ASPIRE STUDY KANPUR

MCA Entrance Classes *By Shivam Gupta*

Banaras Hindu University
BHU - MCA 2020

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1. If $|Z + \bar{Z}| + |Z - \bar{Z}| = 2$, then Z lies in
   (a) a square
   (b) a circle
   (c) a straight line
   (d) None of these

2. The area of the greatest rectangle that can be inscribed in the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, is
   (a) 3ab
   (b) 4ab
   (c) 2ab
   (d) ab

3. The value of $\int_0^{2\pi} \cos^{99} x \, dx$ is :
   (a) 0
   (b) 99
   (c) -1
   (d) 1

4. If $f(x) = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ then $f(x)$ is differentiable on:
   (a) None of these
   (b) $R - \{1, -1\}$
   (c) $[-1, 1]$
   (d) $R - (-1, 1)$

5. If a quadratic curve $y = f(x)$, touches the line $y = x$ at the point (-1,0), then equation of the quadratic curve is :
   (a) $y = x^2 + 2x + 1$
   (b) $y = \frac{x^2}{4} + \frac{x}{2} + \frac{1}{4}$
   (c) $y = \frac{x^2}{2} + \frac{x}{4} - \frac{1}{4}$
   (d) $y = \frac{x^2}{8} - \frac{x}{16} - \frac{1}{16}$

6. The slopes of tangents drawn from a point $(4, 10)$ to the parabola $y^2 = 9x$ are:
   (a) $\frac{1}{4}, \frac{1}{3}$
   (b) $\frac{1}{4}, \frac{3}{4}$
   (c) $\frac{1}{4}, \frac{9}{4}$
   (d) None of these

7. A train is moving with a speed of 180 km/hr. It is same as
   (a) 5 m/sec
   (b) 50 m/sec
   (c) 40 m/sec
   (d) 30 m/sec

8. A man can row upstream at 6 km/hr and downstream at 10 km/hr. Find speed of stream:
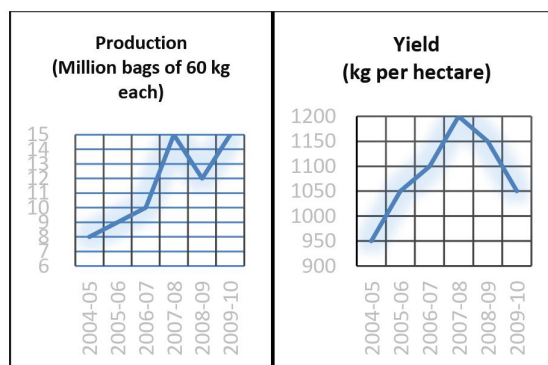   (a) 1 km/hr
   (b) 2 km/hr
   (c) 3 km/hr
   (d) 4 km/hr

9. The following chart shows the percentage distribution of students of a university in different subjects. Total number of students registered is 1056.

PERCENTAGE OF STUDENTS IN DIFFERENT SUBJECTS IN THE UNIVERSITY

Engineering 9%
Physics 24%
Management 12%
Economics 7%
Arts 8%
Computer 18%
Commerce 22%
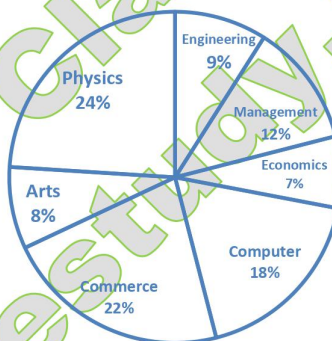
Total number of students registered in finance related subjects?
   (a) 1968
   (b) 2448
   (c) 576
   (d) 2500

10. If $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(2x+3)(x-3)} = 0, \left(x \neq 3, x \neq -\frac{3}{2}\right)$, then value of x is :
    (a) 1
    (b) -2
    (c) 2
    (d) -1

11. The trends in Production and Productivity of Rice for 6 years are given by following charts.

Production (Million bags of 60 kg each)

Yield (kg per hectare)

Average rice production (in kg) during the six years was?

(a) 706000000   (b) 670000000

(c) 607000000   (d) 760000000

12. An integrating factor of the differential equation $\frac{dy}{dx} + y = \frac{1+y}{x}, (x > 0)$ is :

(a) xe^x (b) e^x (c) $\frac{e^x}{x}$ (d) $\frac{x}{e^x}$

13. If $f(x) = 2^x$, then $f(0), f(1), f(2), \ldots$ are in :
    (a) Arithmatico Geometrico Progression
    (b) A.P
    (c) H.P.
    (d) G.P.

