BHU MCA 2016 ACTUAL

1. Which of the following is true ?

(a) $\log(a \times b) = \log a \times \log b$

(b) $Log(a \times b) = \log a + \log b$

(c) $\log \frac{a}{b} = \log a + \log b$

(d) $\log a^b = \log a + \log b$

2. If $10^x = x^{50}$ then x is equal to :

(a) 100 (b) 200 (c) $\sqrt{10}$ (d) $\sqrt{5}$

3. The value of $7\log\frac{16}{15} + 5\log\frac{25}{24} + 3\log\frac{81}{80} +$ is equal to :

(a) log 2 (b) zero (c) unity (d) 0.2

4. The logarithms of $27 \times 4\sqrt{9} \times 3\sqrt{9}$ to the base 3 is :

(a) $8\frac{2}{3}$ (b) $4\frac{1}{6}$ (c) 4 (d) 3

5. If log z = 0.3010 and log3 = 0.4771, then the value of log 5 is :

(a) 0.7781 (b) 0.6990 (c) 0.3010 (d) 1.6990

6. If $a^x = b^y = c^z$ and $b^2 = ac$, then the value of $\frac{1}{x} + \frac{1}{z}$ is equal to : x

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

7. If a, b, c are positive numbers, then the value of

$\left(\frac{2^a}{2^b}\right)^{a+b} \cdot \left(\frac{2^b}{2^c}\right)^{b+c} \cdot \left(\frac{2^c}{2^a}\right)^{c+a}$ is

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

8. The value of $\left(\frac{x^l}{x^{-m}}\right)^{l-m} \left(\frac{x^m}{x^{-n}}\right)^{m-n} \left(\frac{x^n}{x^{-l}}\right)^{n-l}$ is equal to :

(a) 0 (b) – 1 (c) 1 (d) 2

9. If $\log\frac{125}{25} = x,$ the value of x is :

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

10. The value of $\log_2 8 + \log_4 8 + \log_{16} 8$ is equal to

(a) $\frac{21}{4}$ (b) 5 (c) 6 (d) 4

11. If a and b be real numbers and if a – b is negative, then we say :

(a) a < b (b) a > b

(c) a = 0, b = 0 (d) a = b = 1

12. The value of $\frac{1}{a} < \frac{1}{b}$ if :

(a) $a \neq 0, b \neq 0$ and $a < b$

(b) $a \neq 0, b \neq 0$ and $a > b$

(c) $a \neq 0, b = 0$ and $a < b$

(d) $a = 0, b \neq 0$ and $a > b$

13. The value of $a^x < a^y$, if

(a) $a < \frac{1}{a} < 1$ and $\frac{1}{x} > \frac{1}{y} > 0$

(b) $0 < \frac{1}{a} < 1$ and $\frac{1}{x} < \frac{1}{y} < 0$

(c) 0 < a < 1 and x > y > 0

(d) 0 > a > 1 and x < y < 0

14. The arithmetic mean of two positive quantities is greater than or equal to :

(a) Zero (b) Arithmetic mean

(c) Geometric mean (d) Harmonic mean

15. For all x > 0, the value of $x + \frac{1}{x}$ is :

(a) > 2 (b) ≤ 2 (c) ≥ 0 (d) ≤ 0

16. If n is a positive integer, then the value of $\frac{1}{n+1} + \frac{1}{n+2} + \frac{1}{n+3} + \ldots.. + \frac{1}{2n}$ is :

(a) > 0 (b) < 0 (c) $> -\frac{1}{2}$ (d) $> \frac{1}{2}$

17. If a, b, c > 0, then the value of $\frac{a}{b+c} + \frac{b}{c+a} + \frac{c}{a+b}$ is

(a) $\geq \frac{1}{2}$ (b) $\geq \frac{3}{2}$ (c) $\geq \frac{5}{2}$ (d) $\geq \frac{7}{2}$

