

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL 2019Subject: Utilization of Electrical EnergyBranch: **EEE****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Which motor is best suited for rolling mills?
2. Which material is used for electrode in direct arc furnaces?
3. Define Illumination.
4. Which city is adopted electric traction in India?
5. What is the relation between tractive effort and adhesive weight?

II. Answer ALL questions of the following**10x2Mark=20 Marks**

1. Write the advantages of group drives.
2. What are the reasons for using load equalization in electric drives?
3. Write the various types of Induction furnaces.
4. Write different types of Resistance welding.
5. Define Luminous Intensity.
6. Define Beam factor.
7. State the advantages of diesel electric trains.
8. Define scheduled speed.
9. What is adhesive weight?
10. Define coefficient of adhesion.

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

1. Though AC is superior to DC for electric drive, sometimes DC is preferred. Give the reasons and mention some of the applications.

OR

2. Discuss the selection criterion of a motor for a drive application.
3. (a) Comparison between A.C. and D.C. Welding.
(b) Discuss welding electrodes of various metals.

OR

4. (a) Explain any one method of electric heating in detail.
(b) The power required for dielectric heating of a slab of 150 sq cm in area and 2 cm thick is 200 W at frequency of 30 M Hz. The material has relative permittivity of 5 and power factor of 0.05. Determine the voltage necessary and current flowing through the material.

5. a) Discuss the Laws of illumination and its limitation in actual practice.
b) What is photometry? Describe photovoltaic method of photometry and discuss its limitations.

OR

6. a) Compare a tungsten filament lamp with fluorescent lamp in detail. (b) What are the various types of lighting schemes? Explain with relevant diagrams
7. a) What are the various electric traction systems in India? Compare them.
b) Explain regenerating braking of electric motors.

OR

8. a) Draw speed-time curve of sub-urban services and explain
b) A train has a schedule speed of 40kmph between two stops which are 4kms apart. Determine the crest speed over the run, if the duration of stops is 60sec and acceleration and retardation both are 2km/hr/sec each. Assume simplified trapezoidal speed-time curve.
9. a) Explain the speed-time curve for urban service.

(b) A suburban electric train has a maximum speed of 60 kmph. The scheduled speed including a station stop of 20sec is 40kmph. If the acceleration is 1.5 kmph, determine the value of retardation, if the average distance between stops is 3kms.

OR

10. (a) What do you understand by the specific energy consumption and what factors affect the specific energy consumption.

(b) A sub urban electric train has a maximum speed of 70 km/hr. The schedule speed including a station stop of 30 sec is 45 km/hr. If the acceleration is 1.5 km/hr/sec. Find the value of retardation when the average distance stops is 6 m.

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Gundlapochamp ALLy (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2019**Subject: Digital signal ProcessingBranch: **EEE****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. What is the purpose of Anti Aliasing Filter in Digital Signal Processing system?
2. Define Region of Convergence.
3. What is impulse invariant transformation?
4. State the limitations of direct form-II Structure.
5. What do you mean by decimation?

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Explain about quantization process in DSP System.
2. Determine Z-transform and ROC of the finite- duration signal $x(n) = \{2, 4, 5, 7, 0, 1\}$.
3. What is the relation between Z-transform and DFT.?
4. Calculate the number of complex additions and multiplications in a 256-point radix-2 FFT?
5. Obtain the transfer function of the IIR filter whose difference equation is given by
 $y(n) = 0.9y(n-1) + 0.1x(n)$.
6. Give the difference between recursive and non recursive filters.
7. What is the general expression for FIR filter?
8. What is constant phase delay in linear FIR filters?
9. What is interpolator? Draw the symbolic representation of an interpolator?
10. What is overflow limit cycle?

