MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

UG MODEL QUESTION PAPER - I

ELECTRICAL MACHINES-II

II YEAR EEE II SEMESTER

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14 =70M

SECTION-I

1. A) Explain the construction and working principle of transformer. **7M**
   B) In detail, explain the classification of transformer. **7M**

OR

2. A) Explain the functions of the following in a transformer. **7M**
   a) Breather b) Conservator c) Oil
   B) Derive the emf equation of a transformer. **7M**

SECTION-II

3. Describe the tests to be done on a single phase transformer to determine the equivalent circuit parameters. **14M**

OR

4. Following are the test figures for the 4 kVA, 200 / 400 V, 50 Hz, single-phase transformer.
   O.C. test: 200 V, 0.8 A, 70 W.
   S.C. test: 17.5 V, 9 A, 50 W.
   Calculate the parameters of equivalent circuit of a transformer. **14M**

SECTION-III

5. A) Discuss the constructional details of the three-phase transformers with necessary diagrams. **10M**
   B) Give the applications of various types of three phase transformers. **4M**

OR

6. A) With neat phasor diagram explain the voltage regulation of three-phase transformer. **10M**
   B) List out the advantages and disadvantages of a bank of 3, 1-phase transformers to single 3-phase transformers. **4M**

SECTION-IV

7. A) Show that a rotating magnetic field is produced in the air-gap, when a balanced three-phase A.C. supply is given to the stator of a 3-phase induction motor. Justify your claim with necessary mathematical equations. **7M**
   B) Explain the difference between slip ring and squirrel cage induction motor. Why are rotor stampings skewed. **7M**

OR

8. A) Explain the principle of operation of a poly phase induction motor. **7M**

B) In case of an 8-pole induction motor the supply frequency was 50 Hz and the shaft speed was 735 r.p.m. Compute i) Synchronous speed ii) Slip speed per iii) unit slip iv) Percentage slip. **7M**

SECTION-V

9. A) Explain the procedure of no-load and blocked rotor tests on a 3-phase induction motor. **7M**

   B) Two motors A and B with 10-poles and 12-poles respectively are cascaded. The motor A is connected to a 50 Hz supply. Find the speed of the set. **7M**

OR

10. A) Explain the procedure of drawing the circle diagram of an induction motor. What information can be drawn from the circle diagram. **10M**

    B) Write the different types of tests to be conducted on 3-phase induction motor. **4M**

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UG MODEL QUESTION PAPER - II

ELECTRICAL MACHINES-II

II YEAR EEE II SEMESTER

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14 =70M

SECTION-I

1. A) What are the various losses taking place in transformer? How these losses can be minimized. 10**M**
   B) Why transformer rated in KVA. **4M**

OR

2. Explain the operation of transformer ON LOAD & NO LOAD conditions and also draw the phasor diagrams. **14M**

SECTION-II

3. A) Compare the results and procedure of O.C., S.C. tests and back to back tests conducted on transformer. **10M**
   B) What are the advantages of transformer tests. **4M**

OR

4. A) Describe the procedure for conducting Sumpner's test on a pair of transformers with neat circuit diagram. **7M**
   B) Show that one transformer may have slightly less temperature rise than the other in Sumpner's test. **7M**

SECTION-III

5. Describe four possible ways of connections of 3-phase transformers with relevant relations amongst voltages and currents on both HV and LV sides. **14M**

OR

6. Draw the connection diagram and Phasor diagram for the following three-phase connections: (i) Y-Δ, (ii) Δ-Y and (iii) Δ-Δ. Also state their relative advantages and disadvantages. **14M**

SECTION-IV

7. A) Explain the construction of Induction motor. **7M**
   B) Explain how the rotor rotates in induction motor. Explain how the EMF and rotor rotates in same direction. **7M**

OR

8. A) Explain the production of torque in a 3-phase slip ring induction motor. **7M**

B) Explain why an induction motor cannot develop torque when running at synchronous speed. Define the slip speed of an induction motor and deduce how the frequency of rotor currents and magnitude of rotor EMF are related to slip. **7M**

SECTION-V

9. 415 V, 29.84 kW, 50 Hz, delta connected motor game has the following test data.
   No-load: 415 V, 21 A, 1250 W Blocked rotor test: 100 V, 45 A, 2730 W
   Construct the circle diagram and determine the line current and power factor for rated output. Calculate the minimum torque. Assume stator and rotor copper losses equal at standstill. **14M**

OR

10. A) Explain with neat sketch the star-delta starter. Obtain the expression for starting current and torque. **7M**
    B) Explain DOL starter with neat sketch and obtain the expression for starting torque in terms of full load torque. **7M**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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UG MODEL QUESTION PAPER - III

ELECTRICAL MACHINES-II

II YEAR EEE II SEMESTER

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14 =70M

SECTION-I

1. Explain the working principle of transformer and derive the EMF equation. **14M**

OR

2. A) In detail, explain the classification of transformer. **7M**

   B) A 1-phase transformer has 500 primary and 1200 secondary turns. The net cross-sectional area of the core is 75 cm^2. If the primary winding be connected to 400 V, 50 Hz supply, calculate the peak value of flux density in the core and voltage induced in the secondary winding. **7M**

SECTION-II

3. A) Describe the method by which the separation of the core losses of a transformer is achieved. **7M**

   B) The iron loss in a transformer core at normal flux density was measured at frequency of 30 Hz and 50 Hz, the results being 30 W and 54 W respectively. Calculate the i) hysteresis loss and ii) eddy current loss at 50 Hz. **7M**

OR

4. A) State the conditions to be filled for parallel operation of two transformers. **7M**

   B) Draw the phasor diagrams corresponding to parallel operation of transformers with (i) Equal voltage ratio and (ii) Unequal voltage ratios. **7M**

SECTION-III

5. Discuss in detail about Δ / Δ and Y / Y connection. Mention the merits and demerits of each connection and justify. **14M**

OR

6. A 3-phase Δ-Δ bank consists of three 25 kVA, 3,300 / 300 V transformers and supplies a load of 50 KVA. After removing one transformer, determine the following for Y-Y connection.

   i) KVA load carried by each transformer,

   ii) Percent of rated load carried by each transformer,

   iii) Total KVA rating. **14M**

SECTION-IV

7. A) Derive the expression for the rotor e.m.f. and rotor current of an induction motor. **7M**

B) Show that the relative speed between resultant rotor field and resultant stator field of a 3-phase induction motor is zero. **7M**

OR

8. A) Explain torque-speed characteristics of an induction motor. **7M**
   B) Explain term maximum torque, full-load torque, starting torque and no-load torque. **7M**

SECTION-V

9. A) Why it is necessary to employ special starting arrangement for induction motors? Explain any one method of starting the 3-phase induction motors. **7M**
   B) The short circuit current of a squirrel cage induction motor on normal voltage is 3.5 times the full load current and the full load slip is 4 %. Determine the percentage tapping required to an auto transformer starter to start the motor against 1/3 full load torque. Neglect magnetizing current. **7M**

OR

10. Explain various speed control methods of 3-phase induction motor with neat diagrams. **14M**

MALLAREDDY COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION

QUESTION BANK

1. Draw a general lay out of a thermal power plant and explain the working of different circuits. (14)

(OR)

