

PGCET-2014

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	
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 - 4		200112	

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-1 : 50 QUESTIONS CARRY ONE MARK EACH (1 TO 50)
PART-2 : 25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)



MATHEMATICS AND COMPUTER SCIENCE

PART - 1

Each question carries ONE mark.

(50 × 1 = 50)

1. The minimum number of temporary variables needed to swap the contents of two variables is
(A) 1 (B) 2
(C) 3 (D) 0
2. If an int datatype needs 2 bytes of storage then the maximum value it can hold is
(A) $2^{16} - 1$ (B) $2^{15} - 1$
(C) 2^{16} (D) 2^{15}
3. What does the term SCSI stands for ?
(A) Small Computer Software Interface
(B) Small Computer Storage Interface
(C) Small Computer System Interface
(D) Small Computer Standard Interface
4. How many times will the following loop be executed if the input data item is 01234 ?
While (c = getchar() != 0){ }
(A) Infinitely (B) Never
(C) Once (D) 5 times

Space For Rough Work

5. What kind of line is given by the equation $3x + 5 = 0$?
- (A) Line parallel to y -axis
- (B) Line parallel to x -axis
- (C) Oblique line intersecting both x and y axes
- (D) None of these
6. The distance between the points $(8, -3, 8)$ and $(6, -1, 9)$ is
- (A) 4 (B) 3
- (C) -1 (D) 10
7. The direction cosines of a line joining the points $(4, 3, -5)$ and $(-2, 1, -8)$ are
- (A) $\left(\frac{-6}{7}, \frac{2}{7}, \frac{-3}{7}\right)$ (B) $\left(\frac{-6}{7}, \frac{-2}{7}, \frac{3}{7}\right)$
- (C) $\left(\frac{6}{7}, \frac{2}{7}, \frac{3}{7}\right)$ (D) None of these

Space For Rough Work

8. A numerical method to solve algebraic and transcendental equation is
- (A) Runge-Kutta method
 - (B) Newton-Raphson method
 - (C) Euler's method
 - (D) Milne's predictor corrector method
9. Let $F(x) = |x|$, then
- (A) $F'(0) = 0$
 - (B) $F(x)$ is maximum at $x = 0$
 - (C) $F(x)$ is minimum at $x = 0$
 - (D) None of these
10. The maximum slope of the curve $-x^3 + 6x^2 + 2x + 1$ is
- (A) 16
 - (B) 14
 - (C) 19
 - (D) -13
11. The equation of the directrix of the parabola $y^2 + 4y + 4x + 2 = 0$ is
- (A) $x = \frac{1}{2}$
 - (B) $y = \frac{-3}{2}$
 - (C) $x = \frac{3}{2}$
 - (D) $y = \frac{-1}{2}$

Space For Rough Work

12. If $y = a \sin x + b \cos x$, then

(A) $\frac{d^2y}{dx^2} - y = 0$

(B) $\frac{d^2y}{dx^2} + y = 0$

(C) $\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$

(D) None of these

13. Angle between the radius vector and the tangent to the curve $r = F(\theta)$ in its usual form is

(A) $\tan \phi = \frac{d\theta}{dr}$

(B) $\cot \phi = r \frac{d\theta}{dr}$

(C) $\cot \phi = -\frac{d\theta}{dr}$

(D) $\tan \phi = r \frac{d\theta}{dr}$

14. If $u(x, y)$ is homogeneous function of order n , then

(A) $xu_x - yu_y = n^2u$

(B) $xu_x + yu_y = nu$

(C) $xu_x + yu_y = (n + 1)u$

(D) None of these

15. $\int e^{ax+b} dx$ is equal to

(A) $e^{ax+b} + c$

(B) $\frac{e^{ax+b}}{b} + c$

(C) $\frac{e^{ax+b}}{a} + c$

(D) $a \cdot e^{ax+b} + c$

Space For Rough Work

16. Solution of differential equation $\frac{dy}{dx} = \frac{x^2}{y^2}$ is

(A) $x^3 - y^3 = c$

(B) $x^3 + y^3 = c$

(C) $x^4 + y^4 = c$

(D) $x^2 - y^2 = c$

17. The differential equation $y \frac{dy}{dx} + x = a$ (a being constant) represents :

(A) Set of circles with centres in x-axis

(B) Set of circles with centres in y-axis

(C) Family of parabolas

(D) Family of ellipses

18. $L \frac{di}{dt} + Ri + \frac{1}{c} \int i dt = E \sin wt$ can also be written as

