PGCET-2013

010

DAY and TIME	COURSE	SUBJECT
DAY-1 **02.30 pm to 04.30 pm**	Department of Post Graduate Studies and Research in Mathematics and Computer Science, Kuvempu University and Department of Studies in Computer Science, University of Mysore	**MATHEMATICS & COMPUTER SCIENCE**
SESSION : AFTERNOON		

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
100	**150 MINUTES**	**120 MINUTES**

MENTION YOUR PGCET NO.	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	A - 1	**176381**

DOs :
1. Check whether the PGCET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. Ensure whether the circle corresponding to course has been shaded on the OMR answer sheet.
3. This Question Booklet is issued to you by the invigilator after the 2ⁿᵈ Bell i.e., after 02.25 p.m.
4. The Serial Number of this question booklet should be entered on the OMR answer sheet.
5. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
6. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :
1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The 3ʳᵈ Bell rings at 02.30 p.m., till then;
   - Do not remove the paper seal / polythene bag of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 75 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the 3ʳᵈ Bell is rung at 02.30 p.m., remove the paper seal / polythene bag of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 120 minutes:
   - Read each question (item) carefully.
   - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **only one response** for each item.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALL POINT PEN against the question number on the OMR answer sheet.**
4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last Bell is rung at 04.30 pm,** stop marking on the OMR answer sheet and affix your **left hand thumb** impression on the OMR answer sheet as per the instructions.
6. Hand over the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet, the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**
9. Only **Non-programmable** calculators are allowed.

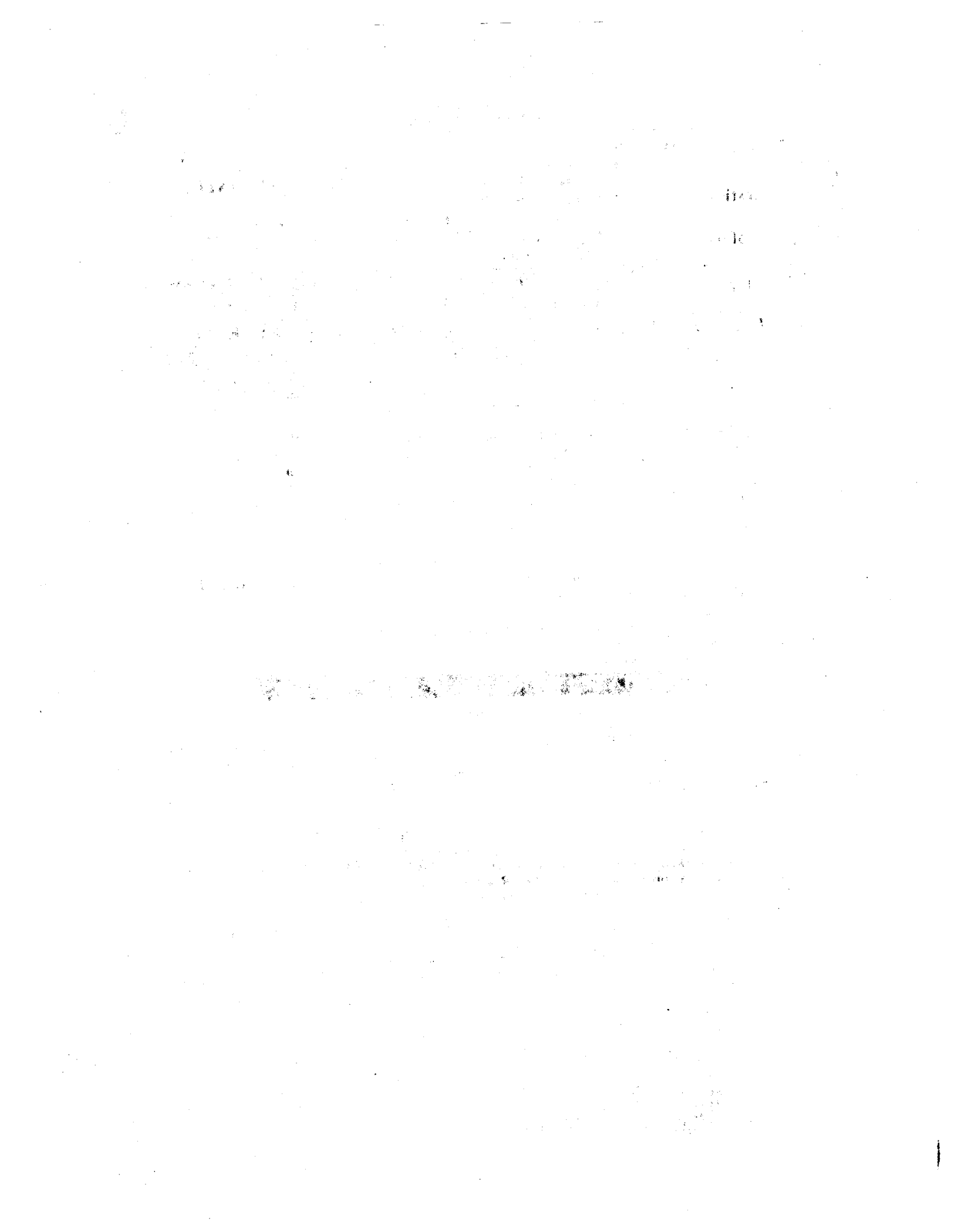| Marks Distribution		
PART-I	:	50 QUESTIONS CARRY ONE MARK EACH (1 TO 50)
PART-II	:	25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)

