Code: 9A12301

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

DIGITAL LOGIC DESIGN & COMPUTER ORGANIZATION

(Common to CSS & IT)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) What are self complementing codes? Give examples.
(b) Write the procedure for constructing hamming codes. Construct hamming codes for the decimal numbers 1, 4, 8.

2 (a) Differentiate in detail the synchronous and asynchronous sequential circuits.
(b) Design the SR flip flop using NAND gates and explain its operation with the help of characteristic table and characteristic equation.

3 (a) Design a 4-bit bidirectional shift register.
(b) Design a Serial in and parallel out 4 bit shift register.

4 Show that 673-356 can be computed by adding 673 to the 10's complement of 356 and discarding the end carry. Draw the block diagram of a three-stage decimal arithmetic unit and show how this operation is implemented. List all input bits and output bits of the unit.

5 Explain about data manipulation instructions with an example.

6 (a) Discuss on the single bus organization of the processor unit.
(b) Define micro instruction.

7 (a) Draw and explain the set associative cache organization.
(b) Give the comparison between mapping techniques.

8 (a) Explain with the help of neat sketch the single bus structure and multiple bus structure to connect I/O devices to a computer.
(b) Explain the different types of signal transfers that take place during CPU communication.

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Code: 9A12302

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

DATA COMMUNICATION SYSTEMS

(Information Technology)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Define the terms bandwidth efficiency and carrier recovery.
(b) Distinguish between probability of error and bit error rate

2 (a) Outline the primary building blocks of a fiber optic system.
(b) List the disadvantages of optical fiber cables.

3 (a) Describe the T1 carrier system.
(b) What is frame synchronization? How is it achieved in a PCM-TDM system?

4 (a) State and explain inverse square law.
(b) Describe diffraction and explain Huygens's principle.

5 Explain in detail about the basic telephone call procedures.

6 (a) Briefly describe the purpose of the IS-41 protocol standard.
(b) Define and describe cellular telephone network components.

7 (a) What is redundancy checking? Explain the different types of redundancy checking.
(b) How many hamming bits are required for a 13 bit character? Explain with example.

8 (a) What is meant by bell system-compatible modems?
(b) Explain the modem operational modes: local command mode, handshake mode, on-line mode, off-line mode.

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Code: 9A02306

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

BASIC ELECTRICAL ENGINEERING

(Common to CSS, IT & CSE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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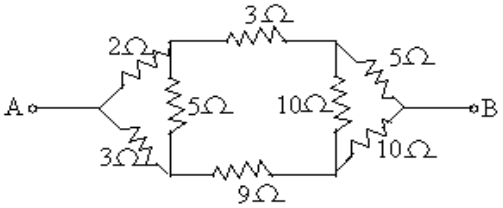
1 (a) Define ohm's law and give its limitations.
(b) A current of 10 A flows through a resistor for 10 min. and the power dissipated by the resistor is 100 W. Find the p.d. Across the resistor and the energy supplied to the circuit.
(c) Four resistors of 2 ohm, 3 ohm, 4 ohm & 5 ohm respectively, are connected in parallel. What potential difference must be applied to the group in order that total power of 100 W may be absorbed?

2 (a) Find the equivalent resistance between the terminals A and B of network shown in figure:



Figure

(b) State and explain superposition theorem.

3 A coil A having a resistance of 10 ohms and inductance of 0.2 Henry is connected in series with another coil B having a resistance of 30 ohms and inductance 0.1H. The two coils in series are fed form 200 V, 50 HZ supply. Determine the voltage across each coil, power dissipated in each coil, and the power factor of the combined series circuit: Draw the phasor diagram.

4 Discuss the constructional details of single - phase transformer and hence obtain the expression induced emf of a transformer.

5 The resistance of the field circuit of a shunt wound dc generator is 200 ohms. When the output of the generator is 100 kW, the terminal voltage is 500 V and the generated emf is 525 V. Calculate: (a) the armature resistance, and (b) the value of the generated emf when the output is 60 kW, with a terminal voltage of 520 V.

6 A 200 V DC shunt motor takes a total current of 100 A and runs at 750 rpm. The resistance of the armature winding and shunt field winding is 0.1 ohms and 40 ohms respectively. Find the copper losses. If the friction and iron losses amount to 1500 W, also calculate shaft power, shaft torque and efficiency.

7 The power input to the rotor of a 220 V, 60 Hz, 3-phase, 6-pole induction motor is 50 kW. It is observ that the rotor emf makes 150 complete cycles per minute. Calculate:
(i) Rotor frequency. (ii) Synchronous speed.
(iii) Slip. (iv) Rotor speed.

8 Explain the moving iron repulsion type instrument with a neat diagram.

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Code: 9A04301

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

ELECTRONIC DEVICES & CIRCUITS

(Common to EIE, E.Con.E, ECE, ECC, CSS, IT, CSE, EEE & MCT)

Time: 3 hours Max Marks: 70

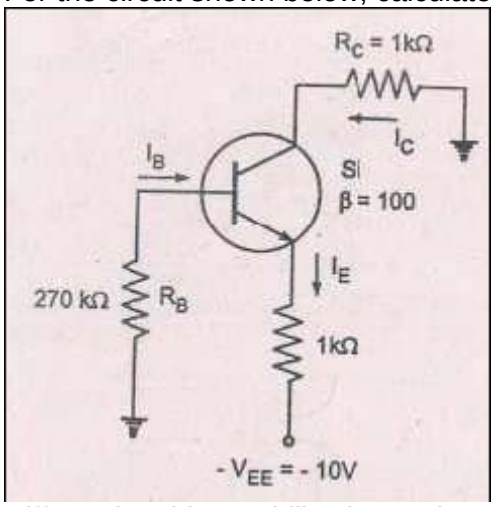
Answer any FIVE questions
All questions carry equal marks
*****

1 (a) What are the various applications of p-n junction diode? Explain them.
(b) What are the specifications of p-n junction diode? Explain how reverse saturation current varies with temperature both in Silicon and Germanium diodes.