18. If a > 0, b > 0, c > 0, then the value of (a + b + c) $\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$ is greater or equal to :

(a) 9 (b) 6 (c) 3 (d) 0

19. If a, b, c are in H.P. and n > 1, then the value of $a^n + c^n$ is greater than :

(a) $\frac{2}{b^n}$ (b) $\frac{1}{2}b^n$ (c) $2b^n$ (d) $\frac{3}{2}b^n$

20. If a, b, c are real numbers such that $a^3 + b^3 + c^3 = 1$, then the value of a.b + b.c + c.a is greater than :

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

21. If the column vectors of a square matrix A are linearly dependent, then :

(a) $|A| = 1$ (b) $|A| = \infty$

(c) $|A| \neq 0$ (d) $|A| = 0$

22. If A is non-singular matrix and so is matrix B, and if A and B are square matrices of the same order, then :

(a) AB is non-singular (b) AB is singular

(c) $(AB)^{-1} = A^{-1}B^{-1}$ (d) $(AB)^{-1}$ does not exist

23. A necessary and sufficient condition that a square matrix A possesses an inverse is that :

(a) A is not a null matrix (b) A is a null matrix

(c) $|A| \neq 0$ (d) $|A| = 0$

24. If A is 3×3 matrix whose rank is 2 and B is 3×3 matrix whose rank is 3, then rank of AB is :

(a) 1 (b) 2 (c) 3 (d) 5

25. The matrix $\begin{bmatrix} 0 & 5 & -2 \\ -5 & 0 & -7i \\ 2 & 7i & 0 \end{bmatrix}$ is

(a) Skew - Hermitian (b) Hermitian

(c) Skew - Symmetric (d) Symmetric

26. If $D_1 = \begin{vmatrix} 3 & 7 & 1 \\ -2 & 1 & 4 \\ 6 & -4 & 3 \end{vmatrix}$ and $D_2 = \begin{vmatrix} 3 & -2 & 6 \\ 7 & 1 & -4 \\ 1 & 4 & 3 \end{vmatrix}$, then

(a) $D_1 = 3D_2$ (b) $D_1 = -D_2$

(c) $D_1 = D_2$ (d) $3D_1 = D_2$

27. The determinant $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix}$ is divided by

(a) a + b (b) a b c (c) $1-abc$ (d) $1+abc$

28. The determinant $\begin{vmatrix} a^2+b^2 & ac+bd \\ ac+bd & c^2+d^2 \end{vmatrix}$ is equal to

(a) $\begin{vmatrix} a & b \\ c & d \end{vmatrix}^2$ (b) $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$ (c) $\begin{vmatrix} a & d \\ b & c \end{vmatrix}^2$ (d) $\begin{vmatrix} a & d \\ b & c \end{vmatrix}$

29. The value of determinant $\begin{vmatrix} x+\lambda & x & x \\ x & x+\lambda & x \\ x & x & x+\lambda \end{vmatrix}$ is equal to :

(a) 3λ (b) λ^2 (c) λ^3 (d) none

30. Let $A_1 = \begin{vmatrix} 3 & 7 & 4 \\ -2 & 1 & 5 \\ 6 & 18 & 3 \end{vmatrix}$ and $A_2 = \begin{vmatrix} 3 & 7 & 4 \\ -2 & 1 & 5 \\ 2 & 6 & 1 \end{vmatrix}$ then :

(a) $A_1 = A_2$ (b) $A_1 = -A_2$

(c) $A_1 = 2A_2$ (d) $A_1 = 3A_2$

31. If the n[th] term of a series is given by $\frac{3+n}{4}$, them the sum of 105 terms of this series is :

(a) 1470 (b) 1500 (c) 1570 (d) 1600

32. If m[th] term of an A.P. is n and its nth term is m, then its pth and (m + n)[th] terms of the series will be :

(a) $m-n+p, 0$ (b) m - n + p, 1

(c) m + n – p, 0 (d) m + n – p, 1

33. If the sums of p, q and r terms of A.P. series be a, b and c respectively, then the value of

$\frac{a}{p}(q-r)+\frac{b}{q}(r-p)+\frac{c}{r}(p-q)$ is equal to :

