Code No.: 404B3 MR14

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-2018

SUBJECT: **Embedded System Design**

(BRANCH: Common to EEE & ECE)

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer All Questions **5x1Mark=5 Marks**

1. Give some examples of microprocessors used in embedded systems.
2. What is a scheduling?
3. What is Hex file creation?
4. List the features of RTOS.
5. Define Interface

II. Answer All Questions **10x2Mark=20 Marks**

1. Explain the quality attribute maintainability in embedded system design .
2. Explain Shortest Job first scheduling?
3. Explain third generation embedded systems.
4. What is The difference between ROM and RAM?
5. What is the use of oscillator circuit?
6. What is compiler?
7. Explain about tasks and threads?
8. What is Multitasking?
9. What is task synchronization?
10. Explain shared memory based IPC.

PART-B

Answer All Questions **5x10 Marks= 50Marks**

1. Explain the different characteristics of embedded systems in detail?

OR

2. Classify embedded systems based on complexity and performance.
3. What is a single purpose processor? What are the benefits of choosing a single purpose processor over a general purpose processor?

OR

4. Explain UART and Single wire communication interfaces.
5. Explain the embedded firmware development languages.

OR

6. Write short notes on.
   (i) Optocouplers (ii) Piezobuzzer (iii) Push button switch
7. Explain Task state diagram and Task control block (TCB).

OR

8. Explain different types of Task scheduling Algorithms?
9. a) Discuss the methods of protecting shared data.
   b) Explain different functional requirements needed in the selection of an RTOS

OR

10. What is remote procedural call? Explain.

Code No.: **402C1** **MR14**

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018

SUBJECT: **Electrical Distribution Systems**

(BRANCH: **EEE**)

Time: **3 Hours** Max Marks:75

PART-A

I. Answer all the questions **5 x1=5M**

1. Define Utilization factor.
2. Write any two benefits derived through optimal location of substation.
3. Define 3-phase balanced system?
4. What are the different types of common faults that occur in a distribution system?
5. Define voltage regulation.

II Answer all the questions **10 x 2=20M**

1. Explain the load modeling?
2. Derive the relation between load factor and loss factor.
3. What is the advantage of square type distributor?
4. How is the voltage level for distribution systems decided?
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. Discuss how the single phase loads connected from 3-phase system.
7. Write the properties of fuse element.
8. Explain the salient points in general coordination procedure.
9. What are the drawbacks of using series capacitor to boost the voltage?
10. Write the advantages of Automatic voltage Regulator.

PART-B

Answer all the questions **5 x 10=50M**

1. Discuss in detail about residential, commercial and agricultural loads and their respective characteristics.

(OR)

2. Write in detail about Residential and industrial loads and their respective characteristics.

3. a) Compare the Radial and Loop type primary feeders.
   b) What are the various factors that influence the primary feeder loading?

(OR)

4. Explain basic design practice of secondary distribution system and also discuss about secondary banking.

5. Explain the rules to be considered to locate the Substation.

(OR)

6. a. Calculate the % voltage drop in the main if load 500kVA is uniformly distributed along the feeder main. Consider k = 0.01%VD/(kVA.mi). (5M)

   b. Derive the expression for voltage drop in 3-phase balanced system. (5M)

7. a) Explain in detail about line sectionalizers.

   b) What are the objectives of distribution system protection.

(OR)

8. a) Explain the operation of re-closure.

   b) The per unit positive,negative,and zero sequence impedances of a distributed network are 0.06,0.06 and 0.04 respectively .determine the fault current for L-L and L-L-L fault.

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

(OR)

10. Explain the effect of AVR on voltage control with a neat sketch.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018

SUBJECT: **DIGITAL SIGNAL PROCESSING**

(BRANCH: **EEE**)

Time: **3 Hours** Max Marks: 75

PART-A

I. Answer all the questions **5 x 1 = 5 M**

1. Define discrete time sinusoidal signal.
2. Define DFT of a discrete time sequence.
3. What is order equation for the low pass Butterworth analog filter?
4. What are FIR filters?
5. List some of the finite word length effects in digital filters.

II Answer all the questions **10 x 2 = 20 M**

1. Determine whether the following systems are time invariant or not

   i.$y(n)= x(n)+x(n-1)$, ii.$y(n)= x^2(n)$
2. Write applications of z- transform.
3. Compute the DFT of the sequence $x(n)=\{1,1,1,1\}$
4. What is the relation between Z-transform and DFT?
5. What are low pass Butterworth filters ?
6. What are the advantages of Bilinear transformation?
7. What are the desirable characteristics of the frequency response of window function?
8. What is Gibbs phenomenon?
9. What is decimation and interpolation?
10. Find the expression for the following multi rate system.

