frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8} \right\}$ perform union, difference and complement over fuzzy sets A and B.   7M

OR

6. a) Explain the features of membership functions.   7M
    b) Discuss in detail the inference method adopted for assigning membership values.   7M

UNIT–IV

7. a) Compare and contrast traditional algorithm and genetic algorithm.   7M
    b) Explain briefly various operators involved in genetic algorithm.   7M

OR

8. a) Explain the operation of a simple genetic algorithm with neat flowchart. 7M
    b) Discuss the various applications of genetic algorithm.   7M

UNIT–V

9. a) Explain in detail the approach of ANN to load flow studies.   14M

OR

10. a) Discuss about the fuzzy logic based unit commitment.   7M
    b) How genetic algorithm is useful for economic dispatch? Explain it.   7M

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IV B.Tech. I Semester Regular Examinations Nov/Dec 2017
Switch Gear and Protection
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
****

UNIT–I

1. a) Describe the construction, principle of operation and applications of SF$_6$ breaker?   7M

   b) A circuit breaker is rated as 2500A, 1500 MVA, 33 kV, 3-sec, 3-phase oil CB. Determine the rated symmetrical breaking current, rated making current, short time rating and rated service voltage?   7M

OR

2. a) What are the requirements of the contact material for a vacuum circuit breaker? Why is current chopping not a serious problem with such circuit breakers?   7M

   b) Explain the terms   (i) restriking voltage   (ii) recovery voltage and (iii) RRRV   7M

UNIT–II

3. a) Determine the time of operation of an IDMT relay of rating 5A and having setting of 125% and TMS = 0.5. The relay is connected through a CT of 400/5A. The fault current is 4000 A. The operating time for PSM of 8 is 3.2 Sec.   7M

   b) Describe with block diagram the construction and Principle of operation of a Microprocessor based percentage differential relay scheme for the protection of power transformer?   7M

OR

4. a) With the help of neat diagram explain the principle of static differential relay?   6M

   b) What is universal torque equation? Using this equation derive the following characteristics   (i) Reactance Relay   (ii) Mho Relay.   8M

UNIT–III

5. a) A 3-phase transformer having a line voltage ratio of 400/33,000 V is star –delta connected. The CTs on the 400 V side have a ratio of 800/5A. What must be the ratio of CTs on 33,000 V side?   7M

   b) Describe the construction, Principle of operation and applications of Buchholz Relay?   7M

OR

6. a) A 11 kV, 100 MVA alternator is grounded through a resistance of 5 Ohms. The CTs have a ratio of 1000/5. The relay is set to operate when there is an out-of balance current of 1 A. What percentage of the generator winding will be protected by the percentage differential scheme of protection?   7M

   b) What are the abnormal conditions in a large alternator against which protection is necessary? Discuss a protection scheme for an alternator against inter-turn faults?   7M

UNIT–IV

7. a) Explain the zonal protection scheme for feeder. Describe the reactance relay characteristic for 3-zone protection. 7M

    b) Discuss and compare briefly various bus-bar arrangements in a power system? 7M

OR

8. a) Describe the pilot wire protection its merits and demerits in detail? 7M

    b) Explain the time graded and current graded systems in over current protection? 7M

UNIT–V

9. a) Explain the protective characteristics of a lightning arrester against the with-stand characteristic of equipment on a voltage – time curve? 9M

    b) Calculate the reactance of a coil suitable for a 33kV, 3-phase transmission system of which the capacitance to earth of each conductor is 4.5 µF? 5M

OR

10. a) Explain different types of earthing the neutral point of a power system. 7M

    b) What is horn-gap arrester? Explain how it works? 7M

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