(a) 0 (b) 1 (c) -1 (d) 2

34. If the sum of three numbers in A.P. is 15 whereas sum of their squares is 83, then the numbers are :

(a) 2, 3, 4 (b) 3,.5, 7

(c) 1, 4, 9 (d) 4, 5, 6

35. If the sum of first three terms of a G.P. is to the sum of the first six terms as 125: 152, then the common ratio of the G.P. is :

(a) $-\frac{5}{7}$ (b) $\frac{5}{7}$ (c) $-\frac{3}{5}$ (d) $\frac{3}{5}$

36. If $x = 1+a+a^2+a^3+.................\infty (a<1)$

and $y = 1+b+b^2+b^3+.................\infty \ (b<1)$

then the value of $1+ab+a^2b^2+a^3b^3+.........\infty$

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

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

37. In a G.P., if the $(m+n)^{th}$ term be p and $(m-n)^{th}$ term be q, then its m^{th} term is :

(a) $\sqrt{\left(\frac{p}{q}\right)}$ (b) $\sqrt{(pq)}$

(c) $\sqrt{(p+q)}$ (d) $\sqrt{(p-q)}$

38. If the harmonic mean of two numbers is 4 and their arithmetical mean A and geometric mean G. satisfy the relation $2A + G^2 = 27$, then two numbers are :

(a) 6 and 3 (b) 7 and 4
(c) 5 and 2 (d) 9 and 5

39. If p^{th} term of H.P. is q r and q^{th} term is r p, then rth term is

(a) $\sqrt{pq}$ (b) pq (c) p + q (d) p – q

40. If a, b, c be in Arithmetical progression, b, c, a be in Harmonical progression, then c, a, b are in :

(a) Arithmetical progression
(b) Geometrical progression
(c) Arithmetical Geometric
(d) Harmonical progression

41. If ${}^nC_{r-1} = 36$, ${}^nC_r = 84$ and ${}^nC_{r+1} = 126$, then r is equal to :

(a) 0 (b) 1 (c) 2 (d) none

42. The coefficient x^4 in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$ is

(a) $\frac{405}{256}$ (b) $\frac{504}{259}$ (c) $\frac{450}{263}$ (d) $\frac{540}{256}$

43. The coefficient of y in the expansion of $\left(y^2 + \frac{c}{y}\right)^5$ is

(a) 20 c (b) 10 c (c) 10 c^3 (d) 20 c^3

44. The coefficient of x^p and x^q (p and q are positive integers) in the expansion of $(1+x)^{p+q}$ are :

(a) equal
(b) equal with opposite signs
(c) reciprocal to each other
(d) zero

45. Given positive integers i > 0, n > 2 and that the coefficients of $(3r)^{th}$ and $(r+2)^{th}$ terms in the binomial expansion of $(1+x)^{2n}$ are equal, then :

(a) n = 2r (b) n = 3r
(c) n = 2r + 1 (d) $n = 2r - r$

46. The term independent of x in the expansion of

$\left(\sqrt{\frac{x}{3}} + \frac{3}{2x^2}\right)^{10}$ is

(a) $-\frac{4}{5}$ (b) $\frac{5}{4}$ (c) $-\frac{5}{6}$ (d) $\frac{6}{5}$

47. If the coefficient of $(2r+1)^{th}$ term and $(r+2)^{th}$ term in the expansion of $(1+x)^{43}$ are equal, then the value of r is equal to :

(a) 3 (b) 6 (c) 10 (d) 14

48. If the coefficients of second, third and fourth terms in the expansion of $(1+x)^{2n}$ are in A.P., then :

(a) $n^2 - 7n + 9 = 0$ (b) $n^2 + 7n - 9 = 0$
(c) $2n^2 - 9n + 7 = 0$ (d) $2n^2 + 9n - 7 = 0$

