POST GRADUATE COMMON ENTRANCE TEST - 2015

DATE & TIME	COURSE	SUBJECT
08-08-2015 02.30 PM TO 4.30 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 AND COMPUTER SCIENCE

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

MENTION YOUR PGCET NO.	QUESTION BOOKLET SERIAL NUMBER	320073
	VERSION CODE	A – 1

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 circles corresponding to course and the specific branch have 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 pm.**
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 PM, TILL THEN;**
   - Do not remove the seal / staple present on the right hand side 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 pm, remove the seal / staple stapled on the right hand side 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 ballpoint 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 (KEA copy), 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 - 75)

MATHEMATICS AND COMPUTER SCIENCE
PART - 1
(Each question carries one mark)

(50 X 1 = 50)

1. Representing the various steps in the form of a pictorial representation is called_____

   a. Language   b. Program

   c. Algorithm   d. Flowchart

2. The processing of removing a bug from alogrithm is called as _____

   a. Error

   b. Problem

   c. Debugging

   d. None of the above

3. _____ is the extension for MS - Powerpoint

   a. DOC   b. XLS

   c. PPT   d. None of the above

4. Resolution is measured in terms of _____

   a. Dots per inch   b. Dot per pitch

   c. Pixels   d. ALL

5. The common keyboard arrangement is called _____ layout

   a. QWERTY   b. QWETYR

   c. QYWERT   d. ALL

6. _____is a technique in which the main memory of the computer system is organised in the form of equal sized - blocks called pages.

   a. Segmentation   b. Swapping

   c. Paging   d. None

7. GVI is an acronomy for _____

   a. Geo - graphical usage interface

   b. Graphical user interface

   c. Global union of internet

   d. Geometrical used interface

8. The execution of a program written in a C language begins from

   a. Main ( )   b. Scanf ( )

   c. Printf ( )   d. ALL of the above

9. How many classes of datatypes does ANSI C supports _____

   a. 1   b. 2

   c. 3   d. 4

10. What is the range of values for float

   a. -128 to 127

   b. $-32,768$ to $32,767$

   c. $3.4C-38$ to $3.4C+38$

   d. $1.7C-308$ to $1.7C + 308$

Space For Rough Work

11. Each variable must be initialized before they are used in the program or function

    a. True
    b. False
    c. Both
    d. ALL of the above

12. Which of the following is not a predifined C header file ?

    a. math. h
    b. conio. h
    c. scientific.h
    d. ctype.h

13. Which of the following operators are used for obtaining the remainder in a division operator?

    a. /
    b. %
    c. !
    d. None of the above

14. Which of the following is the correct statement for computing logical AND ?

    a. a < b & x > y
    b. A < b & x > y
    c. a < b AND x > y
    d. None of the above

15. Which of the following has the highest precendence ?

    a. [ ]
    b. ( )
    c. { }
    d. < >

16. The value of _____ variables persists until the end of the program

    a. Auto
    b. Static
    c. Register
    d. None

17. What is the output of the following program

    ```
    main ( )
    {
        Int m = 5;
        if (m<3)printf("%d",m+1);
        else (m<7) printf(' %d", m+2);
    }
    ```

    a. 5
    b. 6
    c. 7
    d. 8

18. What is the symbol used for bitwise exclusive OR

    a. V
    b. ∧
    c. ~
    d. &

19. _____ are the variables which are declared within a particular function

    a. External variables
    b. Internal variables
    c. Global variables
    d. ALL of the above

20. It is used when the number of repetitions is not known before the loop begins executing. It is known as _____

    a. Infinite lopp
    b. Counter - controlled loop
    c. Sentinel - controlled loop
    d. finite loop

21. An array is a _____ sequenced collection of elements of the same data type

    a. Non - fixed
    b. Fixed - size
    c. Size
    d. None of the above

Space For Rough Work

22. How to do a initializing a two - dimensional array

   a. Int table (2, 3)   b. Int table {2, 3}

   c. Int table [2, 3]   d. Int table [2] [3]

