# POST GRADUATE COMMON ENTRANCE TEST-2016

| DATE and TIME | COURSE | SUBJECT |
|---|---|---|
| 03-07-2016<br>10.30 a.m. to 12.30 p.m. | Department of Post Graduate Studies and Research in Mathematics and Comupter Studies,Kuvempu University and Department ofStudies in Computer Science, University of Mysore | MATHEMATICSAND 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 - 1 | 210546 |

**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 10.25 a.m.**
4. The Serial Number of this question booklet should be entered and the respective circles should also be shaded completely 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 on the OMR answer sheet.
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 10.30 a.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 10.30 a.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.**

Correct Method of shading the circle on the OMR answer sheet is as shown below :


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 12.30 p.m.,** stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Handover 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 TO 75)

**M/C-A1**

A-1 2 M/C

## MATHEMATICS AND COMPUTER SCIENCE

## PART – 1

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

1. The straight line $3x - 4y + 10 = 0$ in its normal form is

(A) $-\frac{3}{5}x + \frac{4}{5}y - 2 = 0$

(B) $\frac{3}{5}x + \frac{4}{5}y + 2 = 0$

(C) $-\frac{3}{5}x - \frac{4}{5}y - 2 = 0$

(D) None of these

2. The direction cosines of a line equally inclined to the axes are

(A) $\pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}$

(B) $\pm\frac{1}{2}, \pm 2, \pm\frac{1}{2}$

(C) $\pm\sqrt{3}, \pm\sqrt{3}, \pm\sqrt{3}$

(D) None of these

3. Maxima and minima occurs

(A) Simultaneously

(B) Once

(C) Rarely

(D) Alternatively

4. $\lim_{x \to 1} \frac{x^3 - 3x + 2}{x^3 - x^2 - x + 1}$ is equal to

(A) $\frac{-3}{2}$

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

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

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

**Space For Rough Work**

5. Rolle's theorem is not applicable to the function $f(x) = |x|$ in the interval $[-1, 1]$ because

(A) f is not differentiable in $(-1, 1)$

(B) $f(x) \geq 0$ for all $x$ in $[-1, 1]$

(C) $f(1) \neq f(-1)$

(D) None of these

6. If $y = \tan^{-1} \sqrt{x}$ then $\frac{dy}{dx}$ is

(A) $\frac{1}{2\sqrt{x}(1+x)}$

(B) $\frac{1}{\sqrt{x}(1+x)}$

(C) $\frac{1}{x(1+\sqrt{x})}$

(D) None of these

7. If $y = \sqrt{\cos x + \sqrt{\cos x + \sqrt{\cos x + \ldots \infty}}}$, then $\frac{dy}{dx}$ is

(A) $\frac{\sin x}{2y+1}$

(B) $\frac{\cos x}{2y+1}$

(C) $\frac{-\sin x}{2y-1}$

(D) $\frac{-\sin x}{(2y-1)^2}$

8. The pedal equation for the curve $r = a\theta$ is

(A) $p = r^{n-1} a$

(B) $p^2 = \frac{r^2 a^2}{\sqrt{r^2 + a}}$

(C) $p = \frac{r^2}{\sqrt{r^2 + a^2}}$

(D) $p = \frac{r^2}{(r^2 + a^2)}$

9. $U = \frac{\sqrt{x^2 + y^2}}{\sqrt{x^3 + y^3}}$ is a homogeneous function of order