[Turn Over

MATHEMATICS AND COMPUTER SCIENCE

PART – I

Each question carries ONE mark.   **(50 × 1 = 50)**

1. Equation of the straight line passing through the points (1, 5) and (3, 9) is

    (A) $2x + y - 3 = 0$ (B) $2x - y + 3 = 0$

    (C) $2x + y + 3 = 0$ (D) None of these

2. If a line makes angles 45° and 60° with the positive X and Y axes respectively, then the angle that the line makes with the Z axis is

    (A) 60° or 120°   (B) 45° or 90°

    (C) 30° or 60°   (D) None of these

3. In three dimensional space, the equation $3x + 5z = 0$ is

    (A) a plane containing Z axis   (B) a plane along Y axis

    (C) a plane along X axis   (D) None of these

4. $\lim\limits_{x \to 0} (x)^x$ is

    (A) 0   (B) 1

    (C) 2   (D) –1

Space For Rough Work

5. If the function f is defined by $f(x) = \frac{x}{1+|x|}$, then f is differentiable

(A) except at $x = \pm 1$

(B) every where

(C) except at $x = 0$

(D) except at $x = 0$ and $x = \pm 1$

6. The value of Eccentricity 'e' for a conic to be a parabola is

(A) $e < 1$

(B) $e > 1$

(C) $e = 1$

(D) $e = 1.5$

7. If $y = x^n$, then the nth derivative of y with respect to x is

(A) n

(B) $(n-1)!$

(C) $(n+1)!$

(D) $(n)!$

8. For the curve $r = f(\theta)$, the length of the perpendicular from pole to the tangent is

(A) $p = r \cos \phi$

(B) $p = r \sin \phi$

(C) $p = r \operatorname{cosec} \phi$

(D) $p = r \sec \phi$

9. If $u = \frac{x^3 + y^3}{\sqrt{x} - \sqrt{y}}$ then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$ is equal to

(A) $\frac{-5}{2} u$

(B) $\frac{-3}{2} u$

(C) $\frac{5}{2} u$

(D) $\frac{3}{2} u$

Space For Rough Work

10. $\displaystyle\int_0^{\pi/6} \sin^5 3\theta \, d\theta$ is equal to

(A) $\dfrac{8}{45}$ (B) $\dfrac{1}{45}$

(C) $\dfrac{9}{45}$ (D) None of these

11. If $y''' + 4y'' + y = \sin^2 x$ is an initial value problem, then the numbers of initial conditions to be provided to solve the differential equation is

