

Code: 9A05302

R09

B. Tech II Year I Semester (R09) Supplementary Examinations, May 2013

**ADVANCED DATA STRUCTURES**

(Common to ECC, CSS, IT & CSE)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Write a C++ program to perform 2D matrix operations as follows:
  - (a) Define class MATRIX, use appropriate constructor(s).
  - (b) Define methods for the following two matrix operations: determinant and transpose.
  - (c) Write a main program to demonstrate the use of the MATRIX class and its methods.
- 2
  - (a) What is reusability? How do you achieve this in C++?
  - (b) What are the different ambiguities involved in multiple inheritance and how they are resolved?
- 3 Write a C++ program for array implementation of stack using ADT.
- 4
  - (a) Explain how a hashing table can be represented.
  - (b) Describe any two hashing functions with example.
- 5
  - (a) Write a C++ program to implement heap sort algorithm.
  - (b) Describe any one external sorting method.
- 6 What is a binary search tree? What is the average depth of a binary search tree? How is it different from binary tree? Justify your answer.
- 7 Compare indexed balanced tree with balanced binary tree. Give suitable example.
- 8 What is meant by prefix matching? Explain with example how prefix matching is done.

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Code: 9A12301

R09

B. Tech II Year I Semester (R09) Supplementary Examinations, May 2013  
**DIGITAL LOGIC DESIGN & COMPUTER ORGANIZATION**  
(Common to CSS and IT)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Draw the flowchart for multiplication of two fixed point numbers when negative numbers are in signed-magnitude representation and explain with an example.
- 2 Design a modulo-12 up synchronous counter using T-flip flops and draw the circuit diagram.
- 3 Explain about the two ways to achieve a BCD counter using a counter with parallel load.
- 4 (a) Explain how booth's algorithm is suitable for signed number multiplication in comparison of conventional shift and add method.  
(b) Discuss the Booth's multiplication algorithm with an example.
- 5 (a) Write short notes on the following with an example:  
(i) Three-address instructions.  
(ii) RISC instructions.  
(iii) Machine instructions.  
(b) Explain about machine instruction sequencing techniques.
- 6 (a) List down the various basic operations a CPU has to perform for the execution of various instructions.  
(b) Explain with the help of a neat sketch how the building blocks of the processor units are organized and how they are interconnected.
- 7 (a) What is meant by cache coherency? Why is cache coherency necessary? Explain different approaches for cache coherency.  
(b) What is meant by virtual memory? What is the need to implement virtual memory?
- 8 (a) What is I/O interface? Explain I/O interface with the help of a block diagram.  
(b) With the help of a neat sketch explain the I/O interface for I/O device and I/O interface for O/P device.

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R09

B. Tech II Year I Semester (R09) Supplementary Examinations, May 2013

**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 What are the various types of network topology? What are the implications of having different topology?
- 2 Contrast the advantages and disadvantages of step-index, graded index, single mode propagation and multi mode propagation.
- 3 (a) Define and explain quantization and describe a folded binary code.  
(b) Write short notes on dynamic range.
- 4 (a) Describe a satellite foot print.  
(b) Explain the terms FDMA, TDMA, CDMA.
- 5 (a) Explain about station signaling and inter office signaling.  
(b) Explain the basic purpose of call progress tones and signals.
- 6 Name and describe the two most prevalent types of interference in cellular telephone systems.
- 7 List and explain various types of bar codes.
- 8 List and describe the two transmission modes used with data communication modems.

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B.Tech II Year I Semester (R09) Supplementary Examinations, May 2013

**BASIC ELECTRICAL ENGINEERING**

(Common to CSS, IT &amp; CSE)

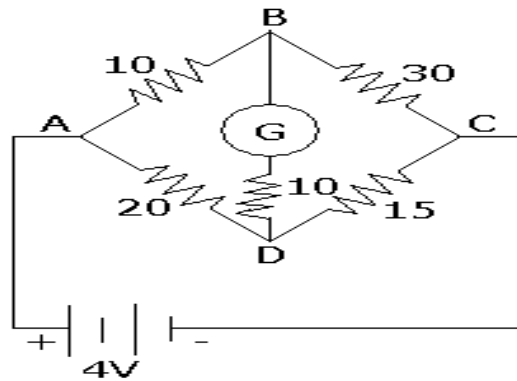
Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
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- 1 (a) State and explain Kirchoff's laws.  
(b) Determine the currents in all the bridge arms of the circuit as shown in figure. Find the value of the current through the galvanometer, and its direction (G is galvanometer, and all resistance are in ohms).



Figure

- 2 (a) Explain the division of current in the parallel branches.  
(b) A circuit consists of three resistances of 12, 18 and 36 ohms respectively by joined in parallel and the combination is connected in series with a resistance of 12 ohms. The whole circuit is connected to 60 V supply. Calculate current in each branch, total current drawn and power dissipated in each resistor.
- 3 (a) A current of 10 A flows in a circuit with a 30 degree angle of lag when the applied voltage is 100 V. Find the impedance, reactance and resistance of the circuit.  
(b) Derive the expression of true power and impedance in RLC series circuit.
- 4 (a) Discuss the constructional features of transformers. Draw neat diagrams.  
(b) Calculate the flux in the core of a single-phase transformer having a primary voltage of 230 V, at 50 Hz and 50 turns. If the flux density in the core is 1 Tesla, calculate the net cross – sectional area of the core.