(A) 1/2

(B) −1/2

(C) 1/3

(D) $1/\sqrt{2}$

10. The value of $\int_0^1 \frac{x^7 dx}{\sqrt{1 - x^2}}$ is equal to

(A) 8/35

(B) 1/35

(C) 15/35

(D) 16/35

**Space For Rough Work**

11. The solution of the differential equation as $ydx + (x + x^2y)\,dy = 0$ is

(A) $\frac{1}{xy} + \log y = c$

(B) $-\frac{1}{xy} + \log y = c$

(C) $-\frac{1}{xy} = c$

(D) $\log y = cx$

12. The solution of the boundary value problem $y'' + y = 0$, $y(0) = 2$, $y'(\pi) = -2$ is

(A) $y = 3 \sin x + 2 \cos x$

(B) $y = 2 (\sin x - \cos x)$

(C) $y = 2 (\sin x + \cos x)$

(D) $y = 2 \sin x + 3 \cos x$

13. $y'' + A(x)\,y' + B(x)\,y = 0$ is

(A) Non-linear and homogeneous

(B) Linear and homogeneous

(C) Linear and non-homogeneous

(D) Non-linear and non-homogeneous

14. $L(e^{-t} \cos 2t)$ is equal to

(A) $\frac{s-1}{(s-1)^2+4}$

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

(C) $\frac{s+1}{(s+1)^2-4}$

(D) None of these

15. Laplace transform of $4^t$ is

(A) $\frac{1}{s - \log 4}$

(B) $\frac{1}{s + \log 4}$

(C) $\frac{1}{s^4}$

(D) $\frac{1}{(s-4)^2+1}$

16. The number of observation in a group is 30. If the average of first 10 is 6.5 and remaining 20 is 7.5, then the average of the whole group is

(A) 41/6

(B) 45/6

(C) 43/6

(D) 7

**Space For Rough Work**

17. If $A = \{x \in R \mid x^2 - 1 = 0\}$ & $B = \{x \in N \mid x < 4\}$ then $B - A =$

(A) $R - \{1\}$

(B) $R - \{-1, 1\}$

(C) $N - \{2, 3\}$

(D) $\{2, 3\}$

18. If m is a set of all $2 \times 2$ matrices whose elements are all natural numbers, then

(A) m is group under multiplication but not a ring

(B) m is group under addition but not a ring

(C) m is group under both addition and multiplication

(D) None of these

19. The number of improper subgroups of a group of order 6 is

(A) 1

(B) 2

(C) 3

(D) 6

20. The series $1 + r + r^2 + r^3 + \ldots\ldots\ldots$

(A) Converges if $r < 1$

(B) Diverges if $-1 < r < 1$

(C) Oscillates if $r > 1$ and $r < -1$

(D) None of these

21. $\Sigma \frac{1}{\sqrt{n}}$ is

(A) Convergent series

(B) Divergent series

(C) Oscillatory series

(D) None of these

22. If A and B are events with $P(A) = 3/8$, $P(B) = 5/8$ and $P(A \cup B) = 3/4$, then $P(B/A) =$

(A) 1/3

(B) 1/2

(C) 2/3

(D) 3/5

23. $\sim [p \vee (\sim q)] =$

(A) $\sim p \vee q$

(B) $\sim p \wedge q$

(C) $\sim p \vee \sim p$

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

**Space For Rough Work**

24. The contrapositive of $(p \vee q) \Rightarrow r$ is

(A) $\sim r \Rightarrow \sim p \, n \sim q$

(B) $r \Rightarrow (p \vee q)$

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

(D) $p \Rightarrow (q \vee r)$

25. A five digit number divisible by 3 is to be formed using the numerals 0, 1, 2, 3, 4 and 5 without repetition. The total number of ways in which this can be done is