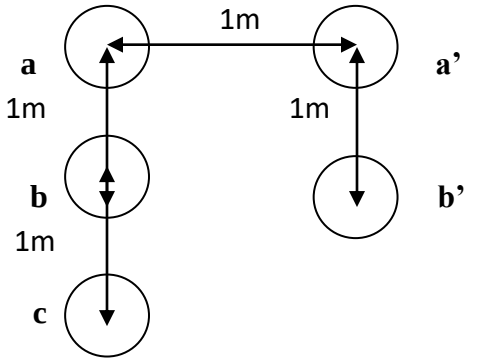
2. With a neat sketch of gas turbine power plant, explain the operation in closed loop configuration with features (14)

3. Classify and explain the schematic arrangement of a hydro power plant with Pumped storage scheme. (14)

(OR)

4. a)With a neat sketch of Kaplan turbine, explain how it implied in hydro power plant (10)
   b) Compare Impulse and reaction turbine (04)

5. (a) Determine the inductance of a single phase transmission line having arrangement of conductor as shown. Diameter of the conductor is 2 cm (6)



(b) Derive an expression for the inductance of a two wire single phase transmission line with internal and external flux linkages. (10)

(OR)

6. (a) Derive an expression for inductance of a double circuit line for hexagonal spacing (8)
   (b) The three conductors of a three phase line are arranged at the corners of triangle of sides 4, 5 and 6 meters. Calculate t he inductance per km of each conductor when conductors are regularly transposed. The diameter of each line conductor is 2cm. (8)

7. Using rigorous method, derive expressions for sending end voltage and current for a long transmission line. (14)

(OR)

8. Determine the efficiency and regulation of a 3 - phase, 100 Km, 50 Hz transmission line delivering 20 MW at a power factor of 0.8 lagging and 66 kV to a balanced load. The conductors are of copper, each having resistance 0.1 Q/km, 1.5 cm outside dia, spaced equilaterally 2 metres between centres. Use nominal T method. (14)

9. Explain the following (14)
   i) Attenuation and propagation constant
   ii) Reflection & refraction co-efficients
   iii) Bewlwy's Lattice diagrams

(OR)

10. a) Explain the Ferranti effect with a phasor diagram and its causes (7)
    b) Estimate the corona loss for a three-phase, 110KV, 50Hz, 150km long transmission line consisting of three conductors each of 10mm diameter and spaced 2.5m apart in a equilateral triangle formation. The temperature of air is 30^0 C and the atmospheric pressure is 750mm of mercury. Assume the irregularity factor as 0.85. Ionization of air may be assumed to take place at a maximum voltage gradient of 30KV/cm. (7)

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION

QUESTION BANK

1. a) What are the desirable properties of control rod materials? Compare the merits and demerits of different control rod materials. (7)
   b) Discuss the part behavior of combined cycle plant and compare with conventional gas turbine plant of the same capacity (7)

(OR)

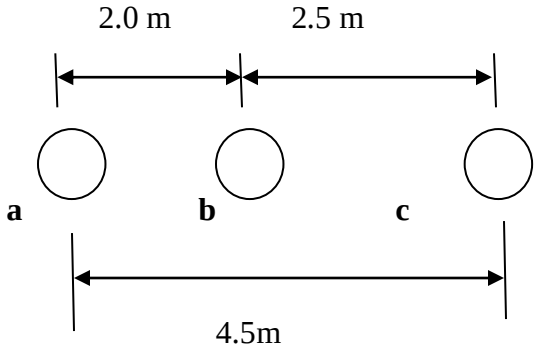
2. a)Why ash and dust handling problem is more difficult than coal handling problems (4)
   b) Draw a general lay out of a thermal power plant and explain the working of different circuits. (10)

3. Draw a neat diagram of storage type hydroelectric power plant and describe the function of each component used in the plant. (14)

(OR)

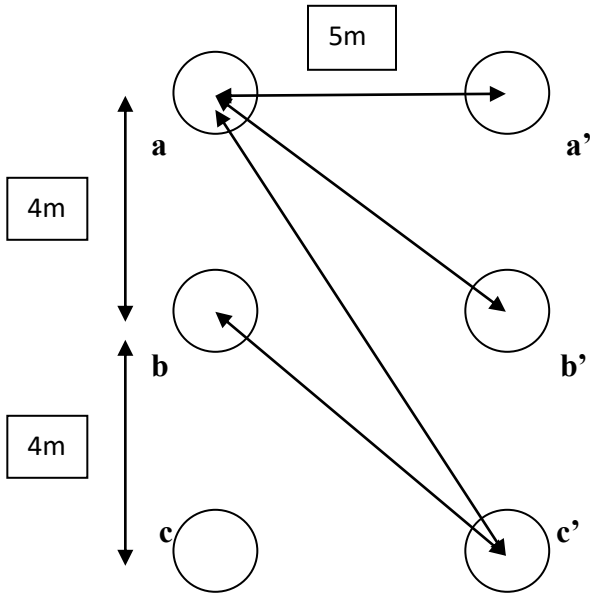
4. a)Discuss about Francis turbine with their work proportions and hydraulic design (7)
   b) Write a short note on draft tube (7)

5. (a) Derive an expression to find out the inductance of a three phase transmission line with unsymmetrical spacing under transposed condition (10)
   (b) A 3 phase 50Hz, 66Kv overhead line conductor are placed in a horizontal plane as shown. The conductor diameter is 1.25cm. If the line length is 100Km, Calculate the inductance per phase (4)



(OR)

6. (a) Determine the inductance of the double circuit line as shown below. the diameter is 2.1793 cm (10)



(b) Why overhead line conductors are invariably stranded? Explain briefly about self GMD and mutual GMD. Also its application. (4)

7. Show how regulation and transmission efficiency are determined for medium lines using (i) nominal T method (ii) nominal π method (14)

(OR)

8. A three phase 5 km long transmission line, having resistance of 0.5 Q/km and inductance of 1.76 mH lkm is delivering power at 0.8 pf lagging. The receiving end voltage is 82 kV. If the supply end voltage is .33 kV, 50 Hz, find line current, regulation and efficiency of the transmission line. (14)

9. Discuss about the termination of lines in power system with different types of conditions (14)

(OR)

10. a) Explain the Ferranti effect with a phasor diagram and its causes (7)
b) Derive the expression to determine the corona disruptive voltage and power loss due to corona. (7)

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ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION

QUESTION BANK

1. a) Draw and explain the layout of an Integrated Gasifier based Combined Cycle Power Plant. (7)

   b) Explain the following terms:
   (i) Fission of nuclear fuel (ii) Distribution of fission energy (iii) The chain reaction. (7)

(OR)

2. Draw an explanatory line diagram of an ash handling system employed in steam power plants and also explain the difficulties encountered in the handling of ash in a thermal power station. (14)

3. Explain in detail about surge tank used in hydro electric power plant. Also explain about the classification and selection of dams. (14)