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- 5 (a) Explain the types of DC generators in detail.  
(b) A lap wound DC generator having 80 slots with 10 conductors per slot generates at no load emf of 400 V, when running at 1000 rpm. At what speed should it be rotated to generate a voltage of 220 V on open circuit.
- 6 A 200 V dc shunt motor develops an output of 16.9 KW when taking an input of 20.2 KW. The field winding resistance is  $50 \Omega$  and armature resistance is  $0.06 \Omega$ . Calculate the efficiency and power input when the output is 7.35 KW.
- 7 A 3-phase, 4-pole 60 Hz induction motor has a slip of 3% at no-load and 5% at full load. Find:  
(i) Synchronous speed.  
(ii) Full-load speed.  
(iii) No-load speed.  
(iv) Frequency of rotor current at stand still.  
(v) Frequency of rotor current at full load.
- 8 Explain the types of damping devices used in the measuring instruments in detail with neat diagrams.

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B. Tech II Year I Semester (R09) Supplementary Examinations, May 2013

**ELECTRONIC DEVICES & CIRCUITS**

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

Time: 3 hours

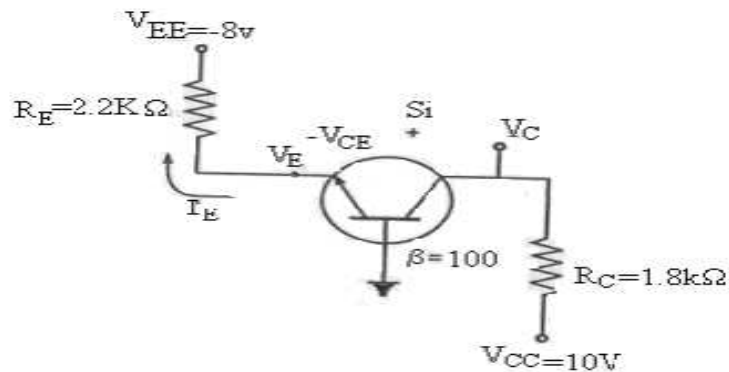
Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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- 1 (a) Draw the forward characteristic of semiconductor diode and briefly explain the method of obtaining the characteristic.
- (b) Mention the reason for silicon devices to work at higher temperatures when compared to germanium devices with necessary energy band diagrams.
- 2 (a) Derive an expression for ripple in a  $\pi$ -section filter when used with a half wave rectifier.
- (b) A full-wave single phase rectifier employs a  $\pi$ -section filter consisting of two  $4 \mu\text{F}$  capacitances and a  $20 \text{ H}$  choke. The transformer voltage to the center tap is  $300 V_{\text{rms}}$ . The load current is  $500 \text{ mA}$ . Calculate the dc output voltage and the ripple voltage. The resistance of the choke is  $200 \Omega$ .
- 3 (a) Define  $\alpha$ ,  $\beta$ ,  $\gamma$  of a transistor and show how they are related to each other.
- (b) Why does the CE configuration provide large current amplification while CB does not?
- 4 (a) For the circuit shown below, determine  $I_E$ ,  $V_C$  and  $V_{CE}$ . Assume  $V_{BE} = 0.7 \text{ V}$ .



- (b) Compare the advantages and disadvantages of biasing schemes.
- 5 (a) Explain the construction and its operation of N-channel JFET with neat diagram.
- (b) Explain JFET parameters.
- 6 (a) Draw the two biasing circuits for JFET and explain.
- (b) Briefly explain the small signal model of JFET.
- 7 (a) Draw the hybrid equivalent circuits for CB, CE and CC configurations.
- (b) Define h-parameters along with its units.
- 8 (a) Explain the working principle of UJT with its characteristics.
- (b) Define the gate power dissipation and explain its importance in SCR.

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Code: 9A05301

R09

B.Tech II Year I Semester (R09) Supplementary Examinations, May 2013  
**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**  
(Common to CSS, IT and CSE)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Which of the following proposition are true and which are false? Give reasons:
  - (a) If the earth is round then the earth travels round the sun.
  - (b) If Alexander Graham Bell invented telephone, then tigers have wings.
  - (c) If tigers have wings, then RDX is dangerous.
- 2 With reference to automatic theorem proving, show that SVR is tautologically implied by  $(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow s)$ .
- 3 (a) Consider  $F : Z^+ \rightarrow Z^+$  define by  $f(a) = a^2$  check if  $f$  is one – to-one and in- to using suitable explanation.  
(b) Let the function  $f$  &  $g$  are defined by  $f(x) = 2x + 1$  and  $g(x) = x^2 - 2$  is  $f \circ g = g \circ f$ .
- 4 If  $(G, *)$  and  $(H, \Delta)$  are two groups and  $f: G \rightarrow H$  is Homomorphism, then prove that kernel is a normal function.
- 5 Find the recurrence relation for generating Fibonacci series and solve the relation.
- 6 (a) How many ways can we get a sum of 8 when two indistinguishable dice are rolled?  
(b) What is the coefficient of  $x^3y^7$  in  $(x+y)^{10}$ ?
- 7 (a) Explain the properties of path matrix.  
(b) What do you mean by graph traversal? Explain the different graph traversal techniques with an example.
- 8 Define the following with an example:
  - (i) Cycle graph.      (ii) Path graph.
  - (iii) Null graph.      (iv) Sub graph.
  - (v) Tree.

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