14. Let $f(x) = |x - 1|$, then :
    (a) $f(x^2) = \{f(x)\}^2$
    (b) $f(|x|) = |f(x)|$
    (c) $f(x + y) = f(x) + f(y)$
    (d) None of these

15. Three dice are thrown, the probability that the same number will appear on each of them is :

(a) $\frac{1}{18}$ (b) $\frac{1}{36}$

(c) $\frac{1}{6}$ (d) None of these

16. REASON : SFBTPO :: THINK : ?
    (a) UIJOL   (b) UJKPM
    (c) UHNKI   (d) SGHMJ

17. If $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P. then :

(a) $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in A.P.   (b) a^2, b^2, c^2 are in A.P.

(c) a, b, c are in A.P.   (d) None of these

18. If a, b, c, d are in G.P. and $a^x = b^y = c^z = d^u$, then x, y, z, u are in :
    (a) A.P.   (b) None of these
    (c) G.P.   (d) H.P.

19. If $\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}, x \neq 3$ and $x \neq -5$, then the value of x is :
    (a) 7 ; -9   (b) 11 ; -9
    (c) -11 ; 9   (d) -7 ; 8

20. Let R is a relation from $\{11,12,13\}$ to $\{8,10,12\}$ defined by $y = x - 3$, then R^{-1} :
    (a) $\{(10,13), (8,11)\}$ (b) $\{(11,8), (13,10)\}$
    (c) None of these   (d) $\{(8,11), (10,13)\}$

21. Three numbers are chosen from 1 to 30. The probability that they are not consecutive is :

(a) None of these   (b) $\frac{142}{145}$

(c) $\frac{143}{145}$ (d) $\frac{144}{145}$

22. Which one is better offer :
    Three successive discounts of 10%, 10% and 30% or three successive discounts of 40%, 5% and 5% ?
    (a) First offer is better   (b) Second offer is better
    (c) Insufficient information
    (d) Both are similar

23. The value of $x^{\log y - \log z} \times y^{\log z - \log y} \times z^{\log x - \log y}$; is
    (a) 1
    (b) xyz
    (c) 0
    (d) $(x + y + z)^{\log x + \log y + \log z}$

24. David gets on the elevator at the 11th floor of a building and rides up at the rate of 57 floors per minute. At the same time, Albert gets on the elevator at the 51th floor of the same building and rides down at the rate of 63 floors per minute. If they continue travelling at these rates, then at which floor will their paths cross ?

(a) 37   (b) 30   (c) 19   (d) 28

25. The value of $2^{2 - \log_2^5}$ is :

(a) $\frac{3}{5}$ (b) $\frac{2}{5}$ (c) $\frac{4}{5}$ (d) $\frac{1}{5}$

26. The equation of the circle passing through the origin which cuts off intercepts of length 6 and 8 from the x and y-axes respectively, is :
    (a) $x^2 + y^2 - 6x - 8y = 0$
    (b) $x^2 + y^2 - 6x + 16y = 0$
    (c) $x^2 + y^2 + 6x - 12y = 0$
    (d) $x^2 + y^2 + 12x + 16y = 0$

27. Find the value of k so that the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common:

    (a) $\frac{27}{4}$ (b) $-\frac{25}{4}$ (c) $-\frac{27}{4}$ (d) $\frac{25}{4}$

28. The sides of a triangle are in the ratio $\frac{1}{3} : \frac{1}{4} : \frac{1}{5}$ and its perimeter is $94cm$. The length of the smallest side is:

    (a) $31.3cm$ (b) $23.5cm$

    (c) $24cm$ (d) $18.8cm$

29. If A and B are two fixed points, then the locus of a point which moves in such a way that the angle APB is a right angle is :

    (a) a hyperbola   (b) a parabola

    (c) a circle   (d) an ellipse

30. If $f(x) = [x]$ and $g(x) = |x|$, then value of $(gof)\left(-\frac{5}{3}\right) - (fog)\left(-\frac{5}{3}\right)$ is :
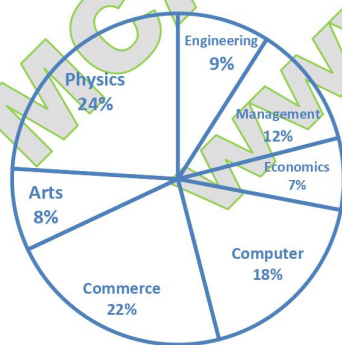
    (a) 3   (b) 1   (c) 0   (d) 2

31. The sum of first three terms of a GP is 16 and the sum of next three term is 128. Then first term of the GP is

    (a) 8   (b) 16   (c) $\frac{30}{7}$ (d) $\frac{16}{7}$

32. The following chart shows the percentage distribution of students of a university in different subjects. Total number of students registered is 1056.

