C 27501-A

Name.....

Reg. No.....

# FIRST SEMESTER M.C.A. DEGREE EXAMINATION, MAY 2012

## MCA 2K 101—DISCRETE STRUCTURES

(New Scheme)

Time : Three Hours

Maximum : 100 Marks

1. (a) Define tautology and contradiction. Verify that $(p \vee q) \longleftrightarrow (q \vee p)$ is a tautology.

   (b) Simplify $(p \vee q) \wedge (\sim p \wedge q)$.

2. (a) Show that the relation '$\subseteq$' defined on power set of a set A is a partial order relation.

   (b) State Pigeonhole Principle. Show that if any 11 numbers are chosen from the set {1, 2, .....20} then one of them will be a multiple of another.

3. (a) Prove that $A \cap B$ is an equivalence relation if A and B are equivalence relations on a set S.

   (b) Draw the Hasse diagram of R where R is a partial order relation on a set A of divisors of 30.

4. (a) Define :

   (i) Abelian group.

   (ii) Subgroup.

   (iii) Homomorphism.

   (b) State and prove Cayley's theorem.

5. (a) Define a ring. Give an example of a ring which is neither commutative nor has a unit element.

   (b) Define a field. Prove that the ring $I_p$ of integers modulo $p$ is a field where $p$ is prime.

6. (a) Prove that every integral domain can be embedded in a field.

   (b) Show that intersection of two ideals is an ideal.

7. (a) Prove that a non-invertible non-zero element $p$ in a Euclidean ring R is prime iff only factors of $p$ are invertible elements of R.

   (b) If R is a unique factorisation domain prove that any two elements of R have a *gcd*.

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# FIRST SEMESTER M.C.A. DEGREE EXAMINATION JUNE 2012

## MCA 2K 102—PROBABILITY AND STATISTICS

(New Scheme)

Time : Three Hours Maximum : 100 Marks

1. (a) Derive the mean and variance of normal distribution. (10 marks)

   (b) State and prove Tchebysheve's inequality. (10 marks)

2. (a) Show that the binomial distribution tends to Poisson distribution when $n \to \infty$, $p \to 0$ such that $np$ is finite.

   (10 marks)

   (b) Define lognormal distribution. Prove that if $X_1$ and $X_2$ are independent lognormal distribution then their product also follows lognormal distribution.

   (10 marks)

3. (a) Derive the sampling distribution of variance. (10 marks)

   (b) Explain the properties of a good estimate. (10 marks)

4. (a) Two samples of size 9 and 8 give the sum of squares of deviation from their respective means equal to 160 inches and 91 inches respectively. Can they be regarded as drawn from two normal population with same variance.

   (10 marks)

   (b) Explain the '$t$' test for testing equality of means of two normal populations. (10 marks)

5. (a) Calculate the Correlation Coefficient for the following data :

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $x$ : | 23 | 27 | 28 | 28 | 29 | 30 | 31 | 33 | 35 | 36 |
| $y$ : | 18 | 20 | 22 | 27 | 21 | 29 | 27 | 29 | 28 | 29 |

   (10 marks)

   (b) Fit a straight line of the form $y = a + bx$ to the data below :

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $x$ : | 1 | 3 | 4 | 6 | 8 | 9 | 11 | 14 |
| $y$ : | 1 | 2 | 4 | 4 | 5 | 7 | 8 | 9 |

   (10 marks)

6. (a) The equation of two regression lines are $3x + 2y = 26$ and $6x + y = 31$. Identify the regression lines. Obtain the Correlation Coefficient. Find the mean values of $x$ and $y$.