23. Do not forget to initialize the elements; otherwise they will contain _____ values.

   a. Zero   b. No value

   c. Garbage   d. ALL

24. Which of the following is used to represent the end of a string value

   a. Blank space

   b. Null character

   c. Newline character

   d. Last element of the string

25. A pointer variable is identified by which symbol ?

   a. #   b. ?

   c. +   d. *

26. Curvature of a straight line is

   a. 1   b. 0

   c. A variable   d. A constant

27. In three dimensions, the equation $x^2 - y^2 = a^2$ represents

   a. a pair of straight lines

   b. a hyperbola

   c. a cylinder

   d. a cone

28. Three lines are coplanar if

   a. They are concurrent

   b. A line is perpendicular to each of them

   c. They are concurrent and a line is perpendicular to each of them

   d. None of the above

29. The nth derivative of x^n is

   a. n !   b. 0

   c. n   d. 1

30. The curves are said to be orthogonal, if the angle between the two curves is

   a. 0   b. $\dfrac{\pi}{4}$

   c. $\dfrac{\pi}{2}$ d. 1

31. If $u = x^y$ then $\dfrac{\partial u}{\partial x}$ is

   a. 0   b. $y\,x^{y-1}$

   c. $x^y \log x$ d. $y\,x^y$

32. The value of $\displaystyle\int_{-\pi/2}^{\pi/2} \cos^7 x\; dx$ is

   a. $\dfrac{32\pi}{35}$ b. $\dfrac{32}{35}$

   c. 0   d. $\dfrac{15}{35}$

Space For Rough Work

33. The area of a loop of the curve $r = a\ \sin 3\theta$ is

   a. $\dfrac{\pi a^2}{12}$ b. $\dfrac{a^2}{12}$

   c. $\dfrac{\pi}{12}$ d. 0

34. The series $1 + r + r^2 + r^3 + \dots\infty$ converges if

   a. $|r| < 1$ b. $r \geq 1$

   c. $r \leq -1$ d. $|r| > 1$

35. Integrating factor of the differential equation

   $\dfrac{dy}{dx} + y\ cos\ x = \dfrac{sin2x}{2}$ is

   a. $e^{\,sin^2 x}$ b. $e^{\,sin^3 x}$

   c. $e^{\,sin\ x}$ d. $sin\ x$

36. $e^{-x}\left(c_1\ cos\ \sqrt{3}\ x + c_2 sin\ \sqrt{3}\ x\right) + c_3\ e^{2x}$ is the general solution of