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    Engineering 9%
    Physics 24%
    Management 12%
    Economics 7%
    Arts 8%
    Computer 18%
    Commerce 22%

    The number of excess enrollment in physics as compared to commerce is

    (a) 90   (b) 86

    (c) 96   (d) 69

33. The surface areas of two spheres are in the ratio 1 : 4. The ratio of their volumes is :

    (a) 1:4   (b) 1:6   (c) 1:2   (d) 1:8

34. The volume of spherical balloon is increasing at the rate of $20 \, cm^3/sec$. The rate of change of its surface area at the instant when its radius is 8 cm, is given by :

    (a) $5 \, cm^2/sec$ (b) $8\pi \, cm^2/sec$

    (c) $\frac{8\pi}{5} \, cm^2/sec$ (d) $8 \, cm^2/sec$

35. The line $\frac{x}{a} + \frac{y}{b} = 1$ touches the curve $y = be^{-x/a}$ at the point

    (a) $\left(a, \frac{a}{b}\right)$ (b) None of these

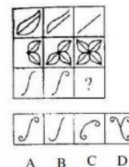   (c) $\left(a, \frac{b}{a}\right)$ (d) $\left(-a, \frac{b}{a}\right)$

36. If A is any of square matrix of order n, then $A(adj\ A)$ is equal to

    (a) $|A|I_n$ (b) $|A|^{n-1}$

    (c) 1   (d) $|A|^n$

37. Which of the following relations on R is an equivalence relation?

    (a) $xR_3y \Leftrightarrow x/y$ (b) $xR_1y \Leftrightarrow |x|/|y|$

    (c) None of these   (d) $xR_2y \Leftrightarrow x \geq y$

38. Select a suitable figure from the four alternatives that would complete the figure matrix.

    (a) A   (b) B   (c) D   (d) C

39. 8 Women can complete a work in 10 days and 10 children take 16 days to complete the same work. How many days will 10 women and 12 children take to complete the work?

    (a) 7   (b) 5   (c) 8   (d) 6

40. The number of straight lines can be formed out of 10 points of which 7 are collinear :

    (a) None of these   (b) 21

    (c) 26   (d) 25

41. In the binomial expansion of $(1+x)^n$, the coefficient of the fifth, sixth and seventh term are in AP, then the value of n is:
   (a) 6,3   (b) 6, 9
   (c) 7, 14   (d) 3, 7

42. The square root of the complex number $(5+2i)$ is :
   (a) $\pm(3+2i)$ (b) $\pm(9+2i)$
   (c) $\pm(9+4i)$ (d) $\pm(3+i)$

43. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$ and $A^2 + aA + bI = 0$, then values of 'a' and 'b' are :
   (a) $a = -2, b = -5$
   (b) $a = 4, b = 23$
   (c) $a = -4, b = 1$
   (d) $a = -3, b = 2$

44. The value of $\int_0^4 |x^2 - 4|dx$, is :
   (a) 8   (b) $\frac{32}{8}$
   (c) 16   (d) $\frac{16}{3}$

45. The center of circle passing through the points $(0,0)$, $(1,0)$ and touching the circle $x^2 + y^2 = 9$ is:
   (a) $(\frac{3}{2}, \frac{1}{2})$ (b) $(\frac{1}{2}, \frac{3}{2})$
   (c) $(\frac{1}{2}, \frac{1}{2})$ (d) $(\frac{1}{2}, -\sqrt{2})$

46. The value of $\begin{vmatrix} b+c & a-b & a \\ c+a & b-c & b \\ a+b & c-a & c \end{vmatrix}$ is :
   (a) $a^2 + b^2 + c^2 - ab - bc - ca$
   (b) 0
   (c) $a^3 + b^3 + c^3 - abc$
   (d) $3abc - a^3 - b^3 - c^3$

47. If $a^x = b^{2x-3}$, then value of x is ($a > 0, b > 0$ and $a, b \in R$) :
   (a) $\frac{b^3}{a^2}$ (b) $\frac{3\log b}{2\log b - \log a}$
   (c) $\frac{\log b}{\log b - 2\log a}$ (d) $\frac{a^2}{b^3}$

48. *Fill in the blanks* :
   ELFA, GLHA, ILJA, ..., MLNA :
   (a) KLMA   (b) KLLA