   (10 marks)

Turn over

(b) From a sample of 19 pairs of observations, the Correlation is 0.5 and Corresponding population value is 0.3. Is the difference significant. (10 marks)

7. (a) Explain the principle of experimentation. (10 marks)

(b) Derive the ANOVA table for CRD. (10 marks)

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# FIRST SEMESTER M.C.A. DEGREE EXAMINATION, JUNE 2012

## MCA 2K 103—COMPUTER PROGRAMMING

Time : Three Hours

Maximum : 100 Marks

*Answer any* **five** *questions.*
*All questions carry equal marks.*

1. (a) Distinguish between High level and Low level languages.
   (b) Explain in detail program design methods.
2. (a) Explain the importance of flow chart in program design.
   (b) Explain the importance of debugging in testing programs.
3. (a) Classify the operators in C language.
   (b) Explain the parameter passing mechanisms available in C and C++.
4. (a) Compare the usage of arrays with pointers.
   (b) Explain the usage of enumerated data types. (10 marks)
   (c) Illustrate bitwise operators in C. (5 marks)
5. [illegible] (5 marks)
   (b) Explain the benefits of OOP.
6. (a) Explain the applications of OOP.
   (b) Can a C program compile using C++ compiler ? If yes, what can you say about the output ? Can they differ ?
7. (a) Explain inheritance.
   (b) Explain polymorphism.

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# FIRST SEMESTER M.C.A. DEGREE EXAMINATION, JUNE 2012

## MCA 2K 104—HARDWARE SYSTEM

Time : Three Hours

Maximum : 100 Marks

*Answer any* **five** *questions.*
*All questions carry equal marks.*

1. (a) Explain DeMorgan's Theorem with suitable examples. Discuss the application of DeMorgan's theorem in digital circuits.

   (b) Explain how multiplexers are used as universal logic design. Illustrate with any *three* variable truth table. (6 marks)

   (c) Explain the design of a synchronous decade counter and discuss the different modes of operation. (6 marks)

2. (a) Discuss the various components on a PC Motherboard with the help of diagram. (8 marks)
   (b) Using a diagram, explain the use of controllers and drivers of a PC.

3. **(a) Explain in detail the memory paging mechanism in 80386 processor.**
   (b) Discuss in detail the segmentation concept of advanced processors and its advantage.

4. (a) With the help of diagram, discuss how 8279 is used to interface with the processor.
   (b) Discuss the different Analog to Digital Conversion techniques.

5. (a) With the help of internal block diagram, explain 8259A priority interrupt controller and its function.
   (b) Discuss the basic CRT operation with the help of necessary diagrams.

6. (a) Discuss the concept of shared bus operation.
   (b) Discuss the DRAM interface scheme in 8086 processor. (6 marks)
   (c) Discuss the salient features of 80486 processor and its advantage over previous processors. (8 marks)

7. (a) Write briefly on the CMOS RAM and the Real Time Clock of PC. (6 marks)
   (b) Explain the circuit of binary to Gray Code Convertor. (6 marks)
   (c) Write an account of common peripherals used in a PC. (7 marks)
   (7 marks)

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# FIRST SEMESTER M.C.A. DEGREE EXAMINATION, JUNE 2012

## MCA 2K 105—INDUSTRIAL MANAGEMENT

Time : Three Hours Maximum : 100 Marks

*Answer any* **five** *questions.*
*All questions carry equal marks.*

1. (a) State the objectives advantages and disadvantages of co-operative enterprise.

   (b) Why are the plant location decisions important in relation to manufacturing system ? What production factors are involved ?

2. (a) What are the various costs associated with inventory ?

   (b) How do the firm's customers benefit from supply chain management ?

3. (a) Describe the various characteristics of personnel management.

   (b) How does job evaluation help in developing an equitable wage structure ? What precautions should be observed in installing an evaluation scheme ?

4. (a) What do you understand by advertisement ? Explain its main objects and functions.

   (b) How many types of sampling plans are there ? Briefly explain by giving examples.

5. (a) What are the three purposes served by quality standard ? Explain.

   (b) What are selection tests ? What are various kinds of tests ?

6. (a) What does ISO stand for ? How did this organization come into existence ?

   (b) What are the factors influencing a wage system ? Discuss various systems of wage payment.

7. (a) Marketing Research is the cornerstone of scientific marketing. Comment.

   (b) Write notes on :

   (i) Planning. (ii) Span of control.

   (iii) Motivation. (iv) Product analysis.