



MCA Entrance Paper – P.U. – 2012

- If $1, \omega, \omega^2$ be the cube roots of unity, then value of $(1 + \omega - \omega^2)^7 + (1 - \omega + \omega^2)^7$
 (a) -128 (b) 128
 (c) 64 (d) -64
- If $i = \sqrt{-1}$ and $z = x + iy$ then the equation $z^2 = \bar{z}$ has
 (a) No solution
 (b) 2 solutions
 (c) 4 solutions
 (d) An infinite number of solutions
- The value of $\frac{\cos 11^\circ + \sin 11^\circ}{\cos 11^\circ - \sin 11^\circ}$ is:
 (a) $\cos 34^\circ$ (b) $\sin 34^\circ$
 (c) $\cot 56^\circ$ (d) $\tan 56^\circ$
- The eccentricity of the ellipse $x^2 + 4y^2 + 8y - 2x + 1 = 0$ is:
 (a) $\frac{\sqrt{3}}{2}$ (b) $\frac{\sqrt{5}}{2}$
 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
- The orthocenter of the triangle formed by the lines $xy=0$ and $x+y=1$ is:
 (a) $(1/2, 1/2)$ (b) $(1/3, 1/3)$
 (c) $(1/4, 1/4)$ (d) $(0, 0)$
- Which of the following statements is a tautology?
 (a) $(\sim q \wedge p) \wedge q$
 (b) $(\sim q \wedge p) \wedge (p \wedge \sim p)$
 (c) $(\sim q \wedge p) \vee (p \vee \sim p)$
 (d) $(p \wedge q) \wedge (\sim (q \wedge q))$
- Let A, B and C be the three events such that $P(A)=0.3, P(B)=0.4, P(C)=0.8, P(A \cap B)=0.08, P(A \cap C)=0.28, P(A \cap B \cap C)=0.09$.
 If $P(A \cup B \cup C) \geq 0.75$, then $P(B \cap C)$ satisfies:
 (a) $P(B \cap C) \leq 0.23$
 (b) $P(B \cap C) \leq 0.48$
 (c) $0.23 \leq P(B \cap C) \leq 0.48$
 (d) $P(B \cap C) \leq 0.15$
- Let $p(x)$ be the polynomial $x^3 + ax^2 + bx + c$ where a, b and c are real constants. If $p(-3) = p(2) = 0$ and $p'(-3) < 0$, which of the following is a possible value of c?
 (a) -27 (b) -18
 (c) -6 (d) -3
- The coefficient of x^3 in the expansion of $(1+x)^3(2+x^2)^{10}$ is:
 (a) 2^{14} (b) $\binom{3}{3} + \binom{10}{1}$
 (c) $\binom{3}{3} + 2\binom{10}{1}$ (d) $\binom{3}{3}\binom{10}{1}2^9$
- Let $f(x)$ be the mean of the five numbers: 4, 9, 7, 5 and x. Let $g(x)$ be the median of these five numbers. For how many values of x, a real number, is $f(x) = g(x)$?
 (a) one (b) two
 (c) three (d) Infinitely many
- Assume that p is a polynomial function on the set of real numbers. If $p(0) = p(2) = 3$ and $p'(0) = p'(2) = -1$, then $\int_0^2 xp''(x) dx =$
 (a) -3 (b) -2
 (c) -1 (d) 2
- Let f be a function such that $f(x) = f(1-x)$ for all real number x. If f is differentiable every where, then $f'(0) =$
 (a) $f'(0)$ (b) $-f'(0)$
 (c) $f'(1)$ (d) $-f'(1)$
- If A is 3×3 matrix such that: $A \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$
 and $A \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$, then the product $A \begin{bmatrix} 6 \\ 7 \\ 8 \end{bmatrix}$ is
 (a) $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ (b) $\begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}$
 (c) $\begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$ (d) $\begin{bmatrix} 9 \\ 10 \\ 11 \end{bmatrix}$
- Which of the following CANNOT be a root of a polynomial in x of the form $9x^5 + ax^3 + b$, where a and b are integers?
 (a) -9 (b) -5
 (c) $1/4$ (d) $1/3$
- Consider the following system of linear equations over the real numbers, where x, y and z are variables and b is a real constant:
 $x + y + z = 0$
 $x + 2y + 3z = 0$
 $x + 3y + bz = 0$
 which of the following statements are true?



