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SEAT No. :

[Total No. of Pages : 2

F.Y.M.C.A.(Engg.)
COMPUTER ORGANIZATION
(2013 Course)(Semester-II)(310902)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.
- 2) Figures to the right side indicate full marks.
- 3) Assume suitable data, if necessary.

Q1) Explain the theorems of Boolean algebra:

[9]

- a) Idempotent law
- b) Absorption law
- c) Involution law.

Give the proof by perfect induction method.

OR

Q2) Construct three basic gates using NAND gate

[9]

Q3) Explain Counters and its types with example.

[8]

OR

Q4) Explain design of Half Adder and Full Adder with truth table for each.

[8]

Q5) a) Express the following function $F = A + \bar{B}.C$ in sum of minterms form. [8]

b) Express the following function $F = x.y + \bar{x}.z$ in sum of maxterms form. [5]

OR

Q6) Write a short note on:

a) DRAM

b) SDRAM

c) RDRAM

d) DDR

[8]

P.T.O

Q7) Explain the processor and memory architecture of a computer system.

[8]

OR

Q8) a) Explain the types of processors:

[6]

i) RISC

ii) CISC

iii) EPIC

b) How many bytes of Kilobytes, Megabytes and Gigabytes are?

[2]

Q9) Explain Pentium processor registers.

[8]

OR

Q10) Explain the architecture for 16-bit 8086.

[8]
3

Q11) What are the types of parallel processor systems. Explain them in detail.

[9]
5

OR

Q12) What is cluster? Explain cluster architecture in detail.

[9]



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F.Y. M.C.A. (Engineering)

C & C++ PROGRAMMING

(2013 Course) (Semester - I) (310901)

Time : 3 Hours] [Max. Marks :50

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.
- 2) Figures to the right side indicate full marks.
- 3) Assume suitable data, if necessary.

Q1) a)

What is a procedural paradigm? State its Disadvantages. ✓

[4]

b)

Enlist the steps to run a C program from command line. ✓

[4]

OR

Q2) a)

List down the steps in executing and debugging C program. ✓

[4]

b)

Explain 'stdio.h' header file in detail. ✓

[4]

Q3) a)

Explain with example 'While Loop'. ✓

[4]

b)

Write a program to store Book Information using Structures in C. ✓

[4]

OR

Q4) a)

Explain the use of '*' and '&' in pointers. ✓

[4]

b)

How Strings are stored and displayed in C. ✓

[4]

Q5) a)

Write a short note on 'Macros'. Write a program to create a macro for finding cube of any number. ✓

[5]

b)

What is the use of 'Call By Reference'? Explain with suitable example. ✓

[4]

OR

Q6) a)

What is Modularity? How Modular programming is implemented and useful in C language? ✓

[5]

b)

Explain any 2 standard Library function with example. ✓

[4]

P.T.O.

Q7) a) Enlist the difference between C & C++. ✓

[4]

b) What are classes and objects? Explain with example. ✓

[4]

OR

Q8) a)

What are Constructors? Explain the different types of Constructors. ✓

[4]

b)

Compare C in and C out of C++ with printf and scanf of C language. ✓

[4]

Q9) a)

Explain the various access modifiers used for inheritance in C++ with example. ✓

[4]

b)

Write a program to overload binary + to add two complex numbers. ✓

[4]

OR

Q10) a)

What is function overriding? ✓

[4]

b)

Explain static function in short. ✓

[4]

Q11) a)

What is command line argument? Write a program to demonstrate the use of it. ✓

[5]

b)

Explain the function seekp() and seekg(). ✓

[4]

OR

Q12) a)

Explain the hierarchy of ostream and fstream classes in C++. ✓

[5]

b)

Differentiate between text and binary files. ✓

[4]

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SEAT No. :

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F.Y. M.C.A. (Engineering)

PRINCIPLES OF PROGRAMMING PRACTICES

(2013 Pattern) (Semester - I) (310903)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.
- 2) Figures to the right side indicate full marks.
- 3) Assume Suitable data, if necessary.

Q1) a) Write a short note on Object oriented Programming Language. [4]

b) What are the software development steps? [4]

OR

Q2) a) Compare Assembly Language and High Level Language. [4]

b) Write a short note on:

- i) Firmware
- ii) Compiler

Q3) a) Define: [4]

- i) Parameter
- ii) Return Value
- iii) Data Dictionary
- iv) Global variable

b) Write a short note on Interactivity Chart. [4]

OR

Q4) a) Name three current problems in your life that might be solved through a heuristic approach. Explain why each of these problems is heuristic in nature. [4]

b) Differentiate between: [4]

- i) Constant and Variable.
- ii) Expression and Equation.

P.T.O.