(A) 216

(B) 600

(C) 240

(D) 3125

26. Which type of computer will you most likely encounter at the Department of motor vehicles ?

(A) Smart phone

(B) Mainframe

(C) Super computer

(D) Minicomputer

27. Which of the following device stores the instruction that helps to start the Computer ?

(A) Joy stick

(B) RAM

(C) ROM

(D) Monitor

28. When you press a key, this device notifies the system software.

(A) Keyboard

(B) Keyboard buffer

(C) Keyboard controller

(D) Network CPU

29. A computer's resolution is determined by _____

(A) Monitor

(B) Video controllers

(C) CPU

(D) System unit

**Space For Rough Work**

30. The CPU uses a _____ to store and retrieve each piece of data in the memory.

(A) Control unit

(B) Cache

(C) Post

(D) Memory location

31. Most popular external connection for a PC is,

(A) PS2

(B) USB

(C) HDX

(D) MIDI

32. Diskettes spin at about _____ revolution per minute.

(A) 3

(B) 30

(C) 300

(D) 3000

33. To remove a system program from your computer you can _____ it.

(A) Uninstall

(B) Delete

(C) Store

(D) Transfer

34. In many GUI-based programs, a _____ displays buttons that lets you issue commands quickly.

(A) Menu bar

(B) Scroll bar

(C) Command bar

(D) Tool bar

35. DOS stands for,

(A) Distributed Operating System

(B) Driver Operating System

(C) Disk Operating System

(D) Diskless Operating System

36. In a _____ network, all devices are connected to device called the hub and communication through it.

(A) Bus

(B) Star

(C) Ring

(D) Mesh

37. A Byte contains _____ Bits.

(A) 8

(B) 10

(C) 12

(D) 14

**Space For Rough Work**

38. Which is the most powerful type of computers ?

(A) Micro computer

(B) Minicomputer

(C) Mainframe computer

(D) Super computer

39. Which of the software tool is used for creating slide show ?

(A) Web design software

(B) Word processing software

(C) PowerPoint software

(D) Spread sheet software

40. Which of this is not an example of software ?

(A) Utilities

(B) OS

(C) FD

(D) Devices drivers

41. The two types of storage available in host computer system are called

(A) primary and secondary

(B) RAM and ROM

(C) primary and hard disk

(D) none of these

42. An example of magnetic storage device is

(A) Keyboard

(B) Diskette

(C) Mouse

(D) Joy stick

43. What does the term SCSI stand for ?

(A) Small Computer Software Interface

(B) Small Computer Storage Interface

(C) Small Computer System Interface

(D) Small Computer Standard Interface

44. The tool used to convert a source program to a machine language is

(A) compiler

(B) loader

(C) linker

(D) preprocessor

**Space For Rough Work**

45. The first mechanical computer designed by Charles Babbage was called

(A) Abacus

(B) Processor

(C) Calculator

(D) Analytical engine

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

(A) Power

(B) Reminder

(C) Percentage

(D) Fractional Part

47. ASCII stands for

(A) American Standard Code for International Information

(B) American Standard Code for Information Interchange

(C) American Standard Code for International Integration

(D) American Standard Code for Information Integration

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

(A) \"

(B) "

(C) "\""

(D) Syntax Error

49. Which is not a keyword in C ?

(A) const

(B) sizeof

(C) main

(D) void

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

(A) extern

(B) static

(C) register

(D) auto

**Space For Rough Work**

## PART – 2

**Each question carries two marks.** **(25 × 2 = 50)**

**51.** The coordinates of the foot of the perpendicular drawn from the point A (1, 2, 1) to the line joining B (1, 4, 6) and C (5, 4, 4) is

(A) (3, 4, 5)

(B) (3, –4, 5)

(C) (–3, 4, –5)

(D) (2, 3, 4)