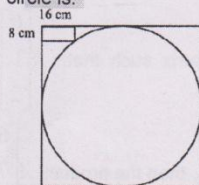
- (i) There exists a value of b for which the system has no solution.
 (ii) There exists a value of b for which the system has exactly one solution.
 (iii) There exists a value of b for which the system has more than one solution.
 (a) i and ii only (b) i and iii only
 (c) ii and iii only (d) i, ii, and iii

16. If f is a continuous function on the set of real numbers and if a, b are real numbers, which of the following must be true?

i. $\int_a^b f(x) dx = \int_{a+3}^{b+3} f(x-3) dx$
 ii. $\int_a^b f(x) dx = \int_a^3 f(x) dx - \int_b^3 f(x) dx$
 iii. $\int_{3a}^{3b} f(x) dx = 3 \int_a^b f(3x) dx$

- (a) i only (b) ii only
 (c) ii and iii only (d) i, ii and iii

17. A circle is inscribed in a square. A small rectangle of size $8\text{ cm} \times 16\text{ cm}$ is placed as shown in the picture below. The radius of the circle is:



- (a) 40 (b) 50
 (c) 24 (d) 128

18. Let $\{a_n\}_{n=1}^{\infty}$ be defined recursively by $a_1=1$

and $a_{n+1} = \left(\frac{n+2}{n}\right)a_n$ for $n \geq 1$. Then a_{30} is equal to:

- (a) $(15)(31)$ (b) $(30)(31)$
 (c) $\frac{32}{30}$ (d) $\frac{32!}{30!2!}$

19. The sum of the series $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + \dots$ upto n -terms is:

- (a) $n-1 + \frac{1}{2^n}$ (b) $n + \frac{1}{2^n}$
 (c) $2n + \frac{1}{2^n}$ (d) $n+1 + \frac{1}{2^n}$

20. The maximum value of

$\sin\left(x + \frac{\pi}{6}\right) + \cos\left(x + \frac{\pi}{6}\right)$ in interval $\left(0, \frac{\pi}{2}\right)$ is attained at

- (a) $\frac{\pi}{12}$ (b) $\frac{\pi}{6}$
 (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

21. The distance between the parallel lines $y=2x+4$ and $6x=3y+5$ is

- (a) $\frac{17}{\sqrt{3}}$ (b) 1
 (c) $\frac{3}{\sqrt{5}}$ (d) $\frac{17\sqrt{5}}{15}$

22. The line $2x-3y=5$ and $3x-4y=7$ are the diameters of a circle of area 154 square units.

Then the equation of this circle is $\left(\pi = \frac{22}{7}\right)$

- (a) $x^2 + y^2 + 2x - 2y = 62$
 (b) $x^2 + y^2 + 2x - 2y = 47$
 (c) $x^2 + y^2 - 2x + 2y = 47$
 (d) $x^2 + y^2 - 2x + 2y = 62$

23. The focus of the parabola $y^2 - x - 2y + 2 = 0$ is:

- (a) $(1/4, 0)$ (b) $(1, 2)$
 (c) $(3/4, 1)$ (d) $(5/4, 1)$

24. $f(x) = \sqrt{\frac{(x+1)(x-3)}{(x-2)}}$ is a real valued

function in the domain:

- (a) $(-\infty, -1] \cup [3, \infty)$ (b) $(-\infty, -1] \cup (2, 3]$
 (c) $[-1, 2) \cup [3, \infty)$ (d) $[-1, 2]$

25. How many words can be formed out of the letters of the word 'PECULIAR' beginning with P and ending with R?

- (a) 100 (b) 120
 (c) 720 (d) 150

26. If $y = \log_e x$ and n is positive integer, then $\frac{d^n y}{dx^n}$ is equal to

- (a) $\left(-\frac{e}{x}\right)^n$ (b) $(n-1)x^{-n}$
 (c) $(n-1)!x^{-n}$ (d) $(-1)^{n-1}(n-1)!x^{-n}$