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks****1. a. Determine the Total solution for 2nd order Differential Equation**

$$y(n) - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1) \text{ when the input sequence is } x(n) = 4^n u(n)$$

[6M]**b. Sketch the frequency response for the system defined by**

$$y(n] + \frac{1}{4}y(n-1) = x(n) - x(n-1)$$

[4M]**(OR)****2. a. Find the discrete convolution of following sequence**

i. $x(n) = \{1, 1, 2, -1\}$ $h(n) = \{1, 0, 1, -1\}$

ii. $u(n) * u(n-2)$

[4M]**b. Determine the response of the system $y(n) = [x(n-1) + x(n) + x(n+1)]$ where**

$$x(n) = \{\dots, 0, 3, 2, 1, 0, 1, 2, 3, 0, \dots\}$$

[6M]

3. Define DFT and IDFT. Prove Circular convolution, Circular correlation and Time reversal properties of DFT.

(OR)

4. Compute 8-point DFT of the given sequence $x(n) = \{1, 2, 1, 2, 1, 2, 1, 2\}$ using DIF FFT algorithm.
5. Determine the system function $H(z)$ of the Chebyshev's low pass digital filter with the specifications

$\alpha_p = 1$ dB ripple in the pass band $0 \leq \omega \leq 0.2\pi$

$\alpha_s = 15$ dB ripple in the stop band $0.3\pi \leq \omega \leq \pi$

using bilinear transformation (assume $T = 1$ sec).

(OR)

6. Convert the analog filter $H(s) = 0.5(s+4)/(s+1)(s+2)$ using impulse invariant transformation with $T = 0.314$ sec.

7. Design a low pass filter using rectangular window of $N=9$ whose desired frequency response is

$$H_d(e^{j\omega}) = \begin{cases} 1 & ; \pi/3 \geq \omega \geq -\pi/3 \\ 0 & ; \text{otherwise} \end{cases}$$

And plot the magnitude response.

(OR)

8. Design FIR Digital High pass filter using Hamming window whose cutoff frequency is 1.2 rad/s and length of window $N=5$.

9. Design 1stage 2stage interpolators to meet the following specifications $I=20$

- a) Pass band : $0 \leq F \leq 90$
- b) Transition band : $90 \leq F \leq 100$
- c) Input sampling rate : 10,000 HZ
- d) Pass band Ripple : 10^{-2}
- e) Stop band Ripple : 10^{-3}

(OR)

10. Explain in detail about the poly phase implementation of FIR filter for interpolator and decimator.

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2019**Subject: Power System Operation and ControlBranch: **EEE**Time: **3 hours**Max. Marks: **75****PART – A****I.** Answer **ALL** questions of the following**5x1Mark=5 Marks**

1. Write transmission line loss formula?
2. What is lagrangian multiplier?
3. How the ALFC loop is affected by AVR loop?
4. What is interconnection operation?
5. How is the real power in a power system controlled?

II. Answer **ALL** questions of the following**10x2Marks=20 Marks**

1. What are the assumptions of B –Coefficients?
2. What is base load and peak load plants?
3. What are the constraints that come in hydro thermal power generation scheduling?
4. Define spinning Reserve.
5. Draw single area control block diagram.
6. What is the function of AVR?
7. What is called tie line bias control.
8. What is called AGC and ALFC and AVR.
9. Explain about effect of excitation control.
10. What is Shunt compensation?

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. **a)** The incremental fuel cost for the two plants are given by

$$IC_1 = 0.2p_1 + 45$$

$$IC_2 = 0.25p_2 + 34$$

Where c is in RS/HR and p is in MW. If both units operate at all times and maximum and minimum loads on each are 100MW and 20MW respectively, determine the economic load schedule of the plants for the loads of 80MW and 180MW . Neglect line losses.

- b)** Explain about incremental production cost and incremental fuel rate curve.

(OR)

2. **a)** How is generation scheduled among various generators when transmission losses are neglected in a thermal system? Explain.

- b)** Explain the following terms [1+2+2]

- i) Input – output curve ii) Incremental water rate curve

- iii) Heat rate curve and cost curve. Bring out the differences between them.

3. Write short notes on
- Derive Kirchmayers method?
 - Explain Hydrothermal scheduling problem.

(OR)

4. Explain Optimum Hydrothermal system scheduling.
5. Explain following concepts i) Control area concept ii) Area control error.
- (OR)
6. Explain isolated single area dynamic response and controlled case.
7. Explain the principle, involved in tie line frequency control in case of two area system.
- (OR)
8. Derive the expression for steady state frequency for the two area system for uncontrolled case.
9. a) Explain clearly about the compensation of line and discuss briefly different methods of compensation.
- b) Discuss the advantages and disadvantages of different types of compensating equipment for transmission system.