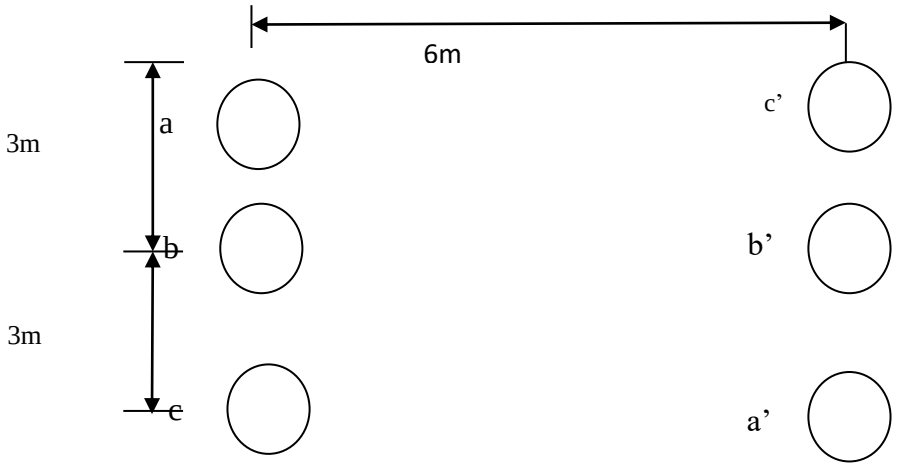
(OR)

4. a) Explain the selection factors of a hydraulic turbine .What are the function of a hydraulic turbine? (7)
   b) Compare Kaplan turbine and Francis turbine. (7)

5. Derive the expression for capacitance of a 3Φ transmission line with unsymmetrical spacing and symmetrical spacing. (14)

(OR)

6. The figure shows the spacing's of a double circuit 3 phase overhead line. the phase sequence is ABC and the line is completely transposed. The conductor radius is 1.3cm. Find the inductance per phase per Km



7. Derive the expression for sending and receiving end power of transmission line in terms of voltages and ABCD constants. (14)

(OR)

8. a) Determine the efficiency and regulation of a three phase 100Km 50Hz transmission line delivering 20MW at a power factor of 0.8, lagging and 66KV to a balanced load. The conductors are of copper, each having resistance 0.1Ω/Km, 1.5cm dia, spaced equilaterally 2m between centers. Use nominal T method (7)

b) A short three phase transmission line with an impedance of (6+j8) Ω per phase has sending and receiving end voltages of 120KV and 110KV respectively for some receiving end load at a power factor of 0.9 lagging. Determine i) power output ii) sending end power factor. (7)

9. Discuss about the Bewley's Lattice diagrams for power system transients. (14)

(OR)

10. a) Explain the Ferranti effect with a phasor diagram and its causes (7)

b) Write short notes on the following:

i) Proximity effect ii) Skin effect iii) corona loss (7)

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QUESTION BANK

1. a) With the help of a sketch show all the important part of nuclear reactor. Describe briefly the functions of each part. (7)
   b) Distinguish between PHWR and LMFBR. (7)

(OR)

2. a)Explain the reheat system and regeneration system of a thermal power plant (7)
   b) Explain the Gas turbine power plant with neat sketch. Discuss the advantages of gas turbine power plant (7)

3. a) Describe the operation of balanced draught system (7)
   b) How are the turbines classified? Explain the pelton turbine with a suitable sketch (7)

(OR)

4. a) Explain pumped storage power plant with its merits & demerits (7)
   b) What are the factors to be considered while selecting the site of a hydro power plant? (7)

5. Derive an expression for capacitances of a single phase transmission system and discuss the effect of earth on capacitance with suitable equation. (14)

(OR)

6. A 3 phase 3 wire overhead line consist of 2.5cm diameter conductors in horizontal configuration. The line is supplying a balanced load
   i) Find the inductance of each phase conductor/Km length
   ii) why are the inductance of the 3 phase different
   iii) what is the significance of imaginary terms in the expression
   Assume that the line is not transposed. Interface spacing is 3m (14)

7. Derive the expression for sending and receiving end power of transmission line in terms of voltages and ABCD constants. (14)

(OR)

8. A 3 phase line having an impedance of (5+j20) per phase delivers a load of 30MW at a power factor of 0.8 lag and voltage of 33kV. Determine the capacity of the phase modifier to be installed at the receiving end if the voltage at the sending end is to be maintained at 33kV. Assume the shunt admittance is neglected. (7)

9. a) Discuss about the Bewley's Lattice diagrams for power system transients. (7)
   b) What is Corona? and mention what are all the factors which effect corona. (7)

(OR)

10. a) Explain the Ferranti effect with a phasor diagram and its causes (7)
    b) Explain the concept of Skin effect and proximity effects (7)

Code No:R17A0407 **R17**

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech II Year II Semester Examinations
SWITCHING THEORY & LOGIC DESIGN
(EEE)

MODEL PAPER-I

Time: 3 hours **Marks: 70**

Note:. Answer any one full question from each unit. Each question carries 14 marks and may have a, b, c as sub questions.

SECTION-I

1) a)What is the gray code equivalent of the Hex Number 3A7 **[4M]**
   b)Detect the error in the received code 1100110 using even parity **[6M]**
   c)Find 9's complement of $(25.63\ 9)_{10}$ **[4M]**

OR

2) Simplify to a sum of 3 terms:
   a)A'C'D' +AC' +BCD + A'CD' + A'BC + AB'C'
   b)Given AB' + AB = C, Show that AC' + A'C = B

SECTION-II

2) Explain how you convert sum of the products into product of sums. Give with example. **[14M]**
   Also minimize the following function. F= (0, 2, 4, 8, 9, 12, 14). Show the gating circuit after minimization.

OR

4) Using the maps method, simplify the following expression using sum of the product from.
   a) (abc)'+a(bc)' +don't cares abc+a'bc'+a'b'c **[7M]**
   b) Abc+(ab)'c +don't cares abc'+ab'c **[7M]**

SECTION-III

5) Explain how you design a combinational circuit. Show a combinational circuit for a Binary multiplier **[14M]**

OR

6) Design a combinational circuit of a magnitude comparator considering one example **[14M]**

SECTION-IV

7) Explain about the following: **[7M]**
   (a) latch excitation table
   (b) Merging of row tables. **[7M]**

OR

8) Design a sequential circuit with two D Flip-Flops A and B. and one input x. when x=0, **[14M]**
   the state of the circuit remains the same. When x=1,the circuit goes through the state transition from 00 to 11 to 11 to 10 back to 00.and repeats.

SECTION-V

9) Differentiate the advantages and disadvantages of ripple counters? **[14M]**

10) Illustrate applications of shift registers? **[14M]**

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Code No: R17A0407 **R17**

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech II Year II Semester Examinations
SWITCHING THEORY & LOGIC DESIGN
(EEE)

MODEL PAPER-II

Time: 3 hours **Marks: 70**

Note:. Answer any one full question from each unit. Each question carries 14 marks and may have a, b, c as sub questions.