27. If α and β are the root of $4x^2 + 3x + 7 = 0$,

then the value of $\left(\frac{1}{\alpha}\right) + \left(\frac{1}{\beta}\right)$ is:

- (a) $-\frac{3}{4}$ (b) $-\frac{3}{7}$



- (c) $\frac{3}{7}$ (d) $\frac{4}{7}$
28. The medians of a triangle meet at (0,-3). While its two vertices are (-1,4) and (5,2), the third vertex is at
 (a) (4,5) (b) (-1,2)
 (c) (7,3) (d) (-4,-15)
29. If $p^2 + q^2 = 1$ and $X = (3p - 4q^3)^2 + (3q - 4p^3)^2$, then the value of X is
 (a) 1 (b) 3
 (c) 6 (d) 12
30. The area of the triangle having the vertices (4,6), (x,4), (6,2) is 10 sq units. The value of x is
 (a) 0 (b) 1
 (c) 2 (d) 3
31. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, then $\cos \theta - \sin \theta$ is equal to
 (a) $\sqrt{2} \sin \theta$ (b) $\sqrt{2} \sec \theta$
 (c) $\frac{\sin \theta}{\sqrt{2}}$ (d)
32. A number is chosen from each of the two sets {1,2,3,4,5,6,7,8,9} and {1,2,3,4,5,6,7,8,9}. If P denotes the probability that the sum of the two numbers be 10 and Q the probability that their sum be 8, then (P+Q) is
 (a) (b) $\frac{137}{729}$
 (c) $\frac{16}{81}$ (d) $\frac{137}{81}$
33. The value of $\lim_{x \rightarrow 0} \frac{|\sin x|}{x}$ is:
 (a) 1 (b) -1
 (c) ∞ (d) does not exist
34. For a frequency distribution of marks in Mathematics for 100 students, the average was found to be 80. Later it was discovered that 48 was misread as 84. The correct mean is:
 (a) 80.36 (b) 79.36
 (c) 79.64 (d) 80.64
35. If a,b,c are real numbers such that $a^2 + b^2 + c^2 = 1$, then $ab + bc + ca \geq$
 (a) $\frac{1}{2}$ (b) $-\frac{1}{2}$
 (c) 2 (d) -2
36. The only integral root of the equation

$$\begin{vmatrix} 2-y & 2 & 3 \\ 2 & 5-y & 6 \\ 3 & 4 & 10-y \end{vmatrix} = 0$$
 is:
 (a) y=0 (b) y=1
 (c) y=2 (d) y=3
37. The harmonic mean of two numbers is 4. The arithmetic mean A and geometric mean G of these two numbers satisfy the equation $2A + G^2 = 27$. The two numbers are:
 (a) 3,6 (b) 4,5
 (c) 2,7 (d) 1,8
38. The root of $x^3 - 2x - 5 = 0$, correct to three decimal places by using Newton Raphson method is:
 (a) 1.0404 (b) 2.0946
 (c) 1.7321 (d) 0.7011
39. The area of the region bounded by the curve $y = |x-1|$ and $y = 3-|x|$ is
 (a) 2 sq units (b) 3 sq units
 (c) 4 sq units (d) 6 sq units
40. Solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = \sin(x)$ is:
 (a) $x(y + \cos x) = \sin x + C$ (b) $x(y - \cos x) = \sin x + C$
 (c) $x(y + \cos x) = \cos x + C$ (d) $x(y - \cos x) = \cos x + C$
41. How many bits are required to store an ASCII character?
 (a) 7 (b) 6
 (c) 8 (d) 16
42. What does HTTP stands for?
 (a) Hypertext transfer Protocol
 (b) Hypertext Token Protocol
 (c) Hypertext Telnet Protocol
 (d) Head Tail Transfer Protocol
43. A 600 MB file is transferred at a rate of 500 Kbps. Approximately, how long will it take?
 (a) 20 minutes (b) 120 minutes
 (c) 160 minutes (d) 1 hour
44. Which of the following is responsible for the management and coordination of activities and the sharing of the resources of the computer?
 (a) Application Software (b) Motherboard
 (c) Operating System (d) RAM
45. WAV file format is associated with what type of files?
 (a) Video (b) sound
 (c) Image (d) Word Document
46. A software is termed an open source software if
 (a) The developer company is open 24 hours
 (b) Its source code is available to share, study and modify
 (c) It can be downloaded from the internet by paying very small amount
 (d) It is available free of cost
47. Consider the following lists:
 List I List II
 1. Linux P. Text File Editor
 2. Mozilla Firefox Q. Image File Format
 3. Notepad R. Operating System
 4. JPEG S. Web Browser