(A) 2   (B) 1

(C) 4   (D) 3

12. The differential equation corresponding to the circuit involving R and L with applied e.m.f $E \sin\omega t$ is

(A) $Li + R\dfrac{di}{dt} = E\sin\omega t$ (B) $Li - R\dfrac{di}{dt} = E\sin\omega t$

(C) $Ri + L\dfrac{di}{dt} = E\sin\omega t$ (D) None of these

13. The general solution of $y'' - 3y' + 2y = 0$ is

(A) $Y = Ae^x + Be^{2x}$ (B) $Y = Ae^x - Be^{2x}$

(C) $Y = (Ax + B)e^x$ (D) None of these

Space For Rough Work

14. $\mathcal{L}(e^{at} \sinbt)$ is equal to

(A) $\dfrac{a}{(s-a)^2 - b^2}$

(B) $\dfrac{b}{(s+a)^2 + b^2}$

(C) $\dfrac{a}{(s-a)^2 + b^2}$

(D) $\dfrac{b}{(s-a)^2 + b^2}$

15. $\mathcal{L}(t^n)$ when n is a positive integer is equal to

(A) $\dfrac{n!}{s^{n+1}}$

(B) $\dfrac{(n-1)!}{s^{n-1}}$

(C) $\dfrac{n}{s^{n+1}}$

(D) $\dfrac{n}{s^n}$

16. The mode of the distribution :

Marks :	4	5	6	7	8
No of students :	6	7	10	8	3

is

(A) 5

(B) 6

(C) 8

(D) 7

17. In the set A={1, 2, 3, 4}, a relation R is defined by R={(a,b)/a, b ∈ A and a + b = even number}. Then R is

(A) Reflexive but not symmetric

(B) Reflexive but not transitive

(C) Not reflexive

(D) Equivalence relation

Space For Rough Work

18. If $n(A) = 4$ and $n(B) = 3$, $B \subseteq A$ then $n(A \cup B) =$

    (A)   4   (B)   3

    (C)   12   (D)   None of these

19. Which one of the following is false ?

    (A)   + is commutative over set of all 2×2 matrices with real elements

    (B) $(N, .)$ is a group

    (C) $(N, +)$ is not a group

    (D) $(Q, .)$ is not a group

20. The sequence $\langle 2(-1)^n \rangle$

    (A)   converges to +2   (B)   converges to –2

    (C)   oscillates finitely   (D)   oscillates infinitely

21. If $\sum u_n$ is a series of positive terms, then

    (A) $\sum u_n$ always diverges to $+\infty$

    (B) $\sum u_n$ either converges or diverges to $-\infty$

    (C) $\sum u_n$ never oscillates

    (D) $\sum u_n$ oscillates finitely

Space For Rough Work

22. The odds in favour of an event A are 5 to 6. The probability of success of A is

(A) $\dfrac{5}{6}$

(B) $\dfrac{5}{11}$

(C) $\dfrac{6}{11}$

(D) None of these

23. $P \Rightarrow q$ can also be written as

(A) $P \Rightarrow \sim q$

(B) $\sim p \vee q$

(C) $\sim q \Rightarrow \sim p$

(D) None of these

24. $\sim [q \vee \sim (p \wedge r)]$ is equal to

(A) $\sim q \wedge (p \wedge \sim r)$

(B) $\sim q \wedge (p \wedge r)$

(C) $q \vee p \wedge r$

(D) $\sim q \vee (p \wedge r)$

25. The number of arrangements which can be made using all letters of the word "LAUGH" if the vowels are adjacent is

(A) 10

(B) 24

(C) 120

(D) 48

26. When we mention the prototype of a function ?

(A) Defining

(B) Declaring

(C) Prototyping

(D) Calling

Space For Rough Work

27. Is there any difference between following declarations ?

extern int fun();

int fun();