SECTION-I

1) a)Encode data bits 1101 into seven bit even parity hamming code **[7M]**
   b)Derive the Boolean algebra expression for a getting network that will have outputs 0 only when X=1, Y=0, Z=0. The outputs are to be 1 for all other cases. **[7M]**

OR

2) a)Expand A+BC'+ABD'+ABCD **[7M]**
   b)Show (A+B')(B+C')(C+D')(D+A')=(A'+B)(B'+C)(C'+D)(D'+A) **[7M]**

SECTION-II

3) For the following expression using only NAND gates, design a combinational network. abcd+a'bc'd'+a'bc'd+a'bcd'+ don't cares (a'b'c'd'+a'b'cd)

OR

4) a)Reduce and implement the following boolean function using NAND gate **[7M]**
   F=abc'+ab'+a'c+a'b'c+ab'c
   b)Design a combinational circuit for a multiplexer **[7M]**

SECTION-III

5) Explain the Analysis and design procedure for a combinational circuit. Also design a binary multiplier **[14M]**

OR

6) DesignFull Adder using two Half adders and OR Gate? **[14M]**

SECTION-IV

7) Explain about the Procedure for Designing Sequential Circuits in detail? **[14M]**

OR

8) Write about SR Flip Flop along with the truth table **[14M]**

SECTION-V

9) Explain the Ripple counter design. Also the decade counter design? **[14M]**

OR

10) Write short notes on shift register? Mention its application along with the Serial Transfer in 4-bit shift Registers? **[14M]**

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Code No: R17A0407 **R17**

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech II Year II Semester Examinations
SWITCHING THEORY & LOGIC DESIGN
(EEE)

MODEL PAPER-III

Time: 3 hours **Marks: 70**

Note:. Answer any one full question from each unit. Each question carries 14 marks and may have a, b, c as sub questions.

SECTION-I

1) Convert the following numbers:
   a)10101100111.0101 to Base 10 **[3M]**
   b)(153.513)10 = ( )8 **[3M]**
   c)Find (3250 - 72532)10 using 10's complement **[3M]**
   d)Divide 01100100 by 00011001 **[2M]**
   e) Given that (292)10 =(1204)b determine `b' **[3M]**

OR

2) a)Explain the different logic gates in detail? **[7M]**
   b)Construct a table for 4 -3 -2 -1 weighted code and write 9154 using this code **[7M]**

SECTION-II

3) a)For the function T(w,x,y,z)=∑(0,1,2,3,4,6,7,8,9,11,15) **[7M]**
   Find all prime implicants and indicate which are essential through the Kmap
   b)Reduce using mapping the following expression and implement the real minimal expression in universal logic F=∑(0,2,4,6,7,8,10,12,13,15) **[7M]**

OR

4) Draw the logic diagram using only two input NAND gate to implement the following expression F= (AB+A'B')(CD'+C'D) **[14M]**

SECTION-III

5) (a) Design a BCD to Excess-3 code converter using minimum number of NAND gates **[7M]**
   (b) Design a BCD to Gray code converter using 8:1 multiplexers. **[7M]**

OR

6) (a) Implement Half adder using 4 NAND gates **[7M]**
   (b) Implement full subtrctor using NAND gates only. **[7M]**

SECTION-IV

7) a)Define Latch? Explain about Different types of Latches in detail? **[14M]**

OR

8) List the characteristic equations for all Flip-Flops? **[14M]**

SECTION-V

8) b) Explain the design of Sequential circuit with an example. Show the state reduction, state assignment .
9) Define BCD Counter and Draw its State table for BCD Counter? **[14M]**

OR

10) Design a left shift and right shift for the following data 10110101? **[14M]**

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech II Year II Semester Examinations
SWITCHING THEORY & LOGIC DESIGN
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MODEL PAPER-IV

Time: 3 hours **Marks: 70**

Note:. Answer any one full question from each unit. Each question carries 14 marks and may have a, b, c as sub questions.

SECTION-I

1) a)For the function T(w,x,y,z)=∑(0,1,2,3,4,6,7,8,9,11,15) **[7M]**
Find all prime implicants and indicate which are essential through the Kmap
b)Design a circuit which will find the 2's complement of a 4 bit binary number. Use one full adder, 3 half adders and any additional gates. **[7M]**

OR

2) a)Perform the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend: **[7M]**
i) 100 – 110000
ii) 11010 - 1101.
b)Perform arithmetic operation indicated below.Follow signed bit notation: **[7M]**
i) 001110 + 110010
ii) 101011 - 100110.

SECTION-II

3) a)Explain the steps for reducing Boolean function using K-Map **[7M]**
b) Construct half subtractor using NAND gates? **[7M]**

OR

4) a)Implement the following function using only NOR gates .F=a(b+cd)+bc' **[7M]**
b)What is don't care condition? **[7M]**

SECTION-III

5) a)Explain the design procedure of Full Adder with diagram **[7M]**
b) Design 2-digit BCD adder with the help of binary adders? **[7M]**

OR

6) Design an 16x1 Multiplexer using 4x1 multiplexer **[14M]**

SECTION-IV

7) Explain about RS and JK flip-flops? **[14M]**

OR

8) What is the difference between Latches and Flip Flops **[14M]**

SECTION-V

9) Design a 3 bit ring counter? Discuss how ring counters differ from twisted ring counter? **[14M]**

OR

10) Write short notes on shift register? Mention its application along with the Serial Transfer in 4-bit shift Registers? **[14M]**

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Code No: R17A0407 **R17**

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech II Year II Semester Examinations
SWITCHING THEORY & LOGIC DESIGN
(EEE)

MODEL PAPER-V

Time: 3 hours **Marks: 70**

Note:. Answer any one full question from each unit. Each question carries 14 marks and may have a, b, c as sub questions.

SECTION-I

1) a)Explain the importance of gray code. **[7M]**
   b)Implement the following function using Logic gates **[7M]**
   A'BC+A'B'C+ABC'+AB'C+A'BC'+A'B'C'

OR

2) a)Let f =∑(5,6,13) and f1=∑(0,1,2,3,5,6,8,9,10,11,13).Find f2 such that f=f1x f2'. **[7M]**
   b)Find all minimal four variable functions which assume the value 1 when the **[7M]**
   minterms 4,10,11,13 are equal to 1 and assume the value 0 when the minterms1,3,6,7,8,9,12,14 are equal to 1.

SECTION-II

3) a)Derive the Boolean expression for a two input Ex-OR gate to relize with two input NAND gates **[7M]**
   without using complemented Variables and draw the circuit
   b) Expand A+BC'+ABD'+ABCD to minterms and maxterms **[7M]**

OR

4) a)Reduce the following expression using K-Map and implement using Logic gates **[7M]**
   F= (a+b').(cd+e')
   b) Reduce using mapping the expression F=π(0,1,3,5,6,7,13,15) and implement the real **[7M]**
   minimal expression in universal logic

SECTION-III

5) a)Design a circuit to convert Xs-3 code to BCD code using 4 bit full adders **[7M]**
   b) Implement the following multiple output combinational circuit using 3 line to 8 line decoder **[7M]**
   F_1=∑m(0,1,2,6)
   F_2=∑m(2,4,6)
   F_3=∑m(0,1,5,6)

OR

6) Show that 16:1 MUX can be realized using 4 to 1 Muxes **[14M]**

SECTION-IV

7) a)Explain combinational circuit design considering one example. **[7M]**
   b) Explain the circuit diagram of full subtractor and full adder? **[7M]**

OR

8) a) Explain the difference between Asynchronous and Synchronous sequential circuits. **[4M]**
   b) Define fundamental mode operation. **[4M]**
   c) Explain the difference between stable and unstable states. **[6M]**
   d) What is the difference between an internal state and total state?