(OR)

10. Discuss in detail about the generation and absorption of reactive power in power system components.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2019Subject: Electrical Distribution Systems

Branch: EEE

Time: 3 hours

Max. Marks: 75

PART – A**I.** Answer ALL questions of the following**5x1Mark=5 Marks**

1. Define Contribution Factor.
2. Write the advantages of outdoor substation.
3. Write the power loss relation between single phase to 3-phase?
4. Define Circuit breaker.
5. What is the importance of shunt capacitor compensation.

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Derive the relation between load factor and loss factor.
2. What is load and write the classification of loads.
3. Write the rules to be considered to locate the substation.
4. Write the differences between radial and loop types of Primary Distribution Feeders.
5. Give the relation between the voltage drop in single phase and voltage drop in three phases when Single phase two wire Ungrounded laterals are considered.
6. Write the total series voltage drop and power loss formulae of a feeder with uniformly distributed load.
7. Write the advantages of Fuse-Fuse coordination?
8. Write about transmission line protective devices
9. Write short notes on power factor correction.
10. Write the advantages of shunt compensation.

PART-B

Answer ALL questions of the following

5x10 Marks= 50Marks

1. Explain load modeling and it's characteristics.

OR

2. Write in detail about Residential and industrial loads and their respective characteristics.
3. Draw the single line diagram of radial and loop type feeders and mention the factors that influences the selection of primary feeder.

OR

4. Explain the criteria for location of a substation and what are the benefits obtained through optimal location of substation.
5. Explain the rules to be considered to locate the Substation.

OR

6. What are automatic line sectionalizers? Explain the purpose and advantage of using them?
7. What are the common faults occur in distribution system? Explain with line diagrams.

OR

8. Explain the principle of operation of fuses and line sectionalizers and also discuss briefly the general coordination procedure.
9. Explain the practical procedure to determine the best capacitor location.

OR

10. Compare and explain the role of shunt and series capacitor in voltage control.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2019Subject: Embedded System DesignBranch: **EEE**Time: **3 hours**Max. Marks: **75****PART – A****I.** Answer **ALL** questions of the following**5x1Mark=5 Marks**

1. Explain the different applications of embedded systems?
2. What are the real time requirements of an embedded systems?
3. Expand COTS, EEPROM, FSM, IDE
4. What is Mailbox?
5. How sockets are established?

II. Answer **ALL** questions of the following**10x2Marks=20 Marks**

1. Write applications of embedded systems in medical domain.
2. What are the complicating factors in embedded design .
3. Name some emerging wireless protocols.
4. What is Von-neumann Architecture?
5. Define protection circuit
6. Explain the role of reset circuit in an embedded system
7. What is soft real time systems? Give an examples?
8. Define bus and interrupts
9. Discuss the problems in shared memory access
10. What is inter task communication

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. Explain in detail about the classification of embedded system.

OR

2. Define Embedded system ?justify Embedded system with an example
3. What are the different types of memories used in embedded system design? Explain each of the with examples.

OR

4. Explain the different factors that needs to be considered in the selection of memory for embedded systems.
5. Explain about Embedded Firmware & different firmware design approaches.

OR

6. Explain the following communication interfaces. (i) WI-FI (ii) Bluetooth
7. Explain about preemptive and non preemptive scheduling with examples?

OR

8. What is Monolithic and micro kernel? Which one is used in RTOS, explain in detail
9. How message passing is organized between the tasks using state transitions. Explain systematic procedure.

OR

10. Explain the following (i) Co operative multitasking (ii) Preemptive multitasking (iii) non-Preemptive multitasking

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2019Subject: High Voltage EngineeringBranch: **EEE**Time: **3 hours**Max. Marks: **75****PART – A****I.** Answer **ALL** questions of the following**5x1Mark=5 Marks**

1. Write Laplace equation.
2. What is break down voltage?
3. Specify the expression for ripple factor in half wave rectifier.
4. What is lightning overvoltage?
5. Propose a suitable test for testing of cables.