Q5) a) What is meant by the coupling of a module? Explain with example different levels of coupling. [5]

b) Write a short note on modular programming. [5]

OR

Q6) a) What is module? Explain different types of modules and State the rules for designing modules. [5]

b) Explain the three logic structures and What is meant by coupling modules? [5]

Q7) a) Explain Efficiency of an algorithm. [4]

b) Write down Exchange of values of two variables with or without third variable. [4]

OR

Q8) a) Write down an algorithm of generation of Pascal triangle. [4]

b) List and Explain factors included in implementation of an algorithm with example. [4]

Q9) a) Explain three different ways of analysis and Which is best to use. [4]

b) Explain time complexity and calculate the same for bubble sort. [4]

OR

Q10) a) Explain how to estimate running time of an algorithm with one method. [4]

b) Explain space complexity and calculate the same for selection sort. [4]

Q11) a) Write a short note on Immediate changeover. [4]

b) Design an algorithm for mean and median of n-numbers. [4]

OR

Q12) a) Difference between testing and debugging. [4]

b) Design an algorithm for Binary Search. [4]

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SEAT No. :
[Total No. of Pages : 4

F.Y. M.C.A. (Under Engineering Faculty)

PROBABILITY AND STATISTICS

(2013 Course) (Semester-I)

Time : 3 Hours]

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.
- 2) Figures to the right side indicate full marks.
- 3) Use of probability table, electronic pocket calculator is allowed.
- 4) Assume suitable data if necessary.

[Max. Marks : 50

Q1) a) A box contains 4 white, 5 red and 6 black balls. One ball is drawn at random from the box. Find the probability that [4]

- i) The ball drawn is of white color.
- ii) The ball drawn is of black color.

b) A certain firm has plants A, B and C producing 30%, 35% and 35% respectively of the total output. The probabilities of non-defective product from these plants are 0.80, 0.85 and 0.90 respectively. An item is selected from the total output of these plants and found to be defective. What is the probability that it is produced by plant B? [5]

OR

Q2) a) State and prove Baye's theorem. [5]

b) Bag I contains 2 green balls and 3 yellow balls and bag II contains 4 green and 1 yellow balls. A ball is chosen at random from one of bag is green. What is the probability that it has come from bag I? [4]

Q3) a) Define with example: [4]

- i) Probability Density Function.
- ii) Conditional Probability.

P.T.O.

b) It has been found that 60% of the rides of 2 wheeler put on crash helmets. Find the probability that: [4]

- i) 4 out of 5 will be using their helmets.
- ii) At least 4 out of 5 will be using their helmets. (Use Poisson Distribution)

OR

Q4) a) Explain the terms: [4]

- i) Independent events.
- ii) Mean and Standard Deviation.

b) A random variable has the following probability mass function. [4]

x	0	1	2	3	4	5	6	7
p(x)	0	k	2k	2k	3k	k ²	2k ²	7k ² +7

Find:

- i) k
- ii) $p(3 < x < 6)$

Q5) a) Obtain mean of Poisson Distribution. [4]

b) Let (X, Y) be a discrete bivariate random variable with the following p.m.f. [4]

Y	X		
	1	2	3
0	1/12	1/6	0
1	0	1/9	1/5
2	1/18	1/4	2/5

Find marginal distribution for X and Y.

OR

Q6) a) A joint p.d.f. of random variable X is given by: [4]

$$f(x) = \begin{cases} c(x-1) & \text{for } 1 < x < 4 \\ 0 & \text{otherwise} \end{cases}$$

Find:

- i) k
- ii) $f(2 < x < 4)$

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b) Write note on:

- i) ☒ Gamma Distribution.
- ii) ☒ Uniform Distribution.

[4]

Q7) a) What is point estimator and point estimate? What properties of estimator make it a good estimator? [4]

b) Explain the following terms: [4]

- i) Sample
- ii) Sampling
- iii) Random Sampling
- iv) Sample Statistics

OR

Q8) a) Explain the following terms: [4]

- i) ☒ Confidence Interval.
- ii) ☒ Central limit Theorem.

b) ☒ What is hypothesis testing? Explain the procedure for Testing of Hypothesis. [4]

Q9) a) What do you mean by sampling distribution? What is standard error? [4]

b) What is χ^2 distribution? Explain properties and applications of χ^2 distribution. [4]

OR

Q10) a) ☒ What is student's t-distribution? Explain properties and applications of student's t-distribution. [4]

b) Explain the following terms: [4]

- i) ☒ Type I and type II errors.
- ii) ☒ Level of Significance.

Q11) a) ☒ Explain Statistical Quality Control (SQC) with its limitations & applications. [5]

b) Explain the procedure to draw np chart. [4]

OR

Q12) a) ☒ Explain the χ^2 test as a test of goodness of fit. Write the steps. [4]

b) Given below are the values of sample mean $\bar{X}$ and sample range R for 10 samples, each of size 5. Draw the appropriate mean and range charts & comment on the state of control of the process. [5]

Sample No.: 1 2 3 4 5 6 7 8 9 10

Mean : 43 49 37 44 45 37 51 46 43 47

Range : 5 6 5 7 7 4 8 6 4 6

($A_2 = 0.577$, $D_3 = 0$, & $D_4 = 2.115$).

