II B.Tech. I Semester Regular Examinations Nov/Dec 2014
Basic Electrical Engineering
(Common to CSE & IT)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1. a) Define the following terms :
   i)   Electric Field
   ii)   Electric current
   iii)   Potential difference
   iv)   Electric Power   8M

   b) Derive the expression for star to delta transformation   6M

2. a) State and explain Kirchhoff's Law's   6M

   b) Explain the voltage and current source Transformation Techniques   8M

3. a) Define the frequency, time period, phase, average and RMS values   6M

   b) A Voltage wave is given by equation $V = 50 + 30 \sin\emptyset$ Volts find the RMS Value of the Wave   8M

4. a) What are the advantages of Star and Delta Connected Systems?   6M

   b) A balanced three phase, Delta Connected Load has per phase impedance of $(25 + J\,40)$. If 400 V, 3 Phase supply is connected to this load. Find
   (i) Phase Current   (ii) Line Current   (iii) Power Supplied to the Load   8M

5. What are the different types of DC Generators, explain them with Circuits and Equations?   14M

6. a) What is the working principle of a Transformer? Give its Constructional details?   6M

   b) A 250/500V Transformer gave the following test results:-
   Short Circuit Test: with low voltage   winding short circuited: 20V, 12A, 100W,
   Open circuit   test: 250V, 1A, 80W on low voltage side.
   Draw the circuit Constants, insert them on the equivalent circuit diagram and calculate the applied voltage and efficiency when the output is 10A at 500V and 0.8 P.f lagging.   8M

7. a) Explain the working principle of a 3 phase Induction Motor   6M

   b) A three phase Induction Motor is wound for 4 poles and is supplied from 50 HZ System calculate
   (I) the synchronous speed   (ii) The Speed of the Motor when slip is 4% and
   (iii) the rotor current frequency when motor runs at 600 rpm   8M

8. Explain the principle, Construction and working of PMMC instrument with neat diagram?   14M

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R-13

II B.Tech. I Semester Regular Examinations Nov/Dec 2014
Digital Logic Design
(Computer Science & Engineering)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1 a) What is the basic difference between   analog and digital system.   4M

   b) What is mean by an over flow? How can you tell that an over flow has occurred   3M

   c) When performing 1's and 2's complement addition why are binary number used in digital system?   7M

2. a) Draw a circuit that uses only one AND gate and one OR gate to realize each of the following function.
      i) (A+B+C+D) (A+ B+C+E) (A+B+C+F)
      ii) WXYZ+VXYZ+VXYZ   6M

   b) Reduce to a minimum sum of products
      F = ((A+B') C')(A+B)(C+A)'   4M

   c) Simply the expression by applying one of the theorems state the theorem used.
      (A+BC)+(DE+F)(A+BC)'   4M

3. a) Given F= AB' D' + A'B +A'C+ CD
      i)   use a K-map to find the minimum sum of product from for F'
      ii)   Find the minimum product of sum of F
      iii) How do you determine if a prime implicate is essential using a K-map
      iv)   Implement a full sub tract using minimum number of gates   10M

   b) Simplify Boolean expression   (x'+y) (x+y)   4M

4. a) Design a combinational circuit that will multiply two 2 bit numbers.   7M

   b) Design a combinational circuit to output the 2's complement of a 4 bit binary number   7M

5. Design a 3 bit counter which counts in the sequence 001, 011, 010, 110, 111, 101, 100, (repeat) 001, …..
      i)   use a D –flip flops
      ii) use T- flip flops
   In each case what will happen if the counter is started in the state 000?   14M

6. In each case what will happen if the counter is start1. Design a counter with the following repeated binary sequence: 0, 1, 2, 3, 4, 5, 6. Use JK Flip-flopped in the state 000?   14M

7. Design an Asynchronous sequential circuit using SR latch with two inputs A and B and one output y. B is the control input which, when equal to 1, transfers the input A to output y. when B is 0, the output does not change, for any change in input.   14M

8. Explain in detail about schottky TTL.Disadvantages of other families, Diagram of schottky TTL, Theory, Working principle, Advantages.   14M

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R-13

II B.Tech. I Semester Regular Examinations Nov/Dec 2014
Electronic Devices and Circuits
(Common to CSE & IT)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1.	a)	Explain V-I characteristics of Practical diode and Ideal Diode	7M
	b)	In what respect LED is different from PN junction diode? State applications of LED	7M
2.	a)	Explain how effectively rectifier can convert A.C to D.C	7M
	b)	For a Full Wave capacitor rectifier using large capacitance sketch output waveforms and list advantages and disadvantages.	7M
3.	a)	Explain transistor Amplifying action	7M
	b)	Explain CE configuration of BJT and explain its characteristics	7M
4.	a)	Explain thermal stability and thermal runaway.	7M
	b)	Explain the voltage divider bias and its stability	7M
5.	a)	Draw the CS drain characteristics of n-channel JFET and explain the shape of these curves qualitatively.	7M
	b)	Explain Enhancement type MOSFET	7M
6.	a)	Explain about Class A, class B, class AB and Class C operation of power amplifiers.	7M
	b)	Explain millers theorem	7M
7.	a)	Draw the circuit diagram of current series feedback circuit and derive the expressions for voltage gain, output resistance and input resistance.	7M
	b)	Classify various feedback amplifiers.	7M
8.	a)	Classify various oscillators based on output waveforms, circuit components, operating frequencies and feedback used	7M
	b)	What is the type of feedback incorporated in the Wein-bridge oscillator circuit? Explain working.	7M

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II B.Tech. I Semester Regular Examinations Nov/Dec 2014
Mathematical Foundations of Computer Science
(Common to CSE & IT)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1. a) Define converse, contrapositive and inverse of an implication.   7M

   b) Obtain the principal disjunctive normal form of (P   [(P   Q)   ¬ (¬Q V¬ P)].   7M

2. a) Write the predicate for the statement "Everyone has exactly one best friend."   7M

   b) Using propositional logic, prove that validity of the following argument,   7M
   P   (Q   S), ¬RVP, Q => R   S.