(A) Both are identical

(B) No difference, except extern int fun(); is probably in another file

(C) int fun(); is overrided with extern int fun();

(D) None of these

28. In C, if you pass an array as an argument to a function, what actually gets passed ?

(A) Value of elements in array

(B) First element of the array

(C) Base address of the array

(D) Address of the last element of array

29. In analyzing the compilation of PL/I program, the term "Syntax analysis" is associated with

(A) recognition of basic syntactic constructs through reductions

(B) recognition of basic elements and creation of uniform symbols

(C) creation of more optional matrix

(D) use of macro processor to produce more optimal assembly code

Space For Rough Work

30. How many times the while loop will get executed if a short int is 2 byte wide ?

```c
#include<stdio.h>
int main()
{
  int j=1;
  while(j <= 255)
  {
      printf("%c %d\n", j, j);
      j++;
  }
  return 0;
}
```

(A) Infinite times   (B) 255 times

(C) 256 times   (D) 254 times

31. Which of the following cannot be checked in a switch-case statement ?

(A) Character   (B) Integer

(C) Float   (D) enum

32. In the following code, the p2 is Integer Pointer or Integer ?

```c
typedef int *ptr;
ptr p1, p2;
```

(A) Integer   (B) Integer pointer

(C) Error in declaration   (D) None of above

Space For Rough Work

33. _____ is an example for applications software.

    (A) DBMS   (B) Compiler

    (C) Editor   (D) Operating System

34. Which type of software can translate scanned text into text that you can edit ?

    (A) OCS   (B) OCR

    (C) ORC   (D) ORS

35. The term dots per inch (dpi) refers to a printer's _____ .

    (A) Resolution   (B) Speed

    (C) Output   (D) Colours

36. The acronym DOS stands for _____ .

    (A) Distributed Operating System   (B) Driver Operating System

    (C) Disk Operating System   (D) Dual Operating System

37. In a _____ network all devices are connected to a hub and communicate through it.

    (A) Bus   (B) Star

    (C) Ring   (D) Mesh

Space For Rough Work

38. Every web page has a unique address called as _____.

    (A) Hyperlink   (B) URL

    (C) HTTP   (D) MAP

39. A nibble is _____.

    (A) 4 bits   (B) 8 bits

    (C) 16 bits   (D) 32 bits

40. Which of the following is not a translator program ?

    (A) Linker   (B) Assembler

    (C) Compiler   (D) Interpreter

41. Which of the following is not an output device of a computer ?

    (A) Printer   (B) Keyboard

    (C) VDU   (D) CRT Screen

42. A translator which reads a high level program line by line and converts it into machine language code is known as

    (A) Linker   (B) Assembler

    (C) Compiler   (D) Interpreter

Space For Rough Work

43. Which of the following is not used as secondary storage ?

(A) Semiconductor Memory   (B) Magnetic Disks

(C) Magnetic Drums   (D) Magnetic Tapes

44. The ALU of computer normally contains high speed storage elements called _____.

(A) Semiconductor Memory   (B) Registers

(C) Hard Disk   (D) Magnetic Disk

45. How does compiler differentiate address of operator from bitwise AND operator ?

(A) By using the number of operands and position of operands

(B) By seeing the declarations

(C) Both option (A) and (B)

(D) By using the value of the operand

46. Which of the following statement is true with respect to unions ?

(A) The last member can only be initialized

(B) The first member can only be initialized

(C) Any member can be initialized

(D) Union cannot be initialized

Space For Rough Work

47. What is the value of **a** after execution of the expression a = b − = c * = 5; given b = 110 and c = 20 ?

(A) 450

(B) 10

(C) 110

(D) −10

48. If ch is a char variable and ch assumes any alphabet, then the expression ch / 32 is equivalent to _____.

(A) tolower(ch)