SECTION-V

9) Design a Modulo-12 up Synchronous counter Using T-Flip Flops and draw the Circuit diagram? **[14M]**

OR

10) Design a left shift and right shift for the following data 10110101? **[14M]**

****

b)

c)

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UG Model question paper-I

CONTROL SYSTEMS
II YEAR II SEMESER
ECE &EEE

Time: 3 hours **Max Marks: 70**

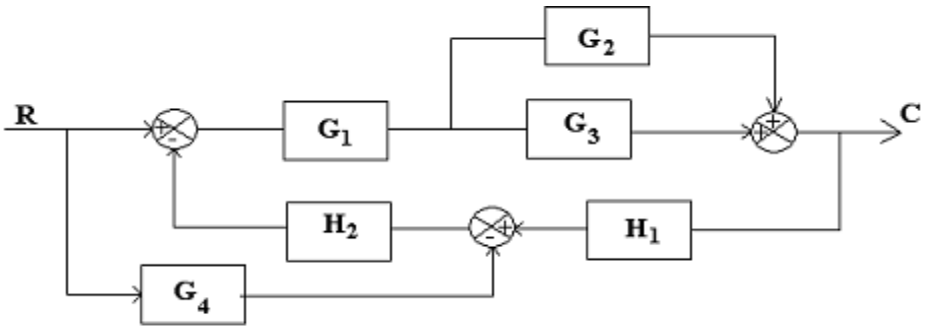
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1 a) What are the basic elements of a control system?
b) Explain the advantages of signal flow graph over block diagram representation. (14M)

(OR)

2. Draw a signal flow graph for the Block diagram shown below and find its closed loop transfer function. (14M)



SECTION -II

3.Define transient response specifications.
i) Delay time ii) Rise time iii) Peak time iii) Peak overshoot
iv) Settling time of second order system (14M)

(OR)

4 a) Obtain the unit step response of a unity feedback system whose open loop transfer function is G(S) = 4/S(S+5). (7M)
b) Determine the step, ramp and parabolic error constants of the unity feedback Control system. The open loop transfer function is following.
G(S) = 1000/(1+0.1S)(1+10S) (7M)

SECTION-III

5. a) Write the necessary conditions for stability. (14M)

b) Consider a sixth order system with the characteristic equation, $S^6 + 2S^5 + 8S^4 + 13S^3 + 20S^2 + 16S + 16 = 0$. Using Routh's stability criterion, find whether the system is stable or not, give the reasons?

(OR)

6. Sketch the root locus plot of a unit feedback system with the open loop transfer function $G(S) = K/S(S+2)(S+4)$. (14M)

SECTION-IV

7. Explain the frequency domain specifications (14M)

(OR)

8.Sketch the Bode plot for $G(S)=200/S(S+5)(S+10)$. (14M)

SECTION-V

9.a) Define controllability and observability.

b) Evaluate the controllability of the system with the matrix (14M)

$$\begin{bmatrix} \dot{X}1 \\ \dot{X}2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix} \begin{bmatrix} X1 \\ X2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

$$Y = \begin{bmatrix} 1 & 0 \end{bmatrix} X$$

(OR)

10.a)Obtain the state transition for the system (14M)

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

b) Explain about diagonalization.?

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UG Model question paper-II

CONTROL SYSTEMS

II YEAR II SEMESER

EEE AND ECE

Time: 3 hours **Max Marks: 70**

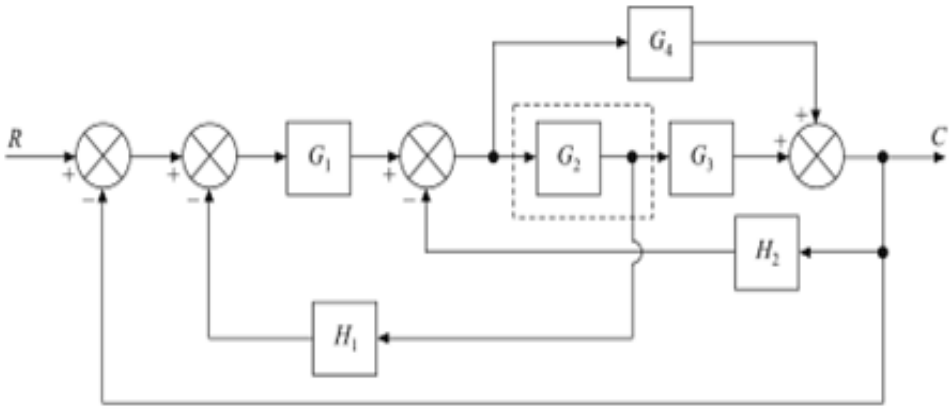
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1. a) Explain the differences between closed loop and open loop systems with examples.
   b) Explain the effect of feedback and feedback characteristics (14M)

OR

2. Determine the Transfer function of the Block Diagram shown below using block diagram reduction technique. (14M)



SECTION –II

3.For a unity feedback system whose open loop transfer function is G(S) = 4/S(S+5).Find Wn,ξ.? (14M)

OR

4 Find the delay time, rise time, peak time, settling time and peak overshoot for unity feedback system with open loop transfer function (14M)

$$G(s) = \frac{16}{s(s+6)}$$

SECTION-III

5 a.The characteristics equations a feedback control system is given as $s^3+2Ks^2+(K+2)s+4 = 0$ Determine the value of K for which the system to be stable with the help of Routh Hurwitz criterion.

b. write the various construction rules to develop the root locus (14M)

OR

6. Sketch the root locus plot of a unit feedback system with the open loop transfer function G(S) = K/S(S+2)(S+4). (14M)

SECTION-IV

7 a.. Explain the general procedure to construct bode plot

b.. For a certain control system sketch the polar plot $G(S)H(S) = \frac{1}{S(S+2)(S+10)}$ (14M)

OR

8 . Sketch the polar plot for G(S) = 1/s(1+s)(1+2s) and determine the gain and phase margins. (14M)

SECTION-V

9. Obtain the state transition matrix for the system (14M)

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

OR

10. Diagonalize Matrix A in the system

$$\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} r(t)$$

(14M)

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UG Model question paper-III

CONTROL SYSTEMS

II YEAR II SEMESER

EEE and ECE

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1.a) Define the transfer function in control system

b)Define effect of feedback on sensitivity, stability and gain (14M)

OR

2.State and explain the Mason's gain formula. (14M)

SECTION-II

3. Explain effects of proportional derivative and proportional integral controllers in system performance (14M)

OR

4. A unity feed back system is characterized by an open loop transfer function G(s)= s(s +5) K . Determine the gain K so that the system will have a damping factor of 0.7. For this value of K determine the natural frequency of the system. It is subjected to a unity step input. Obtain the closed loop response of the system in time domain (14M)

SECTION-III

5. Derive the expressions for frequency domain specifications of a second order system. (14M)

OR

6. Given the open loop transfer function of a unity feedback system G(s) = $10(S+2)/S(S+5)$.Draw the Bode plot and measure from the plot the frequency at which the magnitude is 0 Db? (14M)

SECTION-IV

7. write the various construction rules to develop the root locus (14M**)**

OR

8. Given the open loop transfer function G(s) = $k/(S+5)(S+10)$. Sketch the polar plot and investigate the open loop and closed loop systems stability (14M)

SECTION-V

9.state equation of a system is given by (14M)