   a. $\dfrac{d^3 y}{d x^3} + 4y = 0$

   b. $\dfrac{d^3 y}{d x^3} - 8y = 0$

   c. $\dfrac{d^3 y}{d x^3} + 8y = 0$

   d. $\dfrac{d^3 y}{d x^3} - 2\dfrac{d^2 y}{d x^2} + \dfrac{d y}{d x} - 2 = 0$

37. If $L(f(t)) = \overline{f}(s)$ then $L(e^{-at} f(t))$ is

   a. $\overline{f}(s - a)$ b. $\overline{f}(s + a)$

   c. $\overline{f}(s)$ d. None of the above

38. The chance that a leap year selected at random will contain 53 sundays

   a. $\dfrac{2}{7}$ b. $\dfrac{1}{7}$

   c. 1 d. 7

39. The median of the numbers 11, 10, 12, 13, 9 is

   a. 12.5 b. 12

   c. 10.5 d. 11

40. The value of r for which $^{18}C_{r+6} = {}^{18}C_{3r-24}$ is

   a. 4 b. 12

   c. -12 d. -4

41. If $A = \{0, 1, 2, 3\}$, then which of the following is reflexive ?

   a. $\{(1,1)\ (1,2)\ (3,3)\}$

   b. $\{(0,0)\ (1,1)\ (2,2)\ (2,3)(3,3)\}$

   c. $\{(2,2)\ (3,3)\}$

   d. $\{(1,1)\ (2,2)\ (3,3)\}$

Space For Rough Work

42. If A, B and C are any three sets then
$A \cup (B \cap C) =$

a. $(A \cap B) \cup (A \cup C)$ b. $(A \cup B) \cap (A \cup C)$

c. $(A \cup B) \cap (A \cap C)$ d. $(A \cap B) \cup (A \cap C)$

43. Some group (G, O) is known to be abelian. Then which of the following is TRUE for G ?

a. $g = g^{-1}$ for every $g \in G$

b. $g = g^2$ for every $g \in G$

c. $(goh)^2 = g^2 o h^2$ for every $g, n \in G$

d. G is of finite order

44. A numerical method used to solve
$x e^x - cos \ x = 0$ is

a. Picard's method

b. Weddle's Rule

c. Newton - Raphson method

d. Euler's method

45. The maximum slope of the curve
$-x^3 + 3x^2 + 9x - 27$ is

a. 12   b. 14

c. 16   d. −14

46. The proposition $p \wedge (\sim p \vee q)$ is

a. A tautulogy

b. A contradiction

c. Logically equivallent to $p \wedge q$

d. All of the above

47. From a pack of 52 cards two are drawn with replacement. The probability, that the first is a diamond and the second is a king is

a. $\frac{1}{26}$ b. $\frac{1}{52}$

c. $\frac{17}{2704}$ d. None of the above

48. The set of all real numbers under the usual multiplication operation is not a group since

a. Multiplication is not a binary operation

b. Multiplication is not associative

c. Identity element does not exist

d. Zero has no inverse

49. The general solution of the differential equation $p = log(px - y)$ is

a. $y = px + e^p$ b. $y = px - e^p$

c. $y = px - e^c$ d. $y = cx - e^c$

50. A second order linear differential equation has

a. Two arbitrary solutions

b. One arbitrary solution

c. No aribtrary solution

d. None of the above

Space For Rough Work

51. A set of rules that governs the communication process between the sender and the receiver

   a. Message

   b. Sender

   c. Receiver

   d. Protocol

52. Name of the keywords in the following

   a. a, b

   b. character, number

   c. int, char

   d. None of the above

53. The main use of session layer

   a. Communication & notifying the errors

   b. Receiving and sending

   c. Internet and networks

   d. ALL of the above

54. A hexadecimal number is constituted with the help of digits and letters

   a. 0 -1 & AB

   b. 0 - 6 & AD

   c. 0 - 9 & A - F

   d. None of the above

55. What is the output of the following code
```
main ( )
{
int a=10;
while (a > 0)
{
print f("hello|n");
}
}
```

   a. Finite loop   b. Runtime error

   c. Infinite loop   d. ALL of the above

56. Identify the looping statements in the C programming language

   a. if and else - if

   b. else - if e switch

   c. while and for loop

   d. None of the above

57. C programs are written in lower-case letters, However uppercase letters are used for _____ & _____

   a. Variable & identifiers

   b. Print & Read

   c. Symbolic names and output string

   d. ALL of the above

58. Do not use semicolon at the end of # define directive

   a. True

   b. False

   c. True or False

   d. None of the above

Space For Rough Work

59. # include < stdio.h> includes two predefined functions _____ and _____

a. getch( ) and clrscr( )

b. gets( ) and puts( )

c. printf( ) and scanf( )

d. putchar( ) and getchar( )

60. Bitwise operators are used for testing the bits or shifting them _____ or _____

a. Right or left

b. Right or top

c. Right or bottom

d. ALL of the above

61. How many types of category of functions are there

a. 1   b. 2

c. 4   d. 5

62. How to initialize the double dimension array

a. Int table (2, 2) - (0, 0, 0, 0)

b. Int table { 2, 2} = { 0; 0; 0; 0; }

c. Int table [2] [2] = {{ 0, 0},{ 1, 1 }}

d. None of the above

63. Identify the correct syntax of user-defined function

a. Return type function name (datatype argument)

b. No return type function name (argument)

c. Return type function name (data type)

d. ALL of the above

64. The direction cosines of the points (-4, 9, 6) and (-1, 6, 6) is

a. $\left(\frac{1}{2}, \frac{-1}{2}, 0\right)$ b. $\left(\frac{1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}, 0\right)$

c. $\left(\frac{1}{2}, \frac{1}{\sqrt{2}}, 0\right)$ d. $\left(\frac{-1}{2}, \frac{1}{2}, 0\right)$