(A) $L \frac{d^2i}{dt^2} + Ri \frac{di}{dt} + \frac{i}{c} = Ew \sin wt$

(B) $L \frac{d^2i}{dt^2} + Ri + \frac{i}{c} \frac{di}{dt} = Ew \cos wt$

(C) $L \frac{d^2i}{dt^2} + R \frac{di}{dt} + \frac{i}{c} = E \cos wt$

(D) $L \frac{d^2i}{dt^2} + R \frac{di}{dt} + \frac{i}{c} = Ew \cos wt$

Space For Rough Work

19. $L\left[\frac{F(t)}{t}\right] =$

(A) $\int_0^{\infty} F(s) ds$

(B) $\int_s^{\infty} \frac{F(s)}{s} ds$

(C) $\int_s^{\infty} F(s) ds$

(D) $\int_0^{\infty} \frac{F(s)}{s} ds$

20. If in a frequency distribution, the mean and median are 21 and 22 respectively, then the mode is approximately

(A) 20.5

(B) 22

(C) 24

(D) 25.5

21. If $A = \{1, 2, 3\}$, then which of the following is reflexive ?

(A) $\{(1, 1), (1, 2), (1, 3)\}$

(B) $\{(1, 1), (2, 2), (2, 3) (3, 3)\}$

(C) $\{(1, 1), (2, 2)\}$

(D) $\{(3, 3)\}$

Space For Rough Work

22. If A and B are any two sets, then $A - B$ equals

(A) $A \cap B^C$

(B) $A^C \cap B$

(C) $A \cup B$

(D) $A \cap B$

23. In the group $G = \{0, 1, 2, 3, 4\}$ under addition modulo 5, the value of $(3 + 2^{-1})^{-1}$ is

(A) 1

(B) 2

(C) 3

(D) 4

24. Which one of the following is true ?

(A) If $a * b = a^b$ then $*$ is a binary operation over set of natural numbers but not over the set of rational numbers.

(B) If R is a ring with unity then R is a multiplicative group.

(C) Union of two subgroups is again a subgroup.

(D) Every group has atleast one non-trivial subgroup.

Space For Rough Work

25. $1^2 + 3^2 + 5^2 + \dots$ upto n terms =

(A) $\frac{n(n+1)(2n+1)}{6}$

(B) $\frac{n^2(n+1)^2}{4}$

(C) $\frac{2n(n+1)(2n+1)}{3} + n - 2n(n+1)$

(D) $\frac{2n(n+1)(2n+1)}{3} + 1 - \frac{n(n-1)}{2}$

26. The sequence $\left\langle 1 + \frac{4}{3n} \right\rangle$

(A) Converges to zero

(B) Converges to one

(C) Converges to $7/3$

(D) Diverges

27. If $P_1, P_2, P_3, \dots, P_n$ are probabilities of happening of n independent events, then the probability of happening of atleast one event is

(A) $\bar{P}_1 \bar{P}_2 \bar{P}_3 \dots \bar{P}_n$

(B) $1 - P_1 P_2 P_3 \dots P_n$

(C) $1 - \bar{P}_1 \bar{P}_2 \bar{P}_3 \dots \bar{P}_n$

(D) $P_1 P_2 P_3 \dots P_n$

Space For Rough Work

28. Negation of " $2 + 3 = 5$ and $4 < 6$ " is

(A) $2 + 3 \neq 5$ and $4 < 6$

(B) $2 + 3 = 5$ and $4 \nless 6$

(C) $2 + 3 \neq 5$ or $4 \nless 6$

(D) None of these

29. The value of r for which ${}^{15}C_{r+3} = {}^{15}C_{2r-6}$ is

(A) 2

(B) 4

(C) 6

(D) -9

30. The binary system uses powers of

(A) 2

(B) 10

(C) 8

(D) 16

31. A computer program that converts assembly language to machine language is

(A) Compiler

(B) Interpreter

(C) Assembler

(D) Comparator

Space for Rough Work

32. The section of the CPU that selects, interprets and sees to the execution of program instructions

- (A) Memory
- (B) Register unit
- (C) Control unit
- (D) ALU

33. Which output device is used for translating information from a computer into pictorial form on paper ?

- (A) Mouse
- (B) Plotter
- (C) Touch panel
- (D) Card punch

34. The list of coded instructions is called

- (A) Computer program
- (B) Algorithm
- (C) Pseudo code
- (D) Flow chart

35. Which part of the computer is used for calculating and comparing ?

- (A) Disk unit
- (B) Control unit
- (C) ALU
- (D) Modem

Space For Rough Work

36. The return statement will always return _____ type of data, by default.

- (A) float
- (B) int
- (C) char
- (D) double

37. Another name for one dimensional array is _____.

- (A) One dimensional list
- (B) Single subscripted variable
- (C) One list variable
- (D) All of the above