3. a) Define Relation. Explain the properties of binary relations with examples.   7M

   b) Let L be lattice, then prove that a   b = a if and only if a V b = b.   7M

4. a) If G is a group such that $(ab)^m = a^m b^m$ for three consecutive integers m, for all   7M
   a, b ∈ G, show that G is abelian.

   b) State and prove Lagrange's theorem.   7M

5. a) How many numbers can be formed using the digits 1, 3, 4, 5, 6, 8 and 9 if no repetitions   6M
   are allowed?

   b) Prove C(n, r) = C(n-1, r-1) + C(n-1, r).   8M

6. a) Determine the sequence generated by $f(x) = 1 / (1-x) + 3x^7 - 11$.   8M

   b) Solve the recurrence relation S(k) – 0.25 S(k – 1) = 0, S(0) = 6.   6M

7. a) Define spanning tree. What are its characteristics?   7M

   b) Prove that the complete graph of 5 vertices is non-planar.   7M

8. a) Prove that any two simple connected graphs with n vertices, all of degree 2, are   7M
   isomorphic.

   b) Write the difference between Hamiltonian graphs and Euler graphs.   7M

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R-13

II B.Tech. I Semester Regular Examinations Nov/Dec 2014
Probability & Statistics
(Computer Science & Engineering)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　　**Time: 03 Hours**
Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1. a) Calculate the mean and Standard Deviation for the following data

Size of item :	6	7	8	9	10	11	12
Frequency　:	3	6	9	13	8	5	4

7M

　b) Find the correlation coefficient between *x* and *y* from the given data

x :	78	89	97	69	59	79	68	57
y　:	125	137	156	112	107	138	123	108

7M

2. a) State and prove Baye's theorem　　　　　　　　　　　　　　　7M

　b) Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each drawing. Find the probability that (i) both are white (ii) first is red and second is white　　　　　　　　7M

3. a) A random variable X has the following probability function

x :	0	1	2	3	4	5	6	7
f(x) :	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Determine (i) K　(ii) Evaluate P(X<6) and P(0 < X < 5)　　　7M

　b) For the continuous probability function $f(x) = kx^2 e^{-x}$ when $x \geq 0$, find
(i) *k*　　　(ii) mean　and　(iii) Variance　　　　　　　　7M

4. a) Fit a binomial distribution to the following data

x	0	1	2	3	4	5
f(x)	2	14	20	34	22	8

7M

　b) Find the mean and standard deviation of a normal distribution in which 31% of items are under 45 and 8% are over 64.　　　　　7M

5. A population consists of five numbers 2, 3, 6, 8 and 11. Consider all possible samples of size 2 that can be drawn with replacement from this population. Find

　(a) The mean of the population.

　(b) The standard deviation of the population

　(c) The mean of the sampling distribution of means and

　(d) The standard deviation of the sampling distribution of means.　　14M

6. a) What is the maximum error one can expect to make with probability 0.90 when using the mean of a random sample of size n=64 to estimate the mean of population with variance is 2.56. 7M

   b) A sample of 11 rats from a central population had an average blood viscosity of 3.92 with a S.D. of 0.61. Estimate the 95% confidence limits for the mean blood viscosity of the population. 7M

7. Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	--

Test whether the two horses have the same running capacity. 14M

8. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees

Employees

Soft Drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

14M

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II B.Tech. I Semester Regular Examinations Nov/Dec 2014

Advanced Data Structures Through C++

(Common to CSE & IT)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. Distinguish between the following terms

    (a) Objects and classes

    (b) Data Abstraction and data encapsulation

    (c) Inheritance and polymorphism

    (d) Dynamic binding and message passing   14M

2. Write a C++ program that contains a class string and overloads the following operators on strings:

    +   to concatenate two strings

    -   to delete a substring from the given string

    == to check for the equivalence of both strings   14M

3. a) Define friend class and specify its importance. Explain with suitable example.   7M

   b) Discuss Virtual function and polymorphism with example.   7M

4. a) What are the applications of dictionary with duplicates and without duplicates?   5M

   b) Explain with suitable examples double hashing, rehashing and extendible hashing? 9M

5. a) What is a heap? Differentiate between min heap and max heap?   7M

   b) Sort the list of numbers 20, 12, 35, 10, 80, 30, 17, 2, 1 using heap sort method? 7M

6. a) What are the differences between tree, binary tree and binary search tree?   5 M

   b) Explain the operations of Binary Search tree with an example   9 M

7. Explain the operations insert and deletion of a B-Tree with an example   14M

8. a) Give a suitable example illustrating the computational overhead in Brute-Force method in pattern matching.   7M

   b) Give a detailed note about Compressed Tries.   7M

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