PART-B

Answer all the questions **5 x 10 = 50 M**

1. 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

   $x(n)=\{\ldots,0,3,2,1,0,1,2,3,0\ldots\}$ [6M]

   (OR)

2. Determine the impulse and unit step response of the system described by the following difference

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

(OR)

4. a. Compute the eight-point DFT of the sequence x(n) ={1,1,1,1,0,0,0,0} Using the radix-2 decimation-in-time algorithm.

b. Explain overlap-add method for linear FIR filtering of a long sequence.

5 a. Discuss the steps in the design of IIR filter using Bilinear transformation for any one type of filter.

b. Determine H (Z) using the impulse invariant technique for the analog system function

$$H(S) = \frac{1}{(s+0.5)(s^2+0.5s+2)}$$

(OR)

6. Convert the analog filter with system function

$$H_a(s) = \frac{s+0.1}{(s+0.1)^2+16}$$

into a digital IIR filter by means of the bilinear transformation. The digital filter is to have a resonant frequency of $\omega = \pi/2$

7. (a) Compare FIR and IIR filters.

(b) Justify the statement that FIR filters can have linear phase characteristics.

(OR)

8. Design a FIR low pass filter with cut off frequency of 1KHz and sampling frequency of 4KHz with 11 samples using Fourier series method. Also sketch Frequency response.

9. Explain decimation and interpolation by frequency conversion.

(OR)

10. Explain the process of Interpolation by a factor I and also discuss how the images are eliminated with a neat block diagram.

Code No.: **402B1** **MR14**

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018

SUBJECT: **HIGH VOLTAGE ENGINEERING**

(BRANCH: **EEE**)

Time: **3 Hours** Max Marks:75

PART-A

I. Answer all the questions **5 x1=5M**

1. What is meant by uniform electric field?
2. Give the expression for Paschen's law.
3. What is the limitation of half wave rectifier?
4. Explain the term "distortion".
5. Explain the term puncture path.

II Answer all the questions **10 x 2=20M**

1. What are the applications of insulating materials?
2. Write examples of organic materials.
3. Define Townsend's first ionization coefficient.
4. What is ionization potential?
5. What is capacitance voltage transformer?
6. Write two advantages of sphere gap for measurements.
7. Draw the equivalent circuit of a surge arrester.
8. What is a surge impedance?
9. Explain the importance of RIV measurements for EHV power apparatus.
10. Define loss factor.

PART-B

Answer all the questions **5 x 10=50M**

1. Explain about Charge Simulation Method. Write the procedure for this method for solving field Problems.

(OR)

2. Explain the applications of dielectrics used in power capacitors and circuit breakers.
3. Explain Townsend's criteria for breakdown in gases .Also explain the determination of Coefficients α and γ.

(OR)

4. Explain Paschen's law. Also explain ionization by collision process

5. Explain series impedance voltmeter and series capacitance voltmeters method for measuring high ac Voltages.

(OR)

6. Draw and explain high current generator equivalent circuit.

7. What is meant by insulation co-ordination? How are the protective devices chosen for optimal insulation level in a power system?

(OR)

8. a)Explain simpson's theory in charge formation?
   b) Explain rate of charging of thunder clouds?

9. Explain the following terminologies often used in partial discharge detection
   a) electrical discharge b) partial discharge

(OR)

10. Explain about the measurement of dielectric constant and loss factor.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018

SUBJECT: **POWER SYSTEMS OPERATION AND CONTROL**

(BRANCH: **EEE**)

Time: **3 Hours** Max Marks:**75**

PART-A

I. Answer all the questions **5 x1=5M**

1. Write the load balance equation.
2. What are the optimization techniques for long range hydro scheduling problem?
3. Define single area control.
4. Draw the block diagram for tie-line power.
5. Define reactive power control.

II Answer all the questions **10 x 2=20M**

1. What are the assumptions of B –Coefficients?
2. What are loss coefficients?
3. Define spinning Reserve.
4. Write the equation of optimal hydrothermal scheduling.
5. Draw the block diagram of isolated power system.
6. What do you mean by steady state analysis in load frequency control?
7. Explain performance index and optimal parameter adjustment.
8. What is complete tie-line control?
9. What is reactive power compensation in transmission system?
10. What are disadvantages of shunt compensation?