The correct match is

- (a) 1→R, 2→S, 3→P, 4→Q
- (b) 1→S, 2→R, 3→Q, 4→P
- (c) 1→R, 2→P, 3→S, 4→Q
- (d) 1→Q, 2→S, 3→P, 4→R

48. What is a specialized software program that allows input and output devices to communicate with the rest of the computer system?

- (a) Utility driver
- (b) Utility program
- (c) Device driver
- (d) Data compression utility

49. Pattern of connections between the devices on a network.

- (a) Topology
- (b) WAN
- (c) LAN
- (d) Internet

50. Millisecond is

- (a) Thousandth of a second
- (b) Millionth of a second
- (c) Billionth of a second
- (d) Hundred times a second

51. _____ is simply a fast port that lets you connect computer peripherals and consumer electronics to your computer without restart.

- (a) Freeware
- (b) Shareware
- (c) Firewire
- (d) Firmware

52. Using the HDD as an extension of RAM is a feature of

- (a) Virtual memory
- (b) Cache
- (c) Direct Memory Access (DMA)
- (d) Virtual Reality

53. Which of the following decimal numbers has an exact representation in binary notation?

- (a) 0.2
- (b) 0.3
- (c) 0.4
- (d) 0.5

54. Consider the following code segment:

```
if(Y<0)
{
    X=-X;
    Y=-Y;
}
Z=0;
while (Y>0)
{
    Z=Z+X;
    Y=Y-1;
}
```

Assume that X,Y and Z integer variables and that X and Y have been initialized. Which of the following best describes what this code segment does?

- (a) Sets Z to be the sum X+Y
- (b) Sets Z to be the absolute value of X
- (c) Sets Z to be the value to Y
- (d) Sets Z to be the product X*Y

55. A Trojan Horse refers to

(a) The using of a large financial system to squirrel away small amount of money

(b) Changing data before or as it enters the system

(c) Placing illegal instructions in the middle of a legitimate program.

(d) Using another person's identification code.

56. A cricketer's average in his first 18 innings was 16.5 runs. After a further 8 innings, his average had increased to 32.5 runs. What was his average for the last 8 innings?

- (a) 120
- (b) 80.5
- (c) 68.5
- (d) 65.5

57. A test has 50 questions. A student scores 1 mark for a correct answer, -1/3 for a wrong answer, and -1/6 for not attempting a question. If the net score of a student is 32, the number of questions answered wrongly by that student cannot be less than

- (a) 6
- (b) 12
- (c) 3
- (d) 9

58. A paper of size $L \times W$ ($L > W$) is folded in half along and longer dimension. It is then folded in half along the other dimensions and a third time, along the direction of the first fold. What are the dimensions of the folded paper?

(a) $\frac{L}{4} \times \frac{W}{4}$

(b) $\frac{L}{8} \times \frac{W}{4}$

(c) $\frac{L}{8} \times \frac{W}{8}$

(d) $\frac{L}{4} \times \frac{W}{2}$

59. Three friends divided some bullets equally. After all of them shot 4 bullets the total number of bullets remaining is equal to the bullets each had after division. Find the original number divided.

- (a) 15
- (b) 18
- (c) 21
- (d) 24

60. At 10 a.m two trains started travelling toward each other from stations 287 miles apart. They passed each other at 1:30 p.m the same day. If the average speed of the faster train exceeded the average speed of the slower train by 6 miles per hour, which of the following represents the speed of the faster train, in mile per hour?

- (a) 38
- (b) 40
- (c) 44
- (d) 48

61. A certain street has 1000 buildings. A sign maker is contracted to number the houses from 1 to 1000. How many zeroes will he need?