(b) LLMA   (d) OLPA

49. If ω is a cube root of unity and $\omega \neq 1$, then value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$ is equal to :
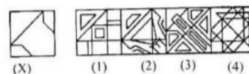   (a) 1   (b) 2
   (c) 0   (d) -1

50. The modulus of the complex number $\left(\frac{3+2i}{2-5i} + \frac{3-2i}{2+5i}\right)$ is :
   (a) $\frac{8}{29}$ (b) $\frac{2\sqrt{2}}{29}$
   (c) $\sqrt{\left(\frac{2}{29}\right)}$ (d) $\frac{2}{5}$

51. If $z = \frac{i-1}{\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}}$ then polar form of z is :
   (a) $\frac{1}{2}\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$
   (b) $\sqrt{2}\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$
   (c) $\frac{1}{2}\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$
   (d) $\sqrt{2}\left(\cos\frac{5\pi}{12} + i\sin\frac{5\pi}{12}\right)$

52. Find out the alternative figure which contains figure (X) as its part:

   (a) 3   (b) 4
   (c) 1   (d) 2

53. The smallest value of x satisfying the inequality $^{10}C_{x-1} > 2 \cdot {}^{10}C_x$ is:
   (a) 10   (b) 7
   (c) 8   (d) 9

54. Two buses tickets from city A to B and three tickets from city A to C cost $Rs. 77$ but three tickets from city A to B and two tickets from city A to C cost $Rs. 73$. What are the fares for cities B and C from A?
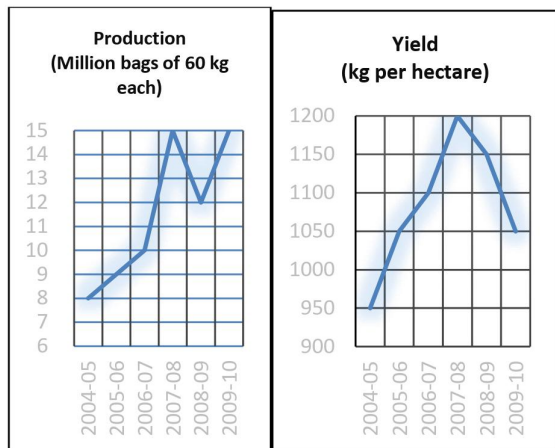   (a) $Rs\ 17, Rs13$
   (b) $Rs\ 4, Rs\ 23$
   (c) $Rs\ 13, Rs\ 17$
   (d) $Rs\ 15, Rs\ 14$

55. The trends in Production and Productivity of Rice for 6 years are given by following charts.

The approximate decrease percentage in rice cultivation area from the year 2007-08 to 2008-09 was

(a) 4%   (b) 8%

(c) 9%   (d) 2%

56. If z_1 and z_2 are two n^{th} roots of unity, then $\arg\left(\frac{z_1}{z_2}\right)$ is a multiple of :

(a) $n\pi$ (b) $\frac{2\pi}{n}$

(c) None of these   (d) $\frac{3\pi}{n}$

57. If $\log_2 x + \log_4 x + \log_8 x = \frac{11}{6}$, then value of x is :

(a) 4   (b) 1

(c) 2   (d) 8

58. ZRYQ : KCJB : PWOV : ?

(a) GBHA   (b) EOFP

(c) ELDK   (d) ISJT

59. The point on the curve $y = x^3 - 11x + 5$ at which the tangent has the equation $y = x - 11$, is given by:

(a) $(4, -7)$ (b) $(3, -8)$

(c) $(-2, -13)$ (d) $(2, -9)$

60. $37\% \ of \ 150 - 0.05\% \ of \ 100 = ?$

(a) 55.45   (b) 55.5

(c) 55.55   (d) 50

61. What is the next two numbers of the following sequence ?

8, 11, 21, 15, 18, 21, 22, …………

(a) 25, 18   (b) 24, 21

(c) 25, 21   (d) 25, 29

62. 250 bananas were divided equally among a certain number of students. If there were 25 more students each would have received half banana less. The number of students is :

(a) 100   (b) 120

(c) 150   (d) 125

63. If $y = \sqrt{logx + \sqrt{logx + \sqrt{logx+\dots \infty}}}$, then $\frac{dy}{dx}$ is equal to :

(a) $\frac{1}{x(2y-1)}$ (b) $\frac{1}{x(y-1)}$

(c) $\frac{1}{x(y+1)}$ (d) $\frac{1}{x(2y+1)}$

64. Window is to pane as book is to :

(a) Glass   (b) Page

(c) Cover   (d) Novel

65. If x, y, z are non-zero and $\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = 0$, then $x^{-1} + y^{-1} + z^{-1}$ is equal to :