PART-B

Answer all the questions **5 x 10=50M**

1. The incremental fuel cost for two plants are given by dc1/dp1=0.10P1+20Rs/mwhr and dc2/dp2=0.1P2+22.5Rs/mwhr. The system is operating at the optimum condition with P1=P2=100mw and dPL /dP2=0.2.Find the penalty factor of plant1 and incremental cost of received power. [10]

OR

2. a) What is production cost of power generated and incremental fuel cost. [5]

   b) Explain i) production cost ii) heat rate curve iii) incremental cost curve [1+1+3]

3. Explain optimal scheduling for hydrothermal system. [10]

OR

4. Explain about Hydrothermal coordination with necessary equations. [10]

5. Explain the steady state analysis of frequency for isolated single area system for uncontrolled case. [10]

OR

6. a) Obtain the block diagram of two area load frequency control.
   b) What is a control area? Discuss the proportional plus integral load frequency control. [5+5]

7. Obtain the composite lock diagram model of a two area load frequency controlled power system Network and write all necessary equations with explanation. [10]

OR

8. Explain optimal two area load flow control. [10]

9. What are the different types of reactive power compensating equipment for transmission systems? State the advantages and disadvantages of each. [10]

OR

10. The load at receiving end of a 3Φ overhead line is 30 MW, 0.8 pf lag at the line voltage of 66kV. A synchronous compensator is situated at sending end and the voltage at both ends of the line is maintained at 66kV. Calculate the MVAR of compensator. The line has a resistance and reactance of 6Ω/ph, 24Ω/ph, respectively. [10]

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018

SUBJECT: **SWITCH GEAR AND PROTECTION**

BRANCH: **EEE**

Time: 3 Hours Max Marks: 75

PART-A

I. Answer all the questions **5 x 1 = 5 Marks**

1. Define Fault clearing time of a circuit breaker.
2. Write universal torque equation for relays.
3. What is the function of Translay Relay?
4. What do you mean by grounding or earthing?
5. Define Impulse Ratio.

II. Answer all the questions **10 x 2 = 20 Marks**

1. What are the types of circuit breakers based on voltage?
2. Mention any two advantages of Vacuum circuit breaker.
3. 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.
4. What are differential relays.
5. What do you understand by field suppression and how it is achieved in alternator?
6. Discuss different transformer faults.
7. What do you mean by equipment grounding?
8. What are the applications of solid grounding?
9. What are the functions of surge diverter and surge absorber?
10. Draw the Standard Impulse Test Wave.

PART-B

Answer all the questions **5 x 10 = 50 Marks**

1. (a) Explain resistance switching and current chopping.

   (b) With a neat diagram explain the construction and working of SF6 Circuit Breaker.

(OR)

2. (a) With a neat diagram explain the construction and operation of Minimum Oil Circuit Breaker.

   (b) For a 132kV system, the reactance and capacitance up to the location of the circuit breaker are 3 ohms and 0.015μF respectively. Calculate the following :

   (i) The frequency of transient oscillation

   (ii) The maximum value of restriking voltage across the contacts of the circuit breaker.

   (iii) The maximum value of RRRV.

3. What are different inverse time characteristics of over current relays? Mention how characteristics can be achieved in practice for an electromagnetic relay.

(OR)

4. (a) Explain MHO and offset MHO relays with R-X characteristics.

   (b) Explain construction and working of a wattmetric type induction-disc relay.

5. (a) Explain the operation of Buchholtz relay for protection of transformers with its diagram.

   (b) A 3-Φ power transformer has a voltage ratio of 33/6.6kV and is star-delta connected. The protective CTs on the 6.6 kV side have a current ratio of 100:1. What must be the ratio of protective CTs on the 33kV side.

(OR)

6. Explain percentage differential protection of transformer with neat diagram.

7. A 230kV, 3-phase, 50Hz, 200km transmission line has a capacitance to earth phase. Calculate the inductance and KVA rating of the Peterson coil used for system.

(OR)

8. (a) Explain the concept of arcing grounds in the power system and derive the necessary expressions.

   (b) Describe the effects of Ungrounded Neutral on system performance.

9. Define and explain briefly volt-time characteristics for over voltages in power systems.

(OR)

10. a) Discuss the phenomenon of lightning stroke. How can wave set up by such a stroke represented.

    b) Explain the construction and working principle of valve type arrestor?