65. $\lim\limits_{x \to 0} \dfrac{2\sin x - \sin 2x}{x^3}$ is equal to

a. 1   b. -1

c. 0   d. $\dfrac{1}{2}$

66. If $y = \sin\left(\log\left(x^2 + 2x + 1\right)\right)$ then

a. $(x+1)^2 y_2 + (x+1) y_1 + 4y = 0$

b. $(x+1)^2 y_2 + (x+1) y_1 - 2y = 0$

c. $(x+1)^2 y_2 - (x+1) y_1 + 4y = 0$

d. $(x+1)^2 y_2 - (x+1) y_1 + 2y = 0$

67. If $u = \sin^{-1}\dfrac{x+y}{\sqrt{x}+\sqrt{y}}$ then $x\,u_x + y\,u_y =$

a. $\dfrac{1}{2} \sin u$ b. $\dfrac{1}{2} \cos u$

c. $\dfrac{1}{2} \tan u$ d. $\dfrac{1}{2} \cot u$

Space For Rough Work

68. The value of the integral $\int_0^1 x^4 (1-x^2)^{3/2} \, dx$ is equal to

a. $\dfrac{5\pi}{8}$ b. $\dfrac{1}{15}$

c. $\dfrac{3\pi}{256}$ d. $\dfrac{\pi}{256}$

69. The differential equation formed, from the equation $y = C_1 \cos 2x + C_2 \sin 2x$ is

a. $\dfrac{d^2 y}{dx^2} + 2y = 0$ b. $\dfrac{d^2 y}{dx^2} - 2y = 0$

c. $\dfrac{d^2 y}{dx^2} - 4y = 0$ d. $\dfrac{d^2 y}{dx^2} + 4y = 0$

70. The solution of the differential equation $\left(x + 2y^3\right)\dfrac{dy}{dx} = y$ is

a. $x = y^3 + cy$ b. $x = y^2 + cy$

c. $x = y + c$ d. None of the above

71. The Laplace Transform of $te^{-2t}\sin 4t$ is

a. $\dfrac{8(s+2)}{s^2 + 4s + 20}$ b. $\dfrac{8(s+2)}{\left(s^2 + 4s + 20\right)^2}$

c. $\dfrac{8(s-2)}{s^2 - 4s + 20}$ d. $\dfrac{8(s-2)}{\left(s^2 - 4s + 20\right)^2}$

72. A pair of dice is tossed twice. The probability of scoring 7 points once is

a. $\dfrac{5}{36}$ b. $\dfrac{5}{6}$

c. $\dfrac{1}{6}$ d. $\dfrac{5}{18}$

73. $\sum \left(1 + \dfrac{1}{n}\right)^{-n^2}$ is

a. Convergent   b. Oscillatory

c. Divergent   d. None of the above

74. The function $\left(\left(p \vee (r \vee q)\right) \wedge \sim (\sim q \wedge \sim r)\right)$ is equal to

a. $q \vee r$

b. $(p \wedge q) \vee (p \wedge r)$

c. $(p \wedge r) \vee (p \wedge q)$

d. $p \vee r$

75. If $U = \{0,1,2,3,4,5,6,7,8\}$, $A = \{2,5,6,7\}$, $B = \{0,2,5,7,8\}$ then $\left(A \cap B^C\right) \times \left(A^C \cap B\right) =$

a. ϕ b. $\{(6,1)(6,2)(6,5)\}$

c. $\{(6,0)(6,8)\}$ d. $\{(6,0)(6,7)\}$

Space For Rough Work

Space For Rough Work