(a) xyz (b) $-\frac{1}{xyz}$

(c) -1   (d) $x + y + z$

66. The only root of the equation $9\log_3(\log_2 x) = \log_2 x - (\log_2 x)^2 + 1$ is :

(a) $x = 4$ (b) $x = 2$

(c) $x = 1$ (d) $x = 3$

67. For the set $A = \{1, 2, 3\}$, R is a relation on the set A as $R = \{(1,1), (2,2), (3,3), (1,3)\}$ to make it the smallest equivalence relation the ordered pairs to be added is :

(a) (3, 1)   (b) (3, 2),(2, 3),(3, 1)

(c) (3, 2),(2, 3) (d) (3, 2)

68. If $a + ib = \frac{c+i}{c-i}$, $a, b, c \in R$, then value of $a^2 + b^2$ is equal to :

(a) 3   (b) 2

(c) 1   (d) 0

69. The pth, q^{th} and r^{th} terms of an A.P. as well as those of a G.P. are a, b, c respectively. The value os $a^{b-c} \times b^{c-a} \times c^{a-b}$ is equal to :
   (a) 1
   (b) 0
   (c) -1
   (d) 2

70. The cost price of 4 things be equal to the sale price of 3 things, then profit percent is:
   (a) $33\frac{1}{3}\%$
   (b) 40%
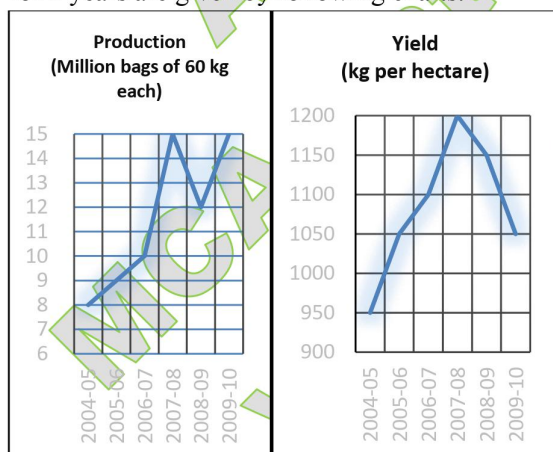   (c) 25%
   (d) $37\frac{1}{2}\%$

71. If the centre of the ellipse is (0,0), major axis is y-axis and it is passing through the points (3, 2) and (1, 6), then equation of the ellipse is :
   (a) $\frac{x^2}{100} + \frac{y^2}{320} = 1$
   (b) $\frac{x^2}{10} + \frac{y^2}{40} = 1$
   (c) $\frac{x^2}{8} + \frac{y^2}{10} = 1$
   (d) $\frac{x^2}{10} + \frac{y^2}{160} = 1$

72. The inequality $|2x - 3| \leq 1$ is valid when x lies in the interval :
   (a) (-4, 3)
   (b) (3, 4)
   (c) [-1, 2]
   (d) [1, 2]

73. The trends in Production and Productivity of Rice for 6 years are given by following charts.

Cultivated area (in hectares) of rice in year 2008-09 was:
   (a) 626087
   (b) 626015
   (c) 626078
   (d) 626080

74. The orthocenter of the triangle formed by the lines $xy = 0$ and $x + y = 1$ is :

(a) $\left(\frac{1}{3}, \frac{1}{3}\right)$
(b) $\left(\frac{1}{2}, \frac{1}{2}\right)$
(c) $\left(\frac{1}{4}, \frac{1}{4}\right)$
(d) (0, 0)

75. If both the roots of the equation $ax^2 + bx + c = 0$ are zero, then :
   (a) $b = 0, c \neq 0$
   (b) $b, c = 0$
   (c) $b \neq 0, c \neq 0$
   (d) $b \neq 0, c = 0$

76. The derivative of $\sec^{-2}\left(\frac{1}{2x^2-1}\right)$ with respect to $\sqrt{1-x^2}$ at $x = -\frac{1}{2}$ is
   (a) -2
   (b) 1
   (c) 2
   (d) 4

77. If $f: R_+ \to [-5, \infty)$ and $f(x) = 9x^2 + 6x - 5$, f is invertible, then $f^{-1}(y)$ is equal to
   (a) $f^{-1}(y) = -\left(\frac{\sqrt{y+5}-1}{9}\right)$
   (b) $f^{-1}(y) = \left(\frac{\sqrt{y+5}}{9}\right)$
   (c) $f^{-1}(y) = \frac{\sqrt{5}+3}{3}$
   (d) $f^{-1}(y) = \left(\frac{\sqrt{y+6}-1}{3}\right)$