38. One nibble is equal to _____ byte.

- (A) one
- (B) two
- (C) half
- (D) quarter

39. Which bitwise operator is suitable for turning off a particular bit in a number ?

- (A) && operator
- (B) & operator
- (C) || operator
- (D) ! operator

Space For Rough Work

40. The keyword used to transfer control from a function back to the calling function is
- (A) switch (B) go back
(C) go to (D) return
41. Which header file should be included to use functions like malloc() and calloc() ?
- (A) memory.h (B) stdlib.h
(C) string.h (D) dos.h
42. In mathematics and computer programming, which is the correct order of mathematical operators ?
- (A) Addition, Subtraction, Multiplication, Division
(B) Division, Multiplication, Addition, Subtraction
(C) Multiplication, Addition, Division, Subtraction
(D) Addition, Division, Modulus, Subtraction
43. Which of the following is not logical operator ?
- (A) & (B) &&
(C) || (D) !

Space For Rough Work

44. Which of the following is the correct order of evaluation for the below expression ?

$$z = x + y * z / 4 \% 2 - 1$$

(A) $* / \% + - =$

(B) $= * / \% + -$

(C) $/ * \% - + =$

(D) $* \% / - + =$

45. What is the correct value to return to the operating system upon the successful completion of a program ?

(A) -1

(B) 1

(C) 0

(D) Programs do not return a value.

46. Why does internet explorer back button sometimes not work ?

(A) A new window was opened

(B) A web page automatically forwarded to an alternate page

(C) Other scripts prevent you from going back

(D) All of the above

Space For Rough Work

47. Which one of the following controls and coordinates all functionalities ?

- (A) CU
- (B) ALU
- (C) MU
- (D) All the above

48. Plotter is a/an

- (A) Input device
- (B) Output device
- (C) Performs both I/O operations
- (D) None of the above

49. Which one of the following is suited for data analysis ?

- (A) DBMS
- (B) Word processing software
- (C) Spreadsheet software
- (D) Adobe Photoshop

50. Set of programs that reads a program written in high level language and translates it into an equivalent program in machine language is called

- (A) Interpreter
- (B) Object software
- (C) Compiler
- (D) Both (A) and (C)

Space For Rough Work

PART - 2

Each question carries two marks.

(25 × 2 = 50)

51. The operator exclusively used with pointer to structure is
- (A) dot (B) $\rightarrow$
- (C) [] (D) *
52. Which one will print the number of elements in an array, given the declaration `int a[10]` ?
- (A) `sizeof(a) / sizeof(int)` (B) `sizeof(a)`
- (C) `sizeof(a[0]) / sizeof(a)` (D) `sizeof(int) / sizeof(a)`
53. Given the declaration `int x[5][3][2]`; the element `x[h][i][j]` may be accessed as _____.
- (A) `*(*(x[h]+i)+j)` (B) `*(*(*x+h)+i)+j)`
- (C) Both (A) and (B) (D) None of them
54. 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