- (a) 100
- (b) 142
- (c) 192
- (d) 250

62. There are three envelopes on a table and one of them contains a secret formula. On the first envelope, it is written, "the formula is not in



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here. It is in Envelope 2." On the second it is written, "The formula is not in Envelope 1. It is in Envelope 3." "On the third, it is written, "The formula is not in here. It is in Envelope 1. If both the statements on one of the envelopes are true; one statement is true and one is false on another envelope; and both the statements are wrong on the remaining one, which envelope contains the formula?

- (a) In envelope 1
- (b) In envelope 2
- (c) In envelope 3
- (d) In None of the envelopes

63. Given the sequence A,BB,CCC,DDDD..... And so on, the 253rd letter in the sequence will be:

- (a) V (b) U
- (c) T (d) W

64. Walking at $\frac{3}{4}$ of his usual speed, a man is late by $2\frac{1}{2}$ hours. The usual time is:

- (a) 10 hours (b) $7\frac{1}{2}$ hours
- (c) 15 hours (d) $6\frac{1}{2}$ hours

65. Of the two digit numbers (those from 11 to 95, both inclusive) how many have a second digit greater than the first digit?

- (a) 37 (b) 38
- (c) 36 (d) 35

Questions: 66-68

Directions: For each word in capital letters, select the word or phrase among the four choices that is most nearly opposite in meaning to the word

- 66. Meager
 - (a) Extravagant (b) Average
 - (c) Excessive (d) Plentiful
- 67. Mundane
 - (a) Heavenly (b) Excellent
 - (c) Exciting (d) Superb
- 68. Beguile
 - (a) Flatter (b) Smile
 - (c) Persuade (d) Cheat

Questions: 69-71

Directions: For each word in capital letters, select the word or phrase among the four choices that is nearest in meaning to the word.

- 69. Inebriate
 - (a) Stupefied (b) Dreamy
 - (c) Drunken (d) Unsteady
- 70. Counsel
 - (a) oppose (b) Advise
 - (c) Correct (d) Publish
- 71. Jeopardy
 - (a) Adventure (b) Magic
 - (c) Enmity (d) Danger

Questions: 72-75

Directions: Out of the four alternatives, choose the one which can be substituted for the given sentences

- 72. A cure for all diseases
 - (a) Panacea (b) Antibiotic
 - (c) Exorcism (d) Incantation
- 73. One who eats everything
 - (a) omniscient (b) omnivorous
 - (c) omnipotent (d) insolvent
- 74. Land surrounded by water as to be almost an island
 - (a) Peninsula (b) Lagoon
 - (c) Archipelago (d) Isthmus
- 75. One who possesses many talents
 - (a) Exceptional (b) Nubile
 - (c) Versatile (d) Gifted

ANSWER KEY

- | | | | |
|---------|---------|---------|---------|
| 1. (b) | 2. (c) | 3. (d) | 4. (a) |
| 5. (d) | 6. (c) | 7. (b) | 8. (a) |
| 9. (a) | 10. (c) | 11. (b) | 12. (d) |
| 13. (b) | 14. (c) | 15. (c) | 16. (d) |
| 17. (a) | 18. (a) | 19. (a) | 20. (a) |
| 21. (d) | 22. (c) | 23. (d) | 24. (c) |
| 25. (c) | 26. (d) | 27. (b) | 28. (d) |
| 29. (a) | 30. (a) | 31. (a) | 32. (c) |
| 33. (d) | 34. (c) | 35. (b) | 36. (b) |
| 37. (a) | 38. (b) | 39. (c) | 40. (a) |
| 41. (a) | 42. (a) | 43. (c) | 44. (c) |
| 45. (b) | 46. (b) | 47. (a) | 48. (c) |
| 49. (a) | 50. (a) | 51. (c) | 52. (a) |
| 53. (d) | 54. (d) | 55. (c) | 56. (c) |
| 57. (c) | 58. (d) | 59. (b) | 60. (c) |
| 61. (c) | 62. (c) | 63. (a) | 64. (b) |
| 65. (c) | 66. (d) | 67. (c) | 68. (c) |
| 69. (c) | 70. (b) | 71. (d) | 72. (a) |
| 73. (b) | 74. (a) | 75. (c) | |