

Probability & Statistics
(Computer Science & Engineering)

Max. Marks: 70

Time: 03 Hours

Answer *any five* questions
All Questions carry equal marks (14 Marks each)

- 1 a) An incomplete frequency distribution is given as follows

Variable	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	12	30	?	65	?	25	18

If the median value is 46 then find the missing frequencies.

7M

- b) Find the rank Correlation coefficient for the following data.

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

7M

2. a) Define

- (i) Sample Space (ii) event
(iii) Outcome (iv) probability

8M

- b) State and prove Multiplication theorem on probability for two events.

6M

3. a) Define

- (i) Random variable (ii) Probability mass function
(iii) Probability density function.

6M

- b) If a fair coin is tossed until a head or five tails occurs then find the mean and variance of a random variable x.

8M

4. a) Show that the Mode of a Poisson distribution lies between
- -1
- and
- $\frac{1}{2}$
- .

7M

- b) The mean of a Binomial distribution is 3 and variance is
- $\frac{9}{4}$
- . Find

- (i) The value of n (ii)
- $P(X = 1)$
- (iii)
- $P(X = 7)$
- (iv)
- $P(1 < X < 6)$
- .

7M

- 5 A population consists of 5, 10, 14, 18, 13, and 24. Consider all possible samples of size two, which can be drawn without replacement from the population. Find
-
- i) the mean of population ii) the standard deviation of population iii) mean of the sample iv) The standard deviation of the sample.

14M

- 6 a) Explain i) Maximum error of estimation

- ii) Confidence interval for Mean of large samples.

10M

- b) A sample of size 10 was taken from a population S.D. of sample is .03. Find the maximum error with 99% confidence

4M

- 7 a) Write Null Hypothesis and Alternative Hypothesis

4M

- b) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also, calculate 95% confidence interval.

10M

- 8 A die is thrown 60 times with the following results.

Face	1	2	3	4	5	6
Frequency	8	7	12	8	14	11

Test at 5% level of significance if the die is honest.

14M

Hall Ticket Number :										
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Code : 1G131

R-11 / R-13

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015
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)

1. a) Define Class? Explain about inline function with Example. 6M
 b) Explain about dynamic memory allocation and de-allocation 8M

2. a) Explain the concept of function overloading and operator overloading with an example. 7M
 b) Explain Base Class and Derived Class with Example. 7M

3. a) Define Abstract Data Type? Explain the implementation of stack ADT in details. 7M
 b) How we can measure the performance of an algorithm? Discuss in detail. 7M

4. Define Hash Table? Discuss in detail about collision resolution technique? 14M

5. a) Define and explain in detail about Priority Queue ADT. 4M
 b) Explain about external sorting and Multi way merge. 10M

- 6 a) Define AVL Trees? Explain various steps for AVL search tree insertion with illustrations. 5M
 b) Define Binary Tree? Explain Binary Tree Traversal with below example.
 Preorder: A B D G C E H I F, In-order: D B G A H E I C F. Construct post order. 9M

7. a) Describe insertion operation of a B-tree with an example. 7M
 b) Explain about splay trees. 7M

8. a) Write and explain the Knuth-Morris-Pratt algorithm with suitable algorithm. 7M
 b) Write and explain Brute force algorithm. 7M

5. a) Explain different methods of excitation of D.C generators with suitable diagrams. 10M
b) What is the Significance of The Back E.M.F of a D.C motor? 4M
6. a) Define voltage regulation and efficiency of a transformer. Deduce the expression for the voltage regulation with lagging power factor. 7M
b) The iron and full load copper loss in a 40KVA 1 phase transformer are 450 W and 850 W respectively. Find
i. Efficiency at full load when the power factor of the load is 0.8 lagging
ii. The maximum efficiency and
iii. The load at which the maximum efficiency occurs. 7M
7. a) Explain the working principle of three phase induction motor. 7M
b) A 6 pole induction motor is fed by three phase 50HZ supply and running with a full load slip of 3%. Find the full load speed of induction motor and also the frequency of rotor emf. 7M
8. a) Explain with neat sketch the construction and working of MC type instrument. 7M
b) Write the errors occurring in a moving coil instrument 7M

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Code : 1G132

R-11 / R-13

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015

Digital Logic Design
(Computer Science & Engineering)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Convert the following to binary, then to Octal. i) F37A.B2 ii) 2DE5.6A 7M
 b) Convert the following to binary, then to hexadecimal i) 735.5 ii) 367.236 7M
2. a) Find the Demorgan equivalent to $F = x(y + z)'$. Draw the truth table showing equality among equations. 7M
 b) Let $P = x'yz' + x'yz + xy'z + xyz$. eliminate the redundant terms. 7M
3. a) Simplify the following three variable equation $J = f(x,y,z) = (0,2,3,4,5,7)$. 5M
 b) Consider the following three-variable multiple output system. The objective is to find a minimal covering for all of the Systems output functions.
 $F_1 = f(a,b,c) = (2,4,5,6)$
 $F_2 = f(a,b,c) = (2,3,6,7)$
 $F_3 = f(a,b,c) = (2,5,6,7)$ 9M
4. a) Implement a single-bit binary half adder to add two single-bit binary values to produce sum and a carry output. 8M
 b) Explain how to realize two bit binary comparator on two operands. 6M
5. a) Explain clocked D Flip-Flop with truth table. 6M
 b) Explain Ring Counter (Synchronous) with timing diagram. 8M
6. a) Explain the problem of Races and Cycles in asynchronous machines. 10M
 b) Explain design process for fundamental and pulse mode asynchronous circuits. 4M
7. a) Explain ROM with block diagram. 6M
 b) Explain PLA with an example. 8M
8. a) Explain analysis principles for Synchronous circuits. 8M
 b) Define state equivalence and give the properties of equivalent states. 6M