2 (a) Calculate the value of capacitance to use in a capacitor filter connected to a full wave rectifier operating at a standard aircraft power frequency of 400 Hz, if the ripple factor is 10% for a load of 500 Ω
(b) Design a filter for full wave circuit with LC filter to provide an output voltage of 10 V with a load current of 200mA and the ripple is limited to 2%.

3 (a) The current gain of a transistor in CE circuit is 49. Calculate CB current gain and find the base current where the emitter current is 3mA.
(b) With neat diagram explain transistor current components.

4 (a) For the circuit shown below, calculate I_B, V_C and V_{CE}.

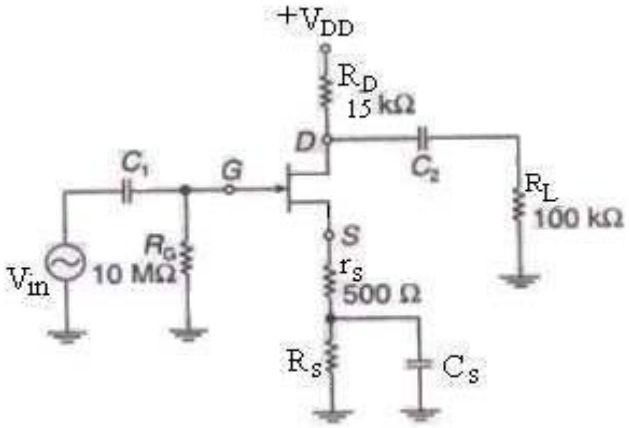


(b) Differentiate bias stabilization and compensation techniques.

5 (a) Explain the principle of MOSFET in depletion mode with neat sketches and o/p characteristics.
(b) Write about the broad classification of FET.

Contd. in Page 2

6 (a) The figure shown below is a swamped FET amplifier. Determine the voltage gain when R_L=100 K. Neglect the FET output resistance (r_d). Take g_m = 4mS.



(b) How should the gate-source junction of a JFET be biased? Explain how the potential applied to this junction controls the drain current.

7 Derive the equations of current gain A_I, voltage gain A_V, input impedance Z_i, output impedance Y_0, voltage gain with R_s(A_{VS}), current gain with R_s (A_{IS}) using a general two port active network.

8 (a) Draw the V-I characteristics of an SCR and explain it in detail.

(b) Obtain the relation between peak-point voltage 'V_P ' on the UJT characteristics, supply voltage 'V_{BB}', Intrinsic stand-off ratio 'η ' and the barrier potential of P-N junction. Explain the significance of peak-point voltage on switching action of UJT device.

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Code: 9A05301

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to CSS, IT & CSE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the law of duality.
(b) Explain the terms of equivalence.

2 (a) Verify the proposition (p ^ q) 7 (p v q) is a contradiction.
(b) Symbolize the following statements:
(i) X is the father of the mother of y.
(ii) All rational numbers are real numbers.

3 (a) What is a relation? Explain the properties of relations.
(b) What are the operations on relations?

4 (a) Explain about homomorphism.
(b) Prove that "Let θ: G→G" be a homomorphism. Then θ is one – one ⇔ K = ker θ = {e}.

5 (a) Solve the recurrence relation using generating function a_n-a_{n-1}= 2(n-1) for n ≥1 and a_0=3.
(b) Suppose there are n guests in a party. Each person shakes hands with everybody else exactly once. Deduce the recurrence relation for the number of handshakes that occur and solve the relation.

6 If a certain license plate require 3 English letters followed by 4 digits. How many different plates can be manufactured if repetition of letters and digits are allowed? How many plates are possible if repetition of letters only allowed? How many are possible if only the digits can be repeated? How many are possible if no repetitions are allowed?

7 (a) For any simple graph G, prove that the number of edges of G is less than or equal to n (n-1)/2, where n is the number of vertices in a graph.
(b) Define spanning tree and planar graph.

8 (a) How many vertices are needed to construct a graph with 7 edges in which each vertex is of degree 2?
(b) Define Hamilton graph. Illustrate with an example.

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Code: 9A05302

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012

ADVANCED DATA STRUCTURES

(Common to ECC, CSS, IT & CSE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Describe the data types supported by C++.
(b) Write a program to arrange the given set of numbers in ascending order using pointer.

2 (a) Write a program in C++ to illustrate the multiple inheritance concepts.
(b) Explain the concepts of function overloading and operator overloading with an example.

3 (a) What characteristics should a good algorithm possess?
(b) Analyze the time and space complexity for recursive binary search algorithm.

4 (a) What is hashing? Explain an instance where hashing technique is used.
(b) Compare time complexities of linear search, binary search and searching from hash tables.

5 (a) Discuss in brief the working of heap sort algorithm.
(b) Write notes on priority queue.

6 (a) Write algorithms to implement the basic binary search tree operations-search, delete.
(b) Explain the concepts for performing single and double rotations of AVL Trees?

7 (a) How do you find height of B-tree? Explain.
(b) Analyze the time complexity of Red-black tree.

8 Analyze the time complexity of Knuth-Morris-Pratt algorithm.

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