49. The value of $C_1 + 2C_2 + 3C_3 + \ldots\ldots + nC_n$ is equal to :

(a) $n.2^{n+1}$ (b) $n.2^{n-1}$ (c) $3n.2^{n+1}$ (d) $3n.2^{n-1}$

50. The value of

$\frac{1}{1i\,(n-1)!} + \frac{1}{3i\,(n-3)!} + \frac{1}{5!(n-3)!} + \ldots$ is equal to

(a) $\frac{2^{n-1}}{n!}$ (b) $\frac{2^{n+1}}{n!}$ (c) $\frac{3^{n-1}}{(2n)!}$ (d) $\frac{3^{n+1}}{(3n)!}$

51. If ${}^{15}C_{3r} = {}^{15}C_{r-3}$, then the value of r is equal to :

(a) 0 (b) 3 (c) 6 (d) 9

52. If ${}^9P_5 + 5 \cdot {}^9P_4 = {}^{10}P_r$,, then the value of r is equal to :

(a) 2 (b) 3 (c) 4 (d) 5

53. The number of different permutations of the letters of the word BANANA is equal to :

(a) 15 (b) 30 (c) 45 (d) 60

54. The total number of 9 digit numbers which have all different digits is :

(a) 3265920 (b) 6345721
(c) 7534723 (d) 9437849

55. Eight chairs are numbered 1 to 8. Two women and three men wish to occupy one chair each. First the women choose the chairs from amongst the chairs marked 1 to 4; and then men select the chairs from amongst the remaining. The number of possible arrangements is :

(a) ${}^6C_3 \times {}^4C_2$ (b) ${}^4C_2 \times {}^4P_3$
(c) ${}^4P_2 \times {}^4P_3$ (d) ${}^4P_2 \times {}^6P_3$

56. The total number of permutations of n different things taken not more than r at a time, when each thing may be repeated any number of times is :

(a) $\frac{n^r(n-1)}{(n+1)}$ (b) $\frac{n^r(n+1)}{(n-1)}$

(c) $\frac{n(n^r-1)}{(n-1)}$ (d) $\frac{n^r-1}{n-1}$

57. Five balls of different colours are to be placed in three boxes of different sizes. Each box can hold all five balls. In how many different ways can we place the balls so that no box remains empty.
(a) 180 (b) 150 (c) 120 (d) 90

58. There are six students A, B, C, D, E, F. In how many ways can a commttee for four be formed so as to always include C but exclude D.
(a) 4 (b) 3 (c) 2 (d) 1

59. How many numbers can be formed by using all the digits 1, 2, 3, 4, 3, 2, 1 so that the odd digits always occupy the odd places.
(a) 6 (b) 12 (c) 18 (d) 23

60. From 6 gentleman and 4 ladies a committee of 5 is to be formed. In how many ways can this be done if the committee is to include at least one lady :
(a) 146 (b) 246 (c) 252 (d) 352

61. If α and β are the roots of $ax^2+bx+c=0$ then the equation whose roots are $\frac{1}{\alpha+\beta}, \frac{1}{\alpha}+\frac{1}{\beta}$ is
(a) $bcx^2+(b^2+ac)x+ab=0$
(b) $cax^2+(c^2+ba)x+bc=0$
(c) $abx^2+(a^2+cb)x+ca=0$
(d) $bcx^2+(b^2-ac)x-ab=0$

62. If $\alpha \neq \beta$, but $\alpha^2=5\alpha-3, \beta^2=5\beta-3$ then the equation whose roots are $\frac{\alpha}{\beta}$ and β/α is
(a) $x^2-15x-3=0$ (b) $3x^2+15x+3=0$
(c) $x^2+19x+3=0$ (d) $3x^2-19x+3=0$