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Code : 1G334

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015

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)

1. a) Draw the energy band diagram of PN junction diode under open circuit condition and explain. 10M
- b) Find the value of dc resistance and ac resistance of a Ge diode at 25°C with $I_c = 25\mu A$ and at an applied voltage of 0.2V across the diode. 4M
2. a) Derive the expression for the following using FWR:
 - i) Average DC current (I_{DC})
 - ii) Average DC voltage (V_{DC})
 - iii) Ripple factor()
 - iv) Efficiency() 8M
- b) A full wave rectified voltage of 18V peak is applied across a 500 μF capacitor filter. Calculate the ripple factor if load takes a average current of 100mA. Assume supply frequency 50Hz. 6M
3. a) Draw the circuit diagram of a BJT in CB configuration and explain its input and output characteristics with neat sketch. 10M
- b) Calculate the value of I_C and I_E for a transistor with $\beta_{DC} = 0.99$ and $I_{CBO} = 5\mu A$, I_B is measured as 20 μA . 4M
4. a) Define the following: i) S ii) S^1 iii) S^{11} 6M
- b) Give the analysis of a voltage –divider bias and derive the expression for stability factor. 8M
5. a) Explain the construction and operation of N-channel JFET with neat sketch. 8M
- b) Distinguish between BJT and FET. 6M
6. a) For CE configuration derive the expression for current gain (A_i), Voltage gain (A_v), input resistance (R_i) and output resistance (R_o) in terms of h-parameters. 7M
- b) Common collector amplifier having $R_S=1K$, $R_1=10K$, $R_2=10K$, $R_E=5K$, $R_L=20K$, the transistor parameters are $h_{ic}=1.2K$, $h_{fc}= -101$, $h_{rc} = 1$ and $h_{oc} = 25\mu A/V$. Calculate A_i , R_i , A_v and R_o . 7M
7. a) Draw the circuit diagram of a voltage series feedback amplifier and derive the expression for input resistance and output resistance. 7M
- b) Calculate the gain , input resistance and output resistance of voltage series feedback amplifier having $A= -300$, $R_i=1.5K$, $R_o=50K$, and $\beta = -1/20$ 7M
8. a) Show that the gain of wien bridge oscillator using BJT amplifier must be at least 3 for the oscillation to occur. 8M
- b) A crystal oscillator has $L=2H$, $C= 0.01pF$ and $R=2K$.Its mounting capacitance is 2pF. Calculate it series and parallel resonating frequency. 6M

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Code : 1G133

R-11 / R-13

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015
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)

1. a) Show that $((P \vee Q) \wedge \sim (\sim P \wedge (\sim Q \vee \sim R))) \vee (\sim P \wedge \sim Q) \vee (\sim P \wedge \sim R)$ is a tautology 7M
- b) Obtain the product-of-sums canonical forms of $(P \vee Q \vee R) \vee (\sim P \vee R \vee Q) \vee (\sim P \vee \sim Q \vee \sim R)$ 7M
2. a) Show that the following premises are inconsistent
 - i. If Jack misses many classes through illness, then he fails high school
 - ii. If Jack fails high school, then he is uneducated
 - iii. If Jack reads a lot of books, then he is not uneducated
 - iv. Jack misses many classes through illness and reads a lot of books 7M
- b) Show that $(x)(P(x) \rightarrow Q(x)) \wedge (x)(Q(x) \rightarrow R(x)) \implies (x)(P(x) \rightarrow R(x))$ 7M
3. a) Let $X = \{1, 2, 3, 4, 5, 6, 7\}$ and $R = \{(x, y) \mid x - y \text{ is divisible by } 3\}$. Show that R is an equivalence relation. Draw the graph of R. 7M
- b) For the equivalence relation $R = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 3), (3, 3), (4, 4)\}$ defined on the set $A = \{1, 2, 3, 4\}$. Find the partition of A induced by R. 7M
4. a) For any elements a, b in a group G, we have (i) $(a^{-1})^{-1} = a$ (ii) $(ab)^{-1} = b^{-1}a^{-1}$ 7M
- b) Prove that the cube roots of unity form a group under the usual multiplication 7M
5. State and prove Pigeon hole principle. Give one application of pigeon hole principle 14M
6. a) Solve the Fibonacci recurrence relation 7M
- b) Solve the recurrence relation $a_n - 3a_{n-1} = 5 \cdot 3^n, n \geq 1, a_0 = 2$ by the method of generating functions 7M
7. a) Show that the sum of the degrees of all the vertices in a graph is an even number and this number is equal to twice the number of edges in the graph. 7M
- b) Define Minimal Spanning tree. Write Prim's algorithm to construct minimal spanning tree 7M
8. a) Find the complement of the complete bipartite graph $K_{3,3}$ 7M
- b) Verify that the complete graph K_5 has cycles with lengths 3, 4, 5 7M