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018

SUBJECT: **UTILIZATION OF ELECTRICAL ENERGY**
(BRANCH : **EEE**)

Time: **3 Hours** **Max Marks: 75**

PART-A

I. Answer all questions. **5 x1=5M**

1. Give an example of intermittent load.
2. Define welding.
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 **10 x 2=20M**

1. Write the advantages of Individual drive.
2. Draw the speed-torque characteristics of DC series motor.
3. What are the different types of resistance welding?
4. Define welding.
5. Write the laws of illumination.
6. Define the term Maintenance factor.
7. What is electric braking?
8. Write the difference between plugging and rheostatic braking.
9. What is adhesive weight?
10. What is tractive effort?

PART-B

Answer all the questions **5 x 10=50 Marks**

1. a) What is electric drive? What are the advantages? **(5M)**
   b) Explain speed control of dc motor drive. **(5M)**

(OR)

2. a) What are the draw backs of rectifier fed DC drives. **(5M)**
   b) What are the factors are to taken into account for selecting a drive for a application? **(5M)**

3. Estimate the rating of an induction furnace to melt two tones of zinc in one hour if it operates at an efficiency of 70%. Specific heat of zinc is equal to 0.1. Latent heat of fusion of zinc 26.67k-cal per kg. Melting point is 455°C. Assume the initial temperature to be 25°C. **(10M)**

(OR)

4. The power required for dielectric heating of a slab of resin 150sq cm in area and 2 cm thick is 200 watts at a frequency of 30MHz. The material has relative permittivity of 5 and a power factor of 0.05. Determine the voltage necessary and current flowing through the material. If the voltage is limited to 600V. What will be the value of the frequency to obtain the same heating? **(10M)**

5. Compare tungsten filament lamp and fluorescent lamp with help of neat figures. **(10M)**

-(OR)

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

7. (a) State the different types of electric braking. Explain each of them in detail. **(5M)**
   b) Explain the requirement of ideal traction & show which drive satisfies almost all the requirements. **(5M)**

(OR)

8. a) What are the various electric traction systems in India? Compare them. **(5M)**
   b) Explain regenerating braking of electric motors. **(5M)**

9. A train weighing 200 tonnes is accelerated uniformly from rest to speed of 45 km/hr. up a uniform Gradient of 1 in 500, in 30 seconds. The power is then cut off and then train coasts down a uniform gradient of 1 in 1000 for a period of 40 sec. When brakes are applied the train comes uniformly to rest in 15 sec. Calculate the maximum power output of the driving motor assuming an efficiency of 60%. **(10M)**

(OR)

10. An electric train has an average speed of 42kmph on a level track between stops 1400 m apart. It is accelerated at 1.7km/hr/sec. Draw the speed-time curve and estimate the specific energy consumption. Assume tractive resistance as 50NW/Tonne and allow 10% rotational inertia. **(10M)**

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018

SUBJECT: **VLSI Design**

(BRANCH: Common to **EEE & ECE**)

Time: **3 Hours** Max Marks:75

PART-A

I. Answer all the questions **5 x1=5M**

1. Define MOS transistor transconductance g_m ?
2. Draw the circuit of CMOS Inverter.
3. Define propagation delay.
4. Differentiate between synchronous and asynchronous reset in counters.
5. What is Standard cell ?

II Answer all the questions **10 x 2=20M**

1. Explain the characteristics of NPN bipolar transistor.
2. What is Lithography?
3. Define lambda based design rules for layout.
4. Draw the stick diagram of an inverter.
5. List out the different layers used in IC design.
6. Explain about Inverter delays?
7. Explain the serial access memories?
8. Draw the Memory array architecture
9. Compare full custom and semicustom design of ICs.
10. Draw the structure of FPGA?

PART-B

Answer all the questions **5 x 10=50 Marks**

1. Derive Drain current of MOS device in triode and saturation regions.

(OR)

2. Discuss different forms of Pull Up, mentioning Merits and Demerits of each form?
3. Explain in detail about scaling of MOS circuits.

(OR)

4. Implement XOR gate using CMOS logic and draw the stick diagram.
5. What are various switch logic circuits? Compare their merits and demerits?

(OR)

6. Explain the domino logic and Pseudo NMOS –logic.

7. Draw the circuit and layout for ROM and explain how the dynamic power dissipation is minimized?

(OR)

8. Explain the trade-offs between open, closed, and twisted bitlines in a dynamic RAM array.
9. Explain the Gate level and function level of Testing?

(OR)

10. Discuss about FPGA design flow and its applications.