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t), \quad t>0$$

OR

10.a) Is the system controllable?

b) Compute the state transition matrix (14M)

c) Compute x1(t) under zero initial condition and a unit step input

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

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UG Model question paper-III

NETWORK THEORY

II YEAR II SEMESER

EEE- MODEL PAPER-1

Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

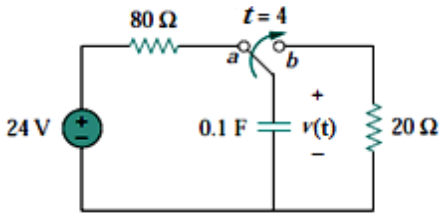
5*14=70M

SECTION-I

1. a) What are the initial conditions? Why are they needed? Explain [7M]

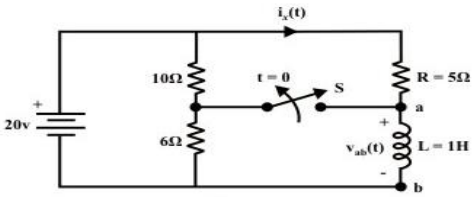
b) The switch in the below figure has been in position *a* for a long time, At *t* = 4 s the switch is moved to position *b* and left there. Determine *v(t)* at *t* = 10 s. [7M]

.

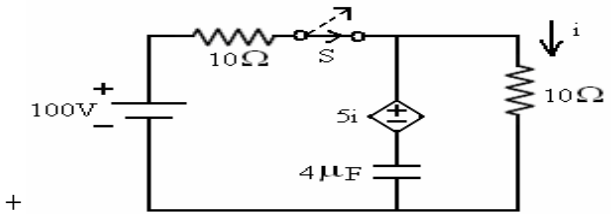


(OR)

2. a) . a) In the given circuit the switch is opened at t=0.Find (i) $V_{ab}(0-)$ (ii) $i_x(0-)$ (iii) $i_x(0+)$ (iv) $V_{ab}(0+)$ (v) $i_x(t=\infty)$ (vi) $i_x(t)$ for t>0. [7M]



b) For the circuit shown below Figure, find the current equation when switch S is opened at t = 0. [7M]



SECTION-II

3. a) Explain about the transient response of series RL circuit to the AC excitation for zero initial conditions [7M]

b). Derive the expression for the current in a series RL circuit (R = 10Ω, L = 10mH) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. . [7M]

(OR)

4. a) Explain about the transient response of series RC circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the current in a series RC circuit (R = 10Ω, C= 5μF) excited by a sinusoidal voltage of 230V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. [7M]

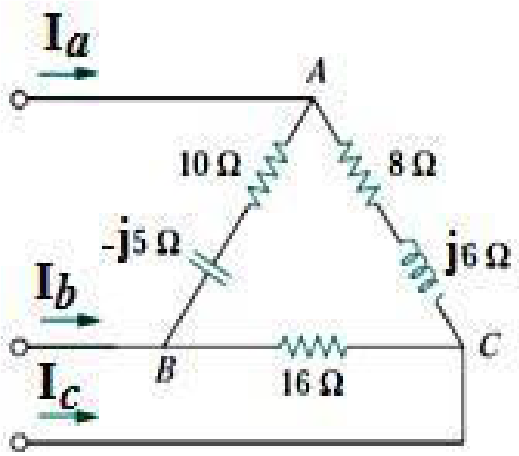
SECTION-III

5. a) A balanced delta-connected load has a phase current $I_{AC} = 10\angle -30^0$ A:
   i) Determine the three line currents assuming that the circuit operates in the positive phase sequence.
   ii) Calculate the load impedance if the line voltage is $V_{AB} = 110\angle 0^0$ V. [7M]

b) A balanced star-connected load absorbs a total power of 5 KW at a leading power factor of 0.6 when connected to a line voltage of 240 V. Find the impedance of each phase and total complex power of load. [7M]

(OR)

6. The unbalanced -load as shown in below figure is supplied by balanced voltages of 200V in the positive sequence. Find the line currents. Take **V***ab* as reference. [14M]



SECTION-IV

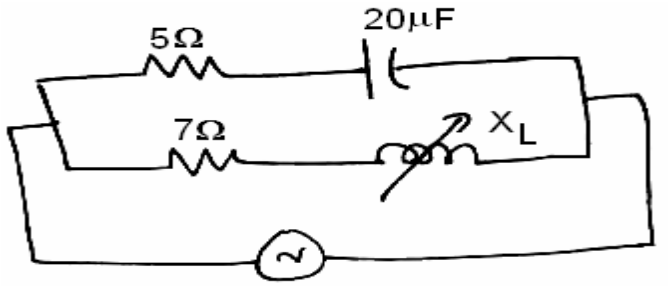
7. a) Explain the locus diagram of series R-L circuit when R is variable. [7M]

b) Explain the locus diagram of series R-C circuit and when C is variable. [7M]

(OR)

8.a) Derive expression for half power frequencies of a R L C series network. [7M]

b) Construct the admittance locus diagram and determine the variable inductance values so that the phase angle between the supply voltage and supply current is zero for the Fig.5. ω = 200 rad/s. [7M]



SECTION-V

9. a) Define driving point impedance. . [4M]

b) Comment on the time domain response of a second order system if the poles are equal negative real values. [5M]

c) What are the properties of transfer function? Explain. [5M]

(OR)

10) a) Derive the relation between ABCD and 'Z'-parameters. [7M]

b) A two port network has the following parameters: Z11 = 4 Ω, Z12 = 1 Ω, Z21 = 3 Ω and Z22 = 3 Ω. Calculate short circuit parameters. [7M]

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UG Model question paper-IV

NETWORK THEORY

II YEAR II SEMESER

EEE- MODEL PAPER-2

Time: 3 hours **Max Marks: 70**

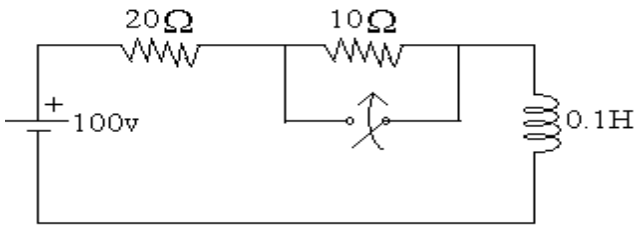
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

5*14=70M

SECTION-I

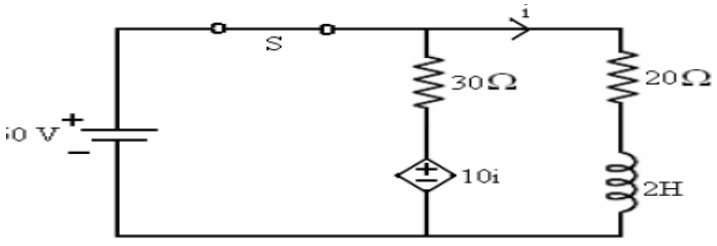
1.a) In a series RL circuit with R = 3 ohm and L = 1 H, a DC voltage of V = 50 V is applied at t = 0. Find the transient response of current and plot the response. [7M]

b) A dc voltage of 100V is applied in the circuit shown in figure below and the switch is kept open. The switch K is closed at t = 0. Find the complete expression for the current. [7M]



(OR)