(B) toupper(ch)

(C) todigit(ch)

(D) None of the above

49. The default return data type in function definition is _____.

(A) void

(B) int

(C) float

(D) char

50. The operator exclusively used with pointer to structure is

(A) dot

(B) →

(C) [ ]

(D) *

Space For Rough Work

PART – II

Each question carries two marks. $(25 \times 2 = 50)$

51. The ratio in which the plane $x - 2y + 3z = 17$ divides the line joining the points $(-2, 4, 7)$ and $(3, -5, 8)$ is

(A) $2 : 5$ (B) $3 : 9$

(C) $3 : 10$ (D) $10 : 3$

52. The angle between the two diagonals of a cube is

(A) $\sin^{-1}\left(\dfrac{1}{\sqrt{3}}\right)$ (B) $\cos^{-1}\left(\dfrac{1}{3}\right)$

(C) $\cos^{-1}\left(\dfrac{1}{\sqrt{3}}\right)$ (D) None of these

53. If $y = \sin^{-1}\left(\dfrac{1-x^2}{1+x^2}\right)$ then $\dfrac{dy}{dx}$ equals

(A) $\dfrac{2}{2-x^2}$ (B) $\dfrac{-2}{1+x^2}$

(C) $\dfrac{2}{1+x^2}$ (D) $\dfrac{1}{2+x^2}$

Space For Rough Work

54. Taylor's series expansion of $\log_e x$ in powers of $(x-1)$ is

(A) $(x-1) - \dfrac{(x-1)^2}{2} + \dfrac{(x-1)^3}{3} - $

(B) $(x-1) + (x-1)^2 + (x-1)^3 + \dots$

(C) $(x-1) - \dfrac{(x-1)^2}{2!} + \dfrac{(x-1)^3}{3!} - $

(D) None of these

55. Angle φ between the radius vector and the tangent to the curve $r = a(1 - \cos\theta)$ is

(A) $\dfrac{-\theta}{2}$

(B) θ

(C) 2θ

(D) $\dfrac{\theta}{2}$

56. If $x = r\cos\theta$, $y = r\sin\theta$, then the jacobian $\dfrac{\partial(r, \theta)}{\partial(x, y)}$ is equal to

(A) $\dfrac{1}{r}$

(B) $\dfrac{-1}{r}$

(C) r

(D) $-r$

Space For Rough Work

A-1   16   010

57. Area enclosed between the curves $y = x^3$ and $y = \sqrt{x}$ is

(A) $\dfrac{5}{10}$

(B) $\dfrac{5}{6}$

(C) $\dfrac{5}{12}$

(D) $\dfrac{5}{9}$

58. The solution of $y'' - y = 0$ with initial conditions $y(0) = 0$ and $y'(0) = 1$ is

(A) $\cosh x$

(B) $\operatorname{sech} x$

(C) $\operatorname{cosech} x$

(D) $\sinh x$

59. Which one of the following is true ?

(A) Equivalent sets are always equal but equal sets may not be equivalent.

(B) The relation 'perpendicular' on a set of lines in a plane is reflexive but not symmetric.

(C) The relation 'subset of' on a set of subsets of universal set is transitive but not reflexive.

(D) The relation 'less than' on a set of natural numbers is neither reflexive nor symmetric.

