MATHEMATICS

Time : Three hours   Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1.   Find $\dfrac{dy}{dx}$ when $y = x^{x^{\cdots^{\infty}}}$.

2.   If $x = \sin t$ $y = \cos pt$ prove   that
$(1 - x^2)y'' - xy' + p^2 y = 0$.

3.   Integrate $I = \displaystyle\int \dfrac{dx}{(2\,\sin x + 3\cos x)^2}$.

4.   Evaluate $\displaystyle\int_{0}^{\pi/2} \dfrac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}}\, dx$.

5.   Find by vector method the angle between the diagonals of a cube.

6.   Find the rank of the matrix by reducing it into normal form $\begin{pmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{pmatrix}$.

7. Prove that the lines joining the origin to the points of intersection of the line $x - y = 2$ and the curve $5x^2 + 12xy - 8y^2 + 8x - 4y + 12 = 0$ make equal angles with the axes.

8. Find the equations of the tangents to the circle $x^2 + y^2 = 25$ which pass through $(7, 1)$.

9. Find the mean, median and mode for the following data 18, 15, 18, 16, 17, 18, 15, 19, 17, 17.

10. Between the hours 2 pm and 4 pm the average number of phone calls per minute coming into the switch board of a company is 2.35. Find the probability that during one particular minute there will be atmost 2 phone calls.

PART B — $(4 \times 10 = 40$ marks$)$

Answer any FOUR questions.

11. Find the angle of intersection between the curves $x^2 - y^2 = a^2$ and $x^2 + y^2 = a^2\sqrt{2}$.

12. Evaluate $\int(3x + 2)\sqrt{x^2 + x + 1}\, dx$.

13. Show that the four points whose position vectors are $3\vec{i} + 2\vec{j} + 4\vec{k}$; $6\vec{i} + 3\vec{j} + 2\vec{k}$; $5\vec{i} + 7\vec{j} + 3\vec{k}$; $2\vec{i} + 2\vec{j} + 5\vec{k}$ are coplanar.

14. Solve the system of equations :

$$x + 2y + 3z = 1$$
$$2x + 3y + 2z = 2 \text{ by matrix method.}$$
$$3x + 3y + 4z = 1.$$

15. Solve $y^2 p - xyq = x(z - 2y)$.

16. Marks of 10 students in Maths and Statistics are given below :

Maths : 32 38 48 43 40 22 41 69 35 64

Statistics : 30 31 38 43 33 11 27 76 40 59

Obtain the correlation coefficient.

PART C — $(2 \times 15 = 30$ marks$)$

Answer any TWO questions.

17. (a) If $y = \sin^{-1}x$ prove that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - n^2 y_n = 0$

(b) Find $\int \dfrac{dx}{5 + 4\cos x}$.

18. (a) Find the value of h and f so that the equation $9x^2 + 2hxy + 4y^2 + 6x + 2fy - 3 = 0$ represents a pair of parallel lines and find the distance between them.

(b) Solve $(mz - ny)p + (nx - lz)q = ly - mx$.

19. (a) Calculate the standard deviation of the following data :

X :	2.0	2.5	3.0	3.5	4.0	4.5	5.0
f :	5	38	65	92	70	40	10

(b) Apply the principle of least squares to fit a straight line $y = a + bx$ to the following data :

x :	2	4	6	8	10	12	14
y :	10	14	15	16	15	17	18

9209/A12

PROGRAMMING IN C

Time : Three hours   Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Discuss about identifiers.

2. Describe the different forms of if statements in C with examples.

3. Discuss in detail about recursion.

4. Explain the features of a static variable.

5. What is an array? How arrays are declared and initialized? Explain.

6. Explain the relationship between an array and a structure.

7. How to passing structures to functions.

8. Describe about pointers.

9. What is files? and how to access a file?

10. Write about the usage of fgets and fputs.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. State all the precedence rules involving arithmetic, relational and logical operators.

12. Explain the storage classes in C with examples.

13. Write a C program accept two matrices of order nxn and display their sum.

14. Discuss in detail about unions.

15. Write a program that sorts a set of given numbers in ascending order.

16. Write about files with simple examples.

PART C — (2× 15 = 30 marks)

Answer any TWO questions.

17. Explain call by value and call by reference methods of passing parameters.

18. (a) Explain the looping structures in C with example.

(b) Write notes on structure of C program.

19. (a) What is recursive function? Give an example.

(b) What are the basic file operation?

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9210/A13

DIGITAL PRINCIPLES AND APPLICATIONS

Time : Three hours   Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Convert (41) to Binary.