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SEAT No. : 1566

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F.Y.M.C.A.(Under Engg.)
DISCRETE MATHEMATICS
(2013 Course)(Semester-I)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) Answers to the two sections should be written in separate answer books.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of probability table, electronic pocket calculator is allowed.
- 5) Assume suitable data if necessary.

- Q1)** a) Prove by mathematical induction that $8^n - 3^n$ is a multiple of 5 for $n \geq 1$ [5]
b) An investigator interviewed 100 students to determine their preferences for the three. [4]
drinks-Milk(M), Coffee(C) and Tea(T). He reported the following: 10 students had all the three drinks, 20 had 'M' and 'C', 30 had 'C' and 'T', 25 had 'M' and 'T', 12 had 'M' only, 5 had 'C' only and 8 had 'T' only. Find
i) How many did not take any of the three drinks
ii) How many take milk but not coffee?

OR

- Q2)** a) Show that $(A-B) \cap C = A \cap (B \cup C)$ by using Venn diagram. [5]
b) Draw Venn diagram to prove that $A \cap (B \cap C) = (A \cap B) \cap C$ [4]
Q3) a) Prove that $\sim(p \wedge q)$ and $\sim p \vee \sim q$ are logically equivalent. [4]
b) Obtain the dnf of the form $(p \rightarrow q) \wedge (\sim p \wedge q)$ [4]

OR

- Q4)** a) i) Show that $(p \wedge (p \rightarrow q)) \rightarrow q$. [4]
ii) $(p \rightarrow q) \leftrightarrow (qv \sim p)$

P.T.O.

- b) Write the following statements in symbolic form [4]

- i) Gopal is tall and handsome
- ii) Gopal is tall but not handsome
- iii) Gopal is neither tall nor handsome
- iv) It is false that Gopal is short or handsome.

Q5) a) Six different mathematics books, four different discrete structures books and different computer sciences books are to be arranged on a shelf. How many different arrangements are possible if [4]

- i) The books in each subject must all be together.
- ii) Only the discrete structures books must be together.
- b) In how many ways can the letters in the word MISSISSIPPI be arranged? [4]

OR

Q6) a) In how many ways can the letters in the word "PIONEER" be arranged so that The two E's always together. [4]

- b) In how many ways can 8 different books be divided among Sameer, Ajay, and Leela if Sameer gets 4 books, Ajay and Leela get 2 each. [4]

Q7) a) Use Warshalls algorithm to find transitive closure of relation R where [5]

$$R = \{(a,b)(b,a)(c,b)(c,d)(d,a)\}$$

- b) Let $f(x) = x+2$, $g(x) = x-2$ and $h(x) = 3x$ for $x \in R$, where $R = \text{set of real numbers}$. find $\text{gof}()$, $\text{fog}()$, $\text{fogh}()$ [4]

OR

Q8) a) Let R be the relation on the set $A = \{5, 6, 8, 10, 28, 36, 48\}$. Let $R = \{(a,b) / a \text{ is a divisor of } b\}$. Draw the Hasse diagram. Determine whether R is reflexive, transitive and symmetric. [5]

- b) Let $A = \{1, 2, 3, 4\}$ and $R = \{(1, 2), (2, 3), (3, 4)\}$ be a relation on A. Find R^* and draw its diagram. [4]

Q9) a) Let G be a graph with e edges and n number of vertices then prove handshaking lemma. That is summation of degree all vertices is equal to twice e. [4]

Draw one such graphs.

- b) Define the following [4]

- i) Self loop and parallel edges
- ii) Simple and Multiple graph

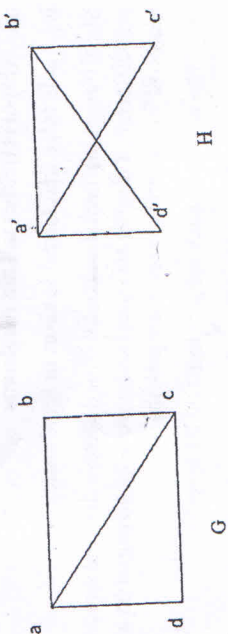
OR

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Q10)a) Define regular graph and bipartite graph. Draw a complete bipartite graph which is not a regular graph. [4]

b) Show that G and H are Isomorphic [4]

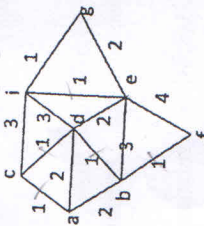


Q11)a) Define [4]

- Rooted tree
 - m-ary tree
 - full binary tree
 - height of tree
- b) Construct an optimal tree for the weights 8, 9, 10, 13, 15, 22. Find the weight of the optimal tree [4]

OR

Q12)a) Use Prim's algorithm to construct a minimal spanning tree for the weighted graph in following figure starting from vertex a. [4]



b) Find shortest path between a-z for the given graph; using Dijkstra's algorithm: [4]