78. In 1 minute $\frac{3}{7}$ of a bucket is filled. The rest of the buckets can be filled in :
   (a) $\frac{4}{3}$ minutes
   (b) $\frac{1}{3}$ minutes
   (c) $\frac{7}{3}$ minutes
   (d) 2 minutes

79. If A+B means A is brother of B; A-B means A is the sister of B and A×B means A is father of B. Which of the following means that C is the son of M?
   (a) N+M-F×C
   (b) M-N×C+F
   (c) F-C+N×M
   (d) M×N-C+F

80. Rahul put his timepiece on the table in such a way that at 6 P.M. hour hand points to North. In which direction the minute hand will point at 9.15 P.M.?
   (a) North
   (b) South
   (c) West
   (d) South – East

81. 2 : 12 :: 5 : ?
   (a) 35
   (b) 25
   (c) 30
   (d) 15

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82. The following chart shows the percentage distribution of students of a university in different subjects. Total number of students registered is 1056.

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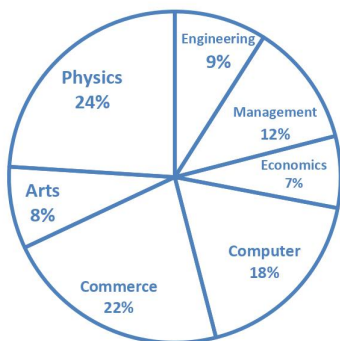
Let sex ratio of enrolled students 1 : 2 (Female : Male). Number of beds available in university hostel for male and female is equal and no female resides outside the hostel, what percent of enrolled students residing outside the hostel?

(a) 30%   (b) 33%
(c) 55%   (d) 50%

83. Out of 40 consecutive integers, two are chosen at random, the probability that their sum is odd, is:

(a) $\frac{14}{29}$ (b) $\frac{1}{2}$

(c) None of these   (d) $\frac{20}{39}$

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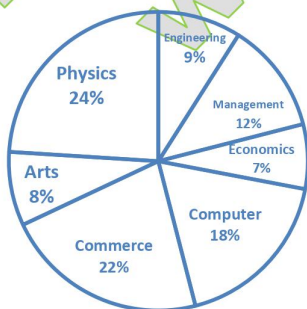
Which of the following sequence shows the increasing order of subjects according to number of enrollments?

(a) Economics, Commerce, Physics, Computer, Arts
(b) Arts, Physics, Economics, Management
(c) Economics, engineering, Computer, Physics
(d) Physics, Computer, Engineering, Economics

85. If the roots of the equation $x^2 - px + q = 0$ differ by unity, then

(a) $p^2 = 4q$ (b) $p^2 = 4q + 1$
(c) None of these   (d) $p^2 = 4q - 1$

86. If $x^2 - kxy + y^2 + 2y + 2 = 0$ denotes a pair of straight lines, then $k =$

(a) $\frac{1}{\sqrt{2}}$ (b) 2
(c) $2\sqrt{2}$ (d) $\sqrt{2}$

87. Let $R = \{(a, a), (b, b), (c, c), (a, b)\}$ be a relation on set $A = \{a, b, c\}$ then R is:

(a) Reflexive   (b) Symmetric
(c) Antisymmetric   (d) Identity Relation

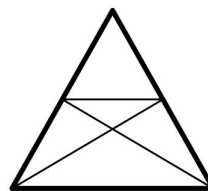88. A man running a race-course, note that the sum of the distances from two flag posts from his is always 10 unit and distance between the flag post is 8 unit. The equation of path traced by the man is :

(a) $\frac{x^2}{25} + \frac{y^2}{16} = 1$ (b) $\frac{x^2}{25} + \frac{y^2}{9} = 1$
(c) $\frac{x^2}{9} - \frac{y^2}{25} = 1$ (d) $\frac{x^2}{25} - \frac{y^2}{16} = 1$

89. How many three-digit numbers are divisible by 7?

(a) 126   (b) 125
(c) 127   (d) 128

90. Find the number of triangles in the given figure :

(a) 10   (b) 14   (c) 12   (d) 8

91. Sanjana's brother – in – law is the son of Ramya. How is Sanjana's husband related to Ramya's husband if Sanjana had no siblings?
    (a) Son – in – law
    (b) Father – in – law
    (c) Nephew
    (d) Son