2.a) For the below circuit (Fig. 1), find the current equation i(t), when the switch is opened at t = 0. [14M]



SECTION-II

3. a)Explain about the transient response of series RLC circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the voltage across the inductor and capacitor in a series RLC circuit (R = 5Ω,L = 5mH, C = 5μF) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t= 0. Assume zero initial conditions.. [7M]

(OR)

4.a) Explain about the transient response of parallel RL circuit to the AC excitation for zero initial conditions. [7M]

b) A parallel RL circuit is connected to an A.C voltage $v=100\sin(500t+30^0)$ at t=0.If R=5 ohms and L=0.01H,find the equation for the current. [7M]

SECTION-III

5. a) Explain the measurement of power in a balanced 3-phase system using a single watt meter. [7M]

b) What is the relationship between phase and neutral line currents in a three phase unbalanced system. [7M]

(OR)

6.a)Explain how to measure reactive power in a three phase balanced system.[7M]

b) A three phase three wire system has a balanced star connected load with a 60Ω resistance in each phase. The circuit is supplied with a balanced supply of 150V, 50 Hz. Determine the line current. [7M]

SECTION-IV

7. Show that the resonant frequency ω_0 of an RLC series circuit is the geometric mean of ω_1 and $\omega_{2,}$ the lower and upper half power frequencies respectively. [14M]

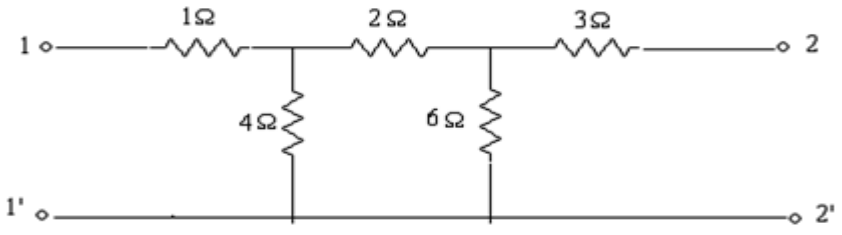
(OR)

8. A voltage $V = 50\angle 0^0$ V is applied to a series circuit consisting of fixed inductive reactance X_L = 5ohms and a variable resistance R. Sketch the admittance and current locus diagrams. [14M]

SECTION-V

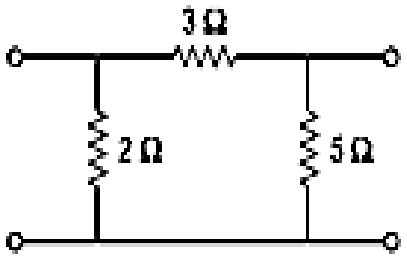
9. .a) Obtain the transmission line parameters when the two transmission networks having the transmission parameters A1, B1, C1, D1 and A2, B2, C2, D2 are connected in cascade.[7M]

b) Obtain 'Y' – parameters for the given network shown in below figure. [7M]



(OR)

10) Determine the *h* parameters for the circuit shown in below figure. [14M]



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UG Model question paper-I

NETWORK THEORY

II YEAR II SEMESER

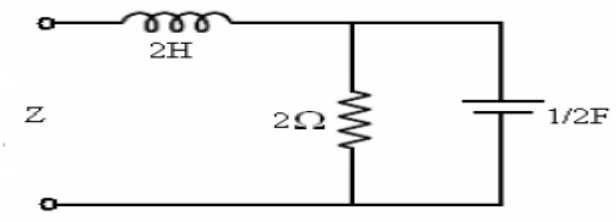
EEE- MODEL PAPER-3

Time: 3 hours **Max Marks: 70**

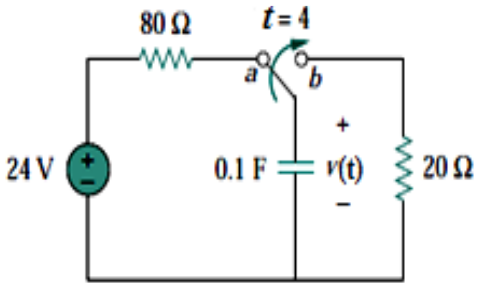
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I **5*14=70M**

1.a) Transform the below circuit in to 'S' domain and determine the Laplace transform impedance. [7M]

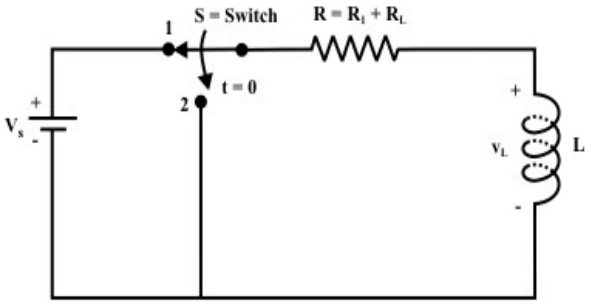


b)At t = 0, switch 1 in below figure is closed, and switch 2 is closed 4 s later. Find i(t) for t > 0. Calculate i for t = 2 s and t = 5 s. [7M]



(OR)

2. a) In the given circuit the switch is shifted from position 1 to 2 at t=0.Determine i(t) for t>0. .[7M]



b) What are the initial conditions? Why are they needed? Explain. [7M]

SECTION-II

3 a) Explain about the transient response of series RL circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the current in a series RL circuit (R = 10Ω, L = 10mH) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. [7M]

(OR)

4. a) Explain about the transient response of series RC circuit to the AC excitation for zero initial conditions [7M]

b)Derive the expression for the current in a series RC circuit (R = 10Ω, C= 5μF) excited by a sinusoidal voltage of 230V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. [7M]

SECTION-III

5. a) Explain the measurement of power in a balanced 3-phase system using a single watt meter. [7M]

b) Three coils each having a resistance of 50 Ω and an inductive reactance of 45 Ω are connected in star and fed by a 3-phase, 400 V, 50 Hz system. Find (i) Line current (ii) Power (iii) Power factor. [7M]

(OR)

6. a) Three impedances each of (10+j3) ohms are connected in star to a 220 V, 3-phase, 50 Hz supply. Calculate the line currents and power delivered to the load. [7M]

b) Derive the relation between phase and line values of a 3-phase balanced delta connected system. [7M]

SECTION-IV

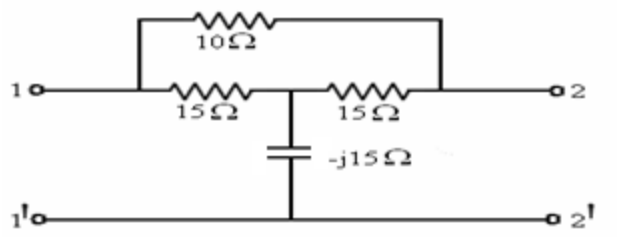
7. Explain the procedure to draw the locus diagram of R-L series circuit when L is varying. [14M]

(OR)

8. A series RLC circuit has to be designed so that it has a band width of 320 Hz and inductance of the coil is 0.2H. It is has to resonate at 350Hz, determine the resistance of coil and capacitance of condenser. If the applied voltage is 150V, determine the voltage across capacitor and coil. [14M]

SECTION-V

9. Determine the transmission parameter and hence determine the short circuit admittance parameters for the below circuit. [14M]



(OR)