**52.** The angle θ between the planes $2x - y + z = 6$ and $x + y + 2z = 3$ is

(A) 75°

(B) 85°

(C) 30°

(D) 60°

**53.** If $y = a \log x + bx^2 + x$ has its extreme values at $x = -1$ and $x = 2$ then

(A) $a = 2, b = -1$

(B) $a = -2, b = 1/2$

(C) $a = 2, b = -1/2$

(D) None of these

**54.** Equation of the ellipse having foci at (–8, 2) and (4, 2) and the length of the major axis as 18 is

(A) $\frac{(x-2)^2}{81}+\frac{(y+2)^2}{45}=1$

(B) $\frac{(x+2)^2}{81}+\frac{(y-2)^2}{45}=1$

(C) $\frac{(x+2)^2}{81}+\frac{(y+2)^2}{45}=1$

(D) None of these

**55.** If $y = x^x$, then $\frac{dy}{dx}$ is

(A) $x^x(1 - \log x^2)$

(B) $x(1 + \log x)$

(C) $x^x \log x$

(D) $x^x(1 + \log x)$

**56.** If $u = (x - y)(y - z)(z - x)$ then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} =$

(A) 0

(B) 1

(C) 2

(D) –1

**Space For Rough Work**

57. Area enclosed between the parabolas $y^2 = 4x$ and $x^2 = 4y$ is

(A) 16/9

(B) 8/16

(C) 16/3

(D) None of these

58. $L\left[\frac{1-e^{-at}}{t}\right]$ is equal to

(A) $\log\left(\frac{s}{s+a}\right)$

(B) $\log\left(\frac{s+a}{s}\right)$

(C) $\log\left(\frac{a}{s+a}\right)$

(D) $\log\left(\frac{s+a}{a}\right)$

59. If A = {1, 2, 3, 4, 5, 6}, B = {2, 4, 6, 8, 10} then the number of elements common

to each of the sets A × B and B × A is

(A) 36

(B) 6

(C) 3

(D) 9

60. Which one of the following is true ?

(A) The set of all cube roots of unity is group under addition

(B) (Z, +, .) is commutative ring without unity

(C) (N, + ) is a subgroup of real numbers under addition

(D) (2 Z, + ) is subgroup of (Z, + )

61. The sum of the series

$\frac{1}{(x+1)(x+2)} + \frac{1}{(x+2)(x+3)} + \ldots \frac{1}{(x+n)(x+n+1)}$ is

(A) $\frac{n}{(x+1)(x+n+1)}$

(B) $\frac{1}{(x+1)(x+n+1)}$

(C) $\frac{n}{(x+n)(x+n+1)}$

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

**Space For Rough Work**

62. In a college 25% of the students failed in physics, 15% of the students failed in mathematics and 10% of the students failed in both. If a student is selected at random then the probability that he failed in physics if he had failed in mathematics is

(A) 1/3

(B) 1/2

(C) 2/3

(D) 1

63. $\sim (p \Rightarrow q) \Leftrightarrow \sim p \vee \sim q$ is

(A) a tautology

(B) a contradiction

(C) Neither a tautology nor a contradiction

(D) Cannot come to any conclusion

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

(A) tolower(ch)

(B) toupper(ch)

(C) todigit(ch)

(D) None of the above

65. Diskettes spin at about _____ revolution per minute.

(A) 3

(B) 30

(C) 300

(D) 3000

66. If ptr1 and ptr2 are valid pointers in the same array, then which of the following statements is valid ?

(A) ptr1 + 2

(B) ptr1 – ptr2

(C) ptr1 * ptr2

(D) Both (A) and (B)

67. A motherboard is...

(A) used to store files and programs temporarily for fast and easy access by the CPU.

(B) a type of permanent memory used by the computer to establish basic input and output.

(C) a device that reads data stored on hard disks.

(D) a device that usually contains the circuitry for the Central Processing Unit, keyboard, and monitor and often having slots for accepting additional circuitry.

**Space For Rough Work**

68. 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

69. A device that prints one character at a time is known as

(A) Laser printer

(B) Line printer

(C) Character printer

(D) Dot-Matrix printer

70. 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

71.
```
int i = 4;
switch (i)
{
default: ;
case 3:
i += 5;
if ( i = = 8)
{
i++;
if (i = = 9) break;
i *= 2;
}
i – = 4;
break;
case 8:
i += 5;
break;
}
printf("i = %d\n", i);
```

What will be the output of the above sample code ?

(A) i = 5

(B) i = 8

(C) i = 9

(D) i = 10

**Space For Rough Work**

72. Which is the combined statement of the following two statements into one ?

char *p;

p = (char*) malloc(100);

(A) char p = *malloc(100);

(B) char *p = (char) malloc(100);

(C) char *p = (char*)malloc(100);

(D) char *p = (char *)(malloc*)(100);

73. Which bitwise operator is suitable for checking whether a particular bit is on or off ?

(A) && operator

(B) & operator

(C) || operator

(D) ! operator

74. 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)

75. 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 these

**Space For Rough Work**

**Space For Rough Work**