63. If the coefficient of x in the quadratic 'equation' $x^2+px+q=0$ was taken as 17 in place of 13, its roots were found to be – 2 and – 15, then the roots of the original equation are :
(a) 9, 4 (b) 10, 3
(c) – 10, – 3 (d) – 9, – 4

64. If α be a root of the equation $4x^2 + 2x - 1 = 0$, then the other root is :
(a) $3\alpha^4-4\alpha$ (b) $4\alpha^3-3\alpha$
(c) $4\alpha^3+3\alpha$ (d) $3\alpha^3+4\alpha$

65. If be α, β be the roots of $ax^2 + 2bx + c = 0$ and , $\alpha+\delta, \beta+\delta$ be those of $Ax^2 + 2Bx + C = 0$, then :
(a) $\frac{b^2-ac}{B^2-AC}=\left(\frac{a}{A}\right)^2$ (b) $\frac{b^2+ac}{B^2+AC}=\left(\frac{A}{a}\right)^2$
(c) $\frac{C^2-BA}{c^2-ba}=\left(\frac{B}{b}\right)^2$ (d) $\frac{C^2+BA}{c^2+ba}=\left(\frac{B}{b}\right)^2$

66. If the roots of $px^2 + qx + 2 = 0$ are reciprocals of each other, then :
(a) p = 0 (b) p = – 2
(c) q = 0 (d) p = 2

67. If one root of the equation $ax^2 + bx + c = 0$ be square of the other, then :
(a) $c^3 + ba^2 + b^2a = 3abc$ (b) $b^3 + ac^2 + a^2c = 3abc$
(c) $a^3 + cb^2 + c^2b = 3abc$ (d) $b^3 - ac^2 + a^2c = -3abc$

68. If the sum of the roots of the equation $ax^2 + bx + c = 0$ is equal to sum of the squares of their reciprocals, then bc^2, ca^2 , ab^2 are in :
(a) Arithmetical Progression
(b) Geometrical Progression
(c) Arithmetical Geometrical series
(d) Harmonica) Progression

69. If the ratio of the roots of the equation $lx^2 + nx + n = 0$ be p : q, then :
(a) $(p+q+nl)=\sqrt{(pq)}$
(b) $\sqrt{\left(\frac{p}{n}\right)}+\sqrt{\left(\frac{q}{l}\right)}+\sqrt{(nl)}=0$
(c) $\sqrt{\left(\frac{p}{q}\right)}+\sqrt{\left(\frac{q}{p}\right)}+\sqrt{\left(\frac{n}{l}\right)}=0$
(d) $\sqrt{(p)}+\sqrt{(q)}+\sqrt{(nl)}=0$

70. If p, q, r are real and $p \neq q$, then the roots of the equation $(P - q) x^2 -5 (p + q) x - 2 (p - q) = 0$ are :
(a) Real and equal (b) Complex and equal
(c) Real and unequal (d) Complex and unequal

71. If the relations is a function, then determine its domain and range :
(a) Domain = {1, 2, 3}, Range = {2}
(b) Domain = {1, 2, 3}, Range = {3}
(c) Domain = {1, 2}, Range = {3}
(d) none of these

72. If A and B are two non-empty sets such that A x B = B × A, then :
(a) A = 0 (b) B = 0 (c) $A \neq B$ (d) A = B

73. If R be the relation on the set N of natural numbers defined by a + 3b = 12, then R is equal to :
(a) {(1, 9), (2, 6), (3, 1)} (b) {(9, 1), (6, 2), (3, 3)}
(c) {(1, 9), (6, 3)} (d) {(6, 2), (3, 1)}

74. If A = {x, y, z} and B = {1,2}, then the number of relations from A into B is :
(a) 16 (b) 27 (c) 64 (d) 81

75. If a function f : $A \to B$ which is both one-to-one and onto, then it is called as a :
(a) Linear function (b) Surjective function
(c) Injective fUnction (d) Bijective function