Space For Rough Work

55. Angle between $x - 2y + z = 0$ and $x + 2y - 2z = 0$ is

(A) $\cos^{-1}\left(\frac{8}{\sqrt{406}}\right)$

(B) $\sin^{-1}\left(\frac{8}{\sqrt{406}}\right)$

(C) $\cos^{-1}\left(\frac{1}{\sqrt{406}}\right)$

(D) $\sin^{-1}\left(\frac{1}{\sqrt{406}}\right)$

56. $\lim_{x \rightarrow 0} \frac{e^x - e^{-x} - 2x}{x - \sin x}$ is equal to

(A) -2

(B) 4

(C) 2

(D) -4

57. If $y = e^{\sin^{-1} x}$, then

(A) $(1 - x^2)y_2 - xy_1 - y = 0$

(B) $(1 - x^2)y_2 + xy_1 + y = 0$

(C) $(1 - x^2)y_2 + y = 0$

(D) None of these

Space For Rough Work

58. If $z = e^{2x+3y} F(2x-3y)$, then

(A) $3\frac{\partial z}{\partial x} + 2\frac{\partial z}{\partial y} = 12z$

(B) $3\frac{\partial z}{\partial x} - 2\frac{\partial z}{\partial y} = z$

(C) $3\frac{\partial z}{\partial x} + 2\frac{\partial z}{\partial y} = 12$

(D) None of these

59. The value of the integral $\int_{-\pi/4}^{\pi/4} \sin^{-4} x \, dx$ is equal to

(A) $\frac{8}{3}$

(B) $-\frac{8}{3}$

(C) $\frac{3}{2}$

(D) None of these

60. The differential equation of all circles passing through the origin and having their centers on the x -axis is

(A) $x^2 = y^2 + 3xy \frac{dy}{dx}$

(B) $y^2 = x^2 + 2xy \frac{dy}{dx}$

(C) $x^2 = y^2 + xy \frac{dy}{dx}$

(D) $y^2 = x^2 - 2xy \frac{dy}{dx}$

61. The solution of the differential equation $x dy = y dx + y^2 dy$ subject to $y(1) = 1$ is

(A) $x + y^2 = 2y$

(B) $x + x^2 = 2y$

(C) $y + x^2 = 2x$

(D) None of these

Space For Rough Work

62. $L[(\cos 4t + 3 \sin 4t)e^{-t}] =$

(A) $\frac{s-15}{s^2-6s-25}$

(B) $\frac{s^2+15}{s^2+6s-25}$

(C) $\frac{s+15}{s^2+6s+25}$

(D) None of these

63. If $U = \{1, 2, 3, 4, 5, 6\}$, $A = \{2, 4, 6\}$, $B = \{1, 2, 3, 4\}$, then $(A \cap B^c) \times (A^c \cap B) =$

(A) ϕ

(B) $\{(6, 1), (6, 2), (6, 3), (6, 4)\}$

(C) $\{(6, 1), (6, 3)\}$

(D) $\{(1, 6), (3, 6)\}$

64. Which one of the following is true ?

(A) The set $G = \left\{ \begin{pmatrix} a & 0 \\ 0 & 0 \end{pmatrix} \mid a \text{ is a non-zero real number} \right\}$ is an infinite non-abelian group under multiplication.

(B) The identity element of the group $M = \left\{ \begin{pmatrix} x & x \\ x & x \end{pmatrix} \mid x \in \mathbb{R} \text{ \& } x \neq 0 \right\}$ under multiplication is $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$.

(C) Every group of order three is abelian.

(D) $(\mathbb{N}, +)$ is a group.

Space For Rough Work

65. $\sum \frac{1}{\sqrt{n}} \tan\left(\frac{1}{n}\right)$ is

- (A) Convergent series (B) Divergent series
(C) Oscillatory series (D) None of these

66. A bag contains 6 white and 8 red balls, then the probability of drawing two balls of same colour is

- (A) $\frac{43}{91}$ (B) $\frac{15}{91}$
(C) $\frac{28}{91}$ (D) $\frac{15}{28}$

67. If p, q, r are simple propositions, then $(p \wedge q) \wedge (q \wedge r)$ is true, then

- (A) p, q, r are all false. (B) p, q, r are all true.
(C) p, q are true and r is false. (D) p is true and q and r are false.

68. A variable declared inside a function by default assumes _____ storage class.

- (A) extern (B) static
(C) register (D) auto

Space For Rough Work

69. An array subscript may be _____.

- (A) Integer Constant
- (B) Integer Variable
- (C) Integer Expression
- (D) All of these

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

- (A) void
- (B) int
- (C) float
- (D) char

71. 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

72. Identify the invalid identifier in C.

- (A) NET_\$
- (B) BINGO
- (C) _ACCOUNT
- (D) _432

Space For Rough Work

73. $x\%y$ is equal to _____.

(A) $(x - (x/y))$

(B) $(x - (x/y) * y)$

(C) $(y - (x/y))$

(D) $(y - (x/y) * y)$

74. What is the output of the following statement ?

```
printf("%u", -1);
```

(A) -1

(B) minimum int value

(C) maximum int value

(D) error

75. In the declaration `double (*p)()` ;

(A) p is a pointer to an array.

(B) p is a pointer to a function.

(C) p is a function returning pointer.

(D) p is an array of pointers.

Space For Rough Work

A-4