92. If the roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$, are equal then $'b'$ is
    (a) $\left(\frac{a+c}{2}\right)$
    (b) $\frac{a-c}{2}$
    (c) $2(a - c)$
    (d) $(a + c)$

93. If the system of equations
    $x + 4ay + az = 0$
    $x + 3by + bz = 0$
    $x + 2cy + cz = 0$
    have a non-zero solution, then $a, b, c (\neq 0)$ are in :
    (a) GP
    (b) AP
    (c) a, b, c are not in any sequence
    (d) HP

94. In how many years, a sim will be thrice of it at the rate of 10% per annum?
    (a) 20 years
    (b) 15 years
    (c) 30 years
    (d) 40 years

95. The angle between the lines $2x^2 - 7xy + 3y^2 = 0$, is:
    (a) $\tan^{-1}\left(\frac{7}{6}\right)$
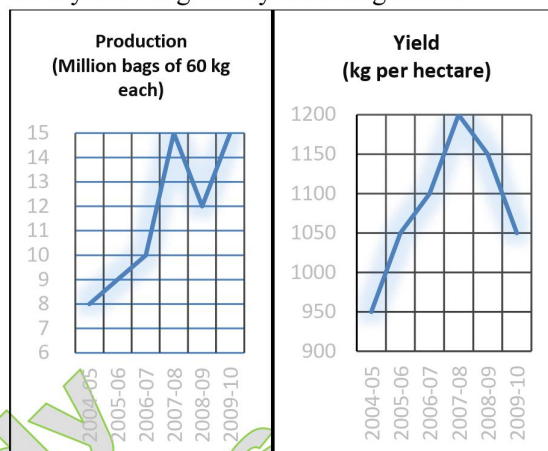   (b) $30°$
    (c) $45°$
    (d) $60°$

96. Let $A = \{1,2,3\}$ and $R = \{(1,2), (2,3), (1,3)\}$ be a relation on A then R is :
    (a) Transitive
    (b) Neither symmetric nor transitive
    (c) Neither reflexive nor transitive
    (d) None of the three

97. Which of the following function is inverse of itself:
    (a) $f(x) = 5^{\log x}$
    (b) $f(x) = 2^{x(x-1)}$
    (c) $f(x) = \frac{1-x}{1+x}$
    (d) None of the three

98. The trends in Production and Productivity of Rice for 6 years are given by following charts.

In which year highest increase in productivity was observed as compared to its previous year?
    (a) $2006 – 07$
    (b) $2007 – 08$
    (c) $2004 – 05$
    (d) $2005 – 06$

99. What day of the week was 18th April 1901?
    (a) Wednesday
    (b) Thursday
    (c) Monday
    (d) Tuesday

100. If 4 – digit numbers be formed using the digits 1, 2, 3, 4 and 5, such that no digit is used more than once is a number, then the number of such even numbers is:
    (a) 120
    (b) 24
    (c) 60
    (d) 48

101. The set of solution of an inequality $\left|x + \frac{1}{x}\right| > \frac{7}{4}$, is:
    (a) $x \in (-2, \infty)$
    (b) $x \in \left(-2, \frac{3}{2}\right)$
    (c) $x \in (-\infty, 2) \cup \left(\frac{5}{2}, \infty\right)$
    (d) $x \in (-\infty, -2) \cup \left(\frac{3}{2}, \infty\right)$

102. The eccentric angle of a point on the ellipse $\frac{x^2}{6} + \frac{y^2}{2} = 1$, whose distance from the center of the ellipse is 2, is
    (a) $\frac{7\pi}{6}$
    (b) $\frac{3\pi}{2}$
    (c) $\frac{5\pi}{3}$
    (d) $\frac{\pi}{4}$

103. If α is an nth root of unity, then
$1 + 2\alpha + 3\alpha^2 + \cdots + n\alpha^{n-1}$ equals :
(a) $\frac{-n}{1-\alpha}$
(b) $\frac{n}{1-\alpha}$
(c) None of these
(d) $\frac{-n}{(1-\alpha)^2}$

104. The area bounded by the straight lines $y = a$ and $\pm 2x + y = 2$, is
(a) 1 sq. units
(b) 2 sq. units
(c) $\frac{1}{2}$ sq. units
(d) $\frac{3}{2}$ sq. units

105. Let $A = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}$, where
$0 < \theta \le 2\pi$, then value of $|A|$ is
(a) $|A| \in [2, \infty)$
(b) $|A| \in [2, 4]$
(c) $|A| = 0$
(d) $0 < |A| < 4$