76. Put the following $\left(\frac{1}{1-2i}+\frac{3}{1+i}\right)\left(\frac{3+4i}{2-4i}\right)$ the form A + i B
(a) $\frac{1}{4}+\frac{9}{4}i$ (b) $\frac{1}{4}-\frac{9}{4}i$
(c) $\frac{1}{5}+\frac{7}{5}i$ (d) $\frac{1}{5}-\frac{7}{5}i$

77. The square root of the complex number – 8 – 6i is :
(a) $\pm(3+4i)$ (b) $\pm(3-4i)$
(c) $\pm(4+3i)$ (d) none

78. Put the number $\frac{1+7i}{(2-i)^2}$ in trigonometrical form, that is, in the form $r(\cos\theta+i\sin\theta)$, where r is a positive real number and $-\pi<\theta\le\pi$.
(a) $\sqrt{2}\left(\cos\frac{3\pi}{4}-i\sin\frac{3\pi}{4}\right)$
(b) $\sqrt{3}\left(\cos\frac{\pi}{4}-i\sin\frac{\pi}{4}\right)$
(c) $\sqrt{2}\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right)$
(d) $\sqrt{3}\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right)$

79. The real values of x and y for which the equations
$\frac{(1+i)x-2i}{3+i}+\frac{(2-3i)y+i}{3-i}=i$ are satisfied, are :
(a) $x=3, y=-1$ (b) $x=-1, y=3$
(c) $x=5, y=-2$ (d) $x=-2, y=5$

80. If $1, \omega, \omega^2$ are the three cube roots of unity, then the value of $(1-\omega+\omega^2)^5+(1+\omega-\omega^2)^5$ is equal to :
(a) 4 (b) 8 (c) 16 (d) 32

81. If x = a + b, y = aα + bβ and z = aβ + bα, where α and β are complex cube roots of unity, then the value of $a^3 + b^3$ is equal to :
(a) x y z (b) $\frac{xy}{z}$ (c) $\frac{yz}{x}$ (d) $\frac{zx}{y}$

82. If the complex numbers z_1, z_2 and z_3 be the vertices of an equilateral triangle and z_0 be the circumference of the triangle, then the value of
$z_1^2+z_2^2+z_3^2$ is equal to :
(a) z_0^2 (b) $2z_0^2$ (c) $3z_0^2$ (d) $4z_0^2$

83. The equation of the straight line passing through the point of intersection of 3x + y + 4 = 0, 3x - 5y +34 = 0 and perpendicular to the line 2x + 3y – 11 = 0 is :
(a) 9x + 7y – 17 = 0 (b) 4x+ 5y + 8 = 0
(c) 3x – 4y + 1 = 0 (d) 3x – 2y + 19 = 0

84. The point of intersection of the straight line given by equation $3y^2 - 8xy - 3x^2 - 29x + 3y - 18 = 0$ is :
(a) (-1, 1) (b) (1, -1)
(c) (2, 1) (d) $\left(-\frac{3}{2}, -\frac{5}{2}\right)$

85. The equation of the circle passing through (-1,2) and concentric with $x^2 + y^2 - 2x - 4y - 4 = 0$ is :
(a) $x^2 + y^2 - 2x - 4y + 1 = 0$
(b) $x^2 + y^2 - 2x - 4y + 2 = 0$
(c) $x^2 + y^2 - 2x - 4y + 4 = 0$
(d) $x^2 + y^2 - 2x - 4y + 8 = 0$

86. The radius of the circle on which the four points of intersection of the lines (2x – y + 1) (x – 2y + 3) = 0 with the axis lie, is :
(a) 5 (b) $\frac{5}{\sqrt{2}}$ (c) $\frac{5}{2\sqrt{2}}$ (d) $\frac{5}{4\sqrt{2}}$