Space For Rough Work

60. A subgroup of group {0, 1, 2, 3, 4} under addition modulo 5 is

(A) {0, 1}

(B) {0, 2, 4}

(C) {0, 1, 3}

(D) {0, 1, 2, 3, 4}

61. The sum of the series $\dfrac{1}{2} + \dfrac{1+2}{3} + \dfrac{1+2+3}{4} + \ldots$ up to 15 terms is

(A) 15

(B) $\dfrac{15}{2}$

(C) 5

(D) 30

62. If A and B are events with $P(A) = \dfrac{1}{2}$, $P(\bar{B}) = \dfrac{5}{8}$ and $P(A \cup B) = \dfrac{3}{4}$ then $P(\bar{A} \cap B)$ is equal to

(A) 1

(B) $\dfrac{1}{5}$

(C) $\dfrac{1}{4}$

(D) 0

63. The proposition $p \Rightarrow \sim (p \wedge \sim q)$ is

(A) contradiction

(B) a tautology

(C) either (A) or (B)

(D) neither (A) nor (B)

Space For Rough Work

64. Consider the following C program :

```
main ()
{ int x, y, m, n ;
scanf ("%d %d", &x, &y);
/ * Assume x > 0 and y > 0 * /
m = x; n = y ;
while ( m ! = n)
{ if (m > n)
m = m - n;
else n = n - m ; }
printf("%d",n); }
```

The program computes

(A) x + y, using repeated subtraction

(B) x mod y using repeated subtraction

(C) The greatest common divisor of x and y

(D) The least common multiple of x and y

65. A possible output of the following fragment of code is:

```
static char wer[] [5] = {"harmot", "merli", "axari"};
printf("%d %d %d", wer,wer[0], &wer[0][0]);
```

(A) 262164 262164 262164   (B) 262164 262165 262166

(C) 262164 262165 262165   (D) 262164 262164 262165

---

66. main()

{

float a;

int x=6, y=4;

a=(float)x/y;

printf("/n value of a = %f",a);

}

The output of the program is

(A) 6.0000000

(B) 4.0000000

(C) 1.5000000

(D) Illegal value in printf()

67. What is the return value of f(p, p) if the value of p is initialized to 5 before the call ? Note that the first parameter is pass by reference, whereas second parameter is pass by value.

int f(int &x, int c)

{

    c=c – 1;

    if(c==0) return 1;

    x=x+1;

    return f(x,c)*x;

}

(A) 3024

(B) 161051

(C) 55440

(D) 6561

Space For Rough Work

68. When we use the case control structure ?

    (A)   To choose one from multiple alternatives

    (B)   To switch from one instruction to another

    (C)   To make the execution fast

    (D)   None of above

69. What will be the output of following code ?

```c
#include<stdio.h>
void main( )
{
    char suite =3;
    switch(suite)
    {
        case 1:
            printf("ALL QUIZ");
        case 2:
            printf("All quiz is great");
        default:
            printf("All quiz contains MCQs");
    }
    printf("Are you like All quiz ?");
}
```

    (A)   ALL QUIZ

    (B)   All quiz is great

    (C)   All quiz contains MCQs

    (D)   All quiz is great. Are you like All quiz ?

Space For Rough Work

70. What will be the output of following program ?

```
void main( )
    {
        int i=3;
        switch(i)
        {
            case 0:
                printf("I am here");
            case 1+0:
                printf("I m in second case");
            case 4/2:
                printf("I m in third case");
            case 8%5:
                printf("Good bye");
        }
    }
```

(A)   All case statements will be executed

(B)   I am here

(C)   Good bye

(D)   I am in third case

71. Which of the following statements should be used to obtain a remainder after dividing 3.14 by 2.1 ?

(A)   rem = 3.14 % 2.1;

(B)   rem = modf(3.14, 2.1);

(C)   rem = fmod(3.14, 2.1);

(D)   Remainder cannot be obtain in floating point division.

72. Most popular external connection for a PC is

(A) PS2

(B) USB

(C) HDX

(D) MIDI

73. The operator % yields _____ in 'C' Language.

(A) Division

(B) Reminder

(C) Percentage

(D) Fractional Part

74. What is the output obtained if we execute the statement printf(" \" ") ?

(A) \"

(B) "

(C) "\""

(D) Syntax Error

75. Which is not a keyword in C ?

(A) const

(B) sizeof

(C) main

(D) void

_____

Space For Rough Work

A-1