II. Answer **ALL** questions of the following**10x2Marks=20 Marks**

1. Write the relation between electric field density (D) and electric field intensity (E).
2. Write the limitation of Finite Element Method.
3. Define Ionization process
4. Define Townsend's secondary ionization coefficient.
5. Draw the circuit of voltage doubler.
6. What are the limitations of series resistance micro ammeter method?
7. Define lightning phenomena.
8. What is direct stroke?
9. What is meant by non-destructive testing?
10. Draw the equivalent circuit of the cable for discharges.

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. Explain the applications of insulating materials in capacitors and circuit breakers.

(OR)

2. Explain Finite Element Method. Also mention the merits and demerits.
3. Explain Townsend's criteria for breakdown in gases .Also explain the determination of Coefficients α and γ .

(OR)

4. Explain breakdown due to internal discharges in solid dielectrics.
5. Explain the working of voltage multiplier circuit with neat waveforms.

(OR)

6. Explain series impedance voltmeter and series capacitance voltmeters method for measuring high ac Voltages.
7. What is the origin of switching surges? Also explain about the charge formation in the clouds.

(OR)

8. Explain about the types of surge arresters. Explain the protection of lines with surge arrester.
9. Explain about the partial discharge measurement to find DC resistivity of a material

(OR)

10. Explain testing of surge arresters.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL 2019**Subject: Switch Gear and Protection**Branch: **EEE****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. What is the function of Auto reclosures?
2. What are the relays used for protection of short and long transmission line?
3. State the methods of protection of busbars.
4. What are the advantages of resonant grounding?
5. What are effects of over voltages in power system?

II. Answer ALL questions of the following**10x2Mark=20 Marks**

- 1) What is the function of auto reclosures?
- 2) Why are circuit breakers designed to have a short time rating?
- 3) Define the following terms related to protective relaying: (a) pick-up current (b) reset ratio
- 4) A relay is connected to a 400/5A CT with a current setting of 150%. Calculate the PSM when circuit carries a fault current of 4000A.
- 5) What are the disadvantages of Differential protection used for alternators?
- 6) What is the function of Buchholtz relay?
- 7) What are the applications of solid grounding?
- 8) Write any two advantages of Neutral grounding.
- 9) What are the causes of over voltage?
- 10) Define Lightning and Arcing ground.

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

- 1) In a short circuit test on a circuit breaker, following readings are obtained on a single frequency transient:
 - (i) Time to reach peak re striking voltage, 50 micro seconds.
 - (ii) Peak re striking voltage, 100kVDetermine average RRRV and frequency of oscillations.

OR

- 2) Explain the terms Recovery voltage, Restriking Voltage and RRRV. Derive an expression for the restriking voltage in terms of system capacitance and inductance.
- 3) (a) Explain the construction and operation of hinged armature type relay with neat sketch.
(b) Compare the characteristics of i) impedance relay ii) mho relay and iii) reactance relay.
Also give their applications.

(OR)

- 4) (a) Describe Instantaneous, DMT and IDMT type Over current Relays with characteristics.
(b) Explain the principle of operation of Differential and Percentage differential relays.

5) (a) Explain a protection scheme provided against stator internal faults of an Alternator with its diagram

(b) A star connected, 3 phase, 10MVA, 6.6kV alternator has a per phase reactance of 10%. It is protected by Merz-Price circulating current principle which is set to operate for fault currents not less than 175A. Calculate the value of earthing resistance to be provided in order to ensure that only 10% of the alternator winding remains unprotected.

OR

6) (a) Explain percentage biased differential protection applied to 3-phase transformer with diagram. Also give different types of CT connections used for various combinations of transformer primary and secondary winding connections. -

(b) Describe Three-zone distance relay protection of lines using Impedance relays.

7) Discuss and compare Solid, Resistance and Reactance methods of neutral grounding and also draw their circuit and phasor diagrams.

(OR)

8) (a) Describe Arc suppression coil grounding with its circuit and phasor diagrams and also derive the expression for inductance of arc suppression coil. [6M]

(b) What are the advantages and disadvantages of an ungrounded system? [4M]

9) (a) What are the advantages and disadvantages of Metal oxide lightning arrester? [4M]

(b) Describe the protection of transmission lines against direct lightning strokes. [6M]-

(OR)

10) (a) Describe the construction and operation of Valve type surge arrester?

(b) Enumerate the basic concept of insulation coordination and draw Volt-Time Characteristics.