106. The argument of $\frac{1 - i\sqrt{3}}{1 + i\sqrt{3}}$ is:
(a) $\frac{4\pi}{6}$
(b) $\frac{4\pi}{3}$
(c) $\frac{\pi}{3}$
(d) $\frac{2\pi}{3}$

107. If a, b, c are in AP as well as in GP, then
(a) $a = b \ne c$
(b) $a \ne b \ne c$
(c) $a \ne b = c$
(d) $a = b = c$

108. Determine b satisfying $\log_{\sqrt{8}} b = 3\frac{1}{3}$:
(a) 24
(b) 32
(c) 16
(d) 40

109. The interval in which the function $y = \frac{x-1}{x^2 - 3x + 3}$ transform the real line is:
(a) $(-\infty, \infty)$
(b) $(0, \infty)$
(c) $[0, 1]$
(d) $\left[-\frac{1}{3}, 1\right]$

110. Look at this series : 1.5, 2.3, 3.1, 3.9, … what number should come next ?
(a) 4.2
(b) 4.4
(c) 4.7
(d) 5.1

111. If $x^2 + 4y^2 = 4xy$, then $x : y =$
(a) 1 : 1
(b) 1 : 4
(c) 2 : 1
(d) 1 : 2

112. The difference between compound interest and simple interest on Rs.8,000 at 5%
(a) Rs. 62
(b) Rs. 61
(c) Rs. 60
(d) Rs. 50

113. The price of an article is reduced by 25%. In order to retain the original price, the present price has to be increased by:
(a) 50%
(b) $33\frac{1}{3}\%$
(c) 25%
(d) 20%

114. The least positive integer n for which $\left(\frac{1+i}{1-i}\right)^n$ is real is:
(a) 2
(b) 6
(c) 8
(d) 4

115. Arrange the words given below in a meaningful sequence :
i. Presentation
ii. Recommendation
iii. Arrival
iv. Discussion
v. Introduction
(a) iii, v, iv, ii, i
(b) v, iii, i, ii, iv
(c) iii, v, i, iv, ii
(d) v, iii, iv, i, ii

116. The equation of lines passing through the intersection of lines $4x - 3y - 1 = 0$ and $2x - 5y + 3 = 0$ and equally inclined to the axes, are:
(a) $x = y ; x + y - 2 = 0$
(b) $x + y - 3 = 0; 2x + 3y = 0$
(c) $x + y + 3 = 0; x = y$
(d) $x + y + 3 = 0; x = y$

117. Compute
$\log_3 4 \log_4 5 \log_5 6 \log_6 7 \log_7 8 \log_8 9$
(a) 1
(b) 4
(c) 3
(d) 2

118. A table is bought for Rs.950 and sold at Rs.1140. Find the gain percentage:
(a) 30%
(b) 10%
(c) 25%
(d) 20%

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119. Given $f(x) = \log\left(\frac{1+x}{1-x}\right)$ and $g(x) = \frac{3x+x^3}{1+3x^2}$ then $fog(x)$ equals:

    (a) $-f(x)$ (b) None of these

    (c) $\{f(x)\}^3$ (d) $3f(x)$

120. On selling an article for $Rs. 48$, one loses 20%. In order to gain 20% what would be the selling price?

    (a) Rs.78   (b) Rs.76

    (c) Rs. 74   (d) Rs.72

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Answer Key

1. A	2. C	3. A	4. B	5. B
6. C	7. B	8. B	9. A	10. D
11. B	12. C	13. D	14. D	15. B
16. A	17. B	18. D	19. A	20. D
21. D	22. B	23. A	24. B	25. C
26. A	27. C	28. C	29. C	30. B
31. D	32. C	33. D	34. A	35. B
36. A	37. B	38. A	39. B	40. D
41. C	42. A	43. C	44. C	45. D
46. D	47. B	48. B	49. C	50. A
51. D	52. B	53. C	54. C	55. A
56. B	57. C	58. B	59. D	60. A
61. C	62. A	63. A	64. B	65. C
66. B	67. A	68. C	69. A	70. A
71. D	72. B	73. A	74. D	75. B
76. D	77. D	78. A	79. D	80. C
81. C	82. B	83. D	84. C	85. B
86. D	87. A	88. B	89. D	90. C
91. D	92. A	93. D	94. A	95. C
96. A	97. C	98. D	99. B	100. D
101. D	102. D	103. A	104. C	105. B
106. B	107. D	108. B	109. D	110. C
111. C	112. B	113. B	114. A	115. C
116. A	117. D	118. D	119. D	120. D