10. Explain about the ABCD –parameters and derive the condition for symmetry and reciprocity. [14M]

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UG Model question paper-V

NETWORK THEORY

II YEAR II SEMESER

EEE- MODEL PAPER-4

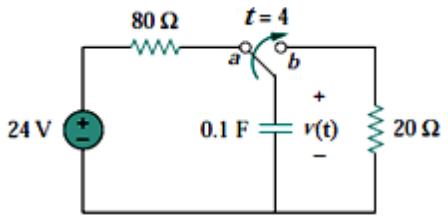
Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

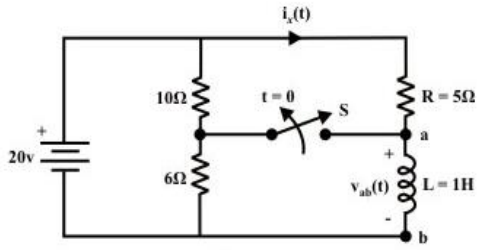
5*14=70

SECTION-I

1. a) The switch in the below figure has been in position *a* for a long time, At t = 4 s the switch is moved to position *b* and left there. Determine $v(t)$ at t = 10 s. [7M]

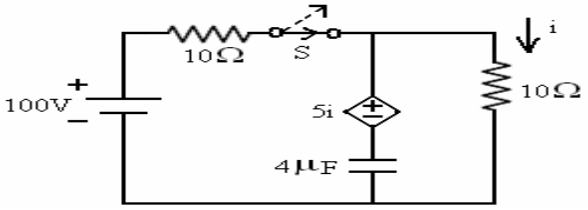


b) In the given circuit the switch is opened at t=0.Find (i) $V_{ab}(0-)$ (ii) $i_x(0-)$ (iii) $i_x(0+)$ (iv) $V_{ab}(0+)$ (v) $i_x(t=\infty)$ (vi) $i_x(t)$ for t>0. [7M]



(OR)

2. a) For the circuit shown below Figure, find the current equation when switch S is opened at t = 0. [7M]



b) In a series RL circuit with R = 3 ohm and L = 1 H, a DC voltage of V = 50 V is applied at t = 0. Find the transient response of current and plot the response. [7M]

SECTION-II

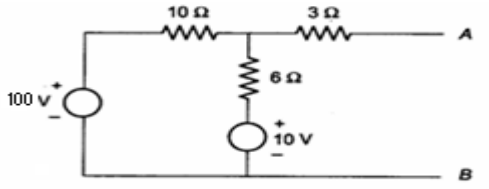
3 .a) Explain about the transient response of series RLC circuit to the AC excitation for zero initial conditions. [7M]

b) Derive the expression for the voltage across the inductor and capacitor in a series RLC circuit (R = 5Ω,L = 5mH, C = 5μF) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t= 0. Assume zero initial conditions. [7M]

(OR)

4. a) Explain about the transient response of parallel RL circuit to the AC excitation for zero initial conditions. [7M]

b) A parallel RL circuit is connected to an A.C voltage $v=100\sin(500t+30^0)$ at t=0.If R=5 ohms and L=0.01H,find the equation for the current. [7M]



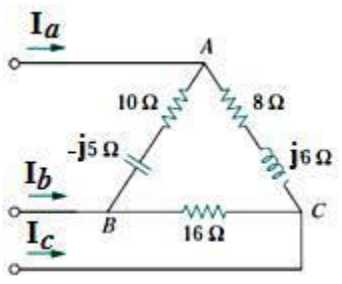
SECTION-III

5. a) A balanced delta-connected load has a phase current $I_{AC}= 10\angle -30^0$ A:
i) Determine the three line currents assuming that the circuit operates in the positive phase sequence.
ii) Calculate the load impedance if the line voltage is $V_{AB}= 110\angle 0^0$ V. [7M]

b)A balanced star-connected load absorbs a total power of 5 KW at a leading power factor of 0.6when connected to a line voltage of 240 V. Find the impedance of each phase and total complex power of load. [7M]

(OR)

6. a) The unbalanced -load as shown in below figure is supplied by balanced voltages of 200V in the positive sequence. Find the line currents. Take **V***ab* as reference. [7M]



b) Prove that two watt-meters are sufficient to measure power in three phase system. [7M]

SECTION-IV

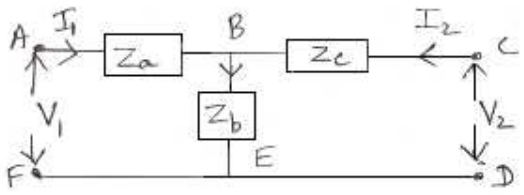
7. Explain about the series resonance and derive the expression for resonant frequency. [14M]

(OR)

8. Define the bandwidth and derive the expressions for bandwidth of series resonating circuit and its relation with Q-factor. [14M]

SECTION-V

9. a) Find the Z parameters and Y parameters of the T- network shown in figure below. [7M]



b) Define driving point impedance. [7M]

(OR)

10) Comment on the time domain response of a second order system if the poles are equal negative real values. [14M]

R17

Code No: R17A0551

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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II B. Tech IISemester MODEL QUESTION PAPER

DATABASE SYSTEMS

(ECE& MECH)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: .Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I

1. Explain about Database architecture with a neat diagram?

OR

2. What are the advantages of DBMS over file management system?

SECTION – II

3. Explain the following with examples.

a) Key constraints. b) Foreign key constraints.

OR

4. What is a view? Explain about views in detail?

SECTION – III

5. Explain the following

a) Joins b)Aggregate functions

OR

6. Explain the following

a) UNION b) INTERSECT c) EXCEPT

SECTION – IV

7. What is Normalization? Explain 1NF,2NF?

OR

8. What is MVD explain in brief?

SECTION – V

9.What is Transaction state? And explain ACID properties?

OR

10. Explain the concept of serilizability?

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SECTION – I

1. a) Describe storage manager component of database system structure?
b) Explain levels of abstraction in DBMS

OR

2. Write a short notes on database languages with examples?

SECTION – II

3. Explain the E-R diagram components and notations with their extended features?

OR

4. Explain the keys
a) primary key b)foreign key c) super key d) candidate key

SECTION – III

5. Define BCNF? How does BCNF differ from 3NF? Explain with an example.

OR

6. What is Redundancy? What are the different problems encountered by redundancy? Explain them.

SECTION – IV

7. What is functional dependency? Explain about dependency preserving?

OR

8. Explain the following
a) 4NF b) 5NF

SECTION – V

9. What are the transaction isolation levels in SQL?

OR

10. Write short notes on recoverability?

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SECTION – I

1. Define DBMS? List Database system applications.

OR

2. List four significant differences between a file processing system and a DBMS?

SECTION – II

3. a) Write a detail note on participation constraints?
b) What is the class hierarchy? How is it represented in the ER diagrams?

OR

4. Explain the concept of Triggers?

SECTION – III

5. what is nested query explain with suitable example?

OR

6. Explain the following
a) NULL values b) HAVING clause c)GROUP BY

SECTION – IV

7. Explain FD and MVD with examples

OR

8. What is Normalization? Discuss what are the types? Discuss the 1NF, 2NF, 3NF with example?

SECTION – V

9. Explain the concept of testing on serializability?

OR

10. What is Transaction state? And explain ACID properties?

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