2. Find the Octal equivalent of the Binary number : 110111011.001010100.

3. What is Binary logic?

4. Prove that $x \cdot x = x$.

5. Write a note on "Sum of products".

6. Give the logic diagram for the expression $F = xy' + x'z$.

7. Draw the Graphic symbol and characteristic table of clocked D flip-flop.

8. What are Multiplexers?

9. What are the steps involved in the design of an ALU?

10. Explain the operation of status register with neat diagram.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Draw the logic diagram for the Boolean expression
$Y = \overline{A}\,\overline{B}CD + A\overline{B}\,\overline{C}D + A\overline{B}CD + AB\overline{C}\,\overline{D}$.

12. Describe the Mc-Clausky tabulation method with an illustration.

13. Using Boolean algebra reduce the expression
$Y = AB + ABC + \overline{A}B + A\overline{B}C$.

14. Explain the Input/Output actions of Rs and Jk flip-flops.

15. Describe with a logic diagram and truth table of a Half-adder.

16. Write short notes on "ROM" and "PLA".

PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. Prove the equations $\overline{A+B} = \overline{A}\cdot\overline{B}$ and $\overline{AB} = \overline{A} + \overline{B}$ with logic circuits and truth tables.

18. (a) $AB + \overline{AC} + \overline{A}BC(AB + C) = 1$.

    (b) $W\overline{X}(W + Y) + WY(\overline{W} + \overline{X}) = 1$.

    Using Boolean algebra, prove the above equations.

19. (a) Explain the working of a serial-in and serial-out shift register with wave forms.

    (b) Explain the action of ALU with suitable diagrams.

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9211/A14 OCTOBER 2009

PC SOFTWARE FOR WINDOWS

Time : Three hours   Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. What are templates? How are they created?

2. What is the use of Headers and Footer option?

3. Explain the features of MS-WORD.

4. Describe page formatting options in Excel.

5. How is a worksheet formatted? Explain.

6. What are the features of PowerPoint?

7. Explain Mathematical functions with examples.

8. What is DTP? Explain.

9. How graphics is applied to a presentation?

10. Explain the types of viruses.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Write short notes on :

    (a) Borders and shading (b) Tabs.

12. Describe database functions with example.

13. Explain the options available in the standard t
bar.

14. Describe the various options in view menu
MS-WORD.

15. How can use prevent virus from our system?

16. Explain mixed mode referencing with example.

PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. Explain the use of Mail Merge option in detail.

18. How macros and multiple worksheets are crea
in MS-EXCEL? Explain.

19. Describe custom Animation and slide transition
PowerPoint.

SYSTEM SOFTWARE

Time : Three hours   Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1.   List out the different types of conditional jump instructions in SIC/XE.

2.   What is a system software?

3.   Write about language development tools.

4.   What are the advantages of assembly language programming?

5.   Write an algorithm for one pass of a linking loader.

6.   Discuss about linking and relocation concepts.

7.   Explain macro expansion with example.

8. Name the facilities provided by macros.

9. Explain program testing and debugging in detail.

10. Write about compile and go loader.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Discuss the major steps involved to develop an assembly language program.

12. What is code optimization? Discuss.

13. What is a macro? With examples explain any five features of a macro.

14. Name the two data structure used for allocation Explain them.

15. Name the different sources of interrupts.

16. What are recursive procedures? Explain it with an example.

PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. (a) Describe the design of the one pass of a two-pass assembler.

(b) Write a short note on tables if the macro processor.

18. Write about

(a) Symbol table requirements

(b) Linking and loading schemes.

19. Summarize software tools for text editors.

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COBOL PROGRAMMING

Time : Three hours   Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Explain the COBOL character set. Give examples.

2. What is a data name? How is it different from a literal? Explain.

3. Explain briefly about level structure.

4. Explain VALUE clause.

5. Differentiate between GO TO statement and GO TO with DEPENDING ON statement.

6. What is the use of EXIT statement? Explain.

7. Explain data record.

8. What is meant by relative file organization? Explain.

9. Explain the four basis steps of decision making.

10. Briefly explain about word processing facilities.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Write a COBOL program to accept the details such as employee number, name, and department and display the same.

12. Explain four divisions of COBOL program.

13. Explain about editing characters.

14. Write short notes on table handling.

15. Explain about I-O control paragraph.

16. Explain the objectives and major activities of material management.

PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. (a) Explain the basis verbs in COBOL with examples.

    (b) Explain the sorting of files in detail.

18. (a) Explain the statements for sequential files.

    (b) Write a COBOL program to prepare payroll for employees of an organization.

19. Explain in detail about applications of computer in science and technology.