87. The focal distance of any point P (x_1, y_1) on the parabola $y^2 = 4ax$ is equal to :
(a) $x_1 + y_1$ (b) $x_1 y_1$ (c) $a x_1$ (d) $a + x_1$

88. If PQ be a double ordinate of a parabola, the locus of its points of trisection is :
(a) $y^2=\frac{1}{3}ax$ (b) $y^2=\frac{2}{3}ax$
(c) $y^2=\frac{1}{9}ax$ (d) $y^2=\frac{4}{9}ax$

89. The locus of the middle points of chords of the ellipse - $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, which are drawn through the positive end of the minor axis is :
(a) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{x}{a}$ (b) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{y}{b}$

(c) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{x}{b}$ (d) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{y}{a}$

90. The line y = mx + c touches the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, if c is equal to :

(a) $\pm\sqrt{(a^2-m^2b^2)}$ (b) $\pm\sqrt{(a^2+m^2b^2)}$

(c) $\pm\sqrt{(a^2m^2-b^2)}$ (d) $\pm\sqrt{(a^2m^2+b^2)}$

91. If f (x) , $f(x)=\sqrt{\left(\frac{x-\sin x}{x+\cos^2 x}\right)}$, then $\lim_{x\to\infty} f(x)$

(a) 0 (b) ∞ (c) 1 (d) –1

92. For a real number y, let [y] denote the greatest integer less than or equal to y. Then

$f(x)=\frac{\tan\pi\,|x-\pi|}{1+[x]^2}$ is

(a) discontinuous at some x,
(b) continuous at all x, but the derivative f '(x) does not exists for some x,
(c) f '(x) exists for all x but second derivative f "(x) does not exist.
(d) f '(x) exists for all x.

93. A cone is circumscirbed to a sphere of radius r. When the volume of the cone is minimum, its altitude is :

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

94. The value of $\int e^x\left(\frac{1+x\log x}{x}\right)dx$ is equal to :

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

95. The value of $\int_0^{\pi/4}\sin^4 x\cos^2 x\,dx$ is equal to :

(a) $\frac{\pi}{12}$ (b) $\frac{\pi}{16}$ (c) $\frac{\pi}{24}$ (d) $\frac{\pi}{32}$

96. The area under the curve y = sin x between x = 0 and x = π is:

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

97. The probability that at least one of the events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.2, then P($\overline{A}$) + P($\overline{B}$) is :

(a) 0.4 (b) 0.8 (c) 1.2 (d) 1.4

(Here $\overline{A}$ and $\overline{B}$ are complements of A and B respectively)

98. The probability that a card drawn out of a packet of 52 is of diamond is :

(a) $\frac{1}{4}$ (b) $\frac{1}{13}$ (c) $\frac{1}{52}$ (d) 1

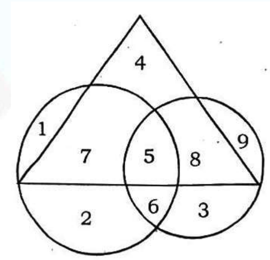
99. A the is tossed twice. The probability of 'a number greater than 4 on each toss' is :

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{9}$ (d) $\frac{1}{12}$

100. A bag contains 5 red and 4 green balls. If three bags are selected at random from the bag, the probability that they are of same colour is :

(a) $\frac{1}{2}$ (b) $\frac{1}{6}$ (c) $\frac{2}{9}$ (d) $\frac{1}{3}$

Directions : Question No. 101 to 106. These questions are based on the following diagram in which the triangle represents female graduates. Small circle rpresents self - employed females and the big circle represents self employed females with bank loan facility. Numbers are shown in the different sections of the diagram. On basis of these numbers, answer the following questions :



101. How many self-employed female graduates are with bank loan facility ?
(a) 5 (b) 12 (c) 20 (d) 7

102. How many non-graduate self-employed females are with bank loan facility ?
(a) 3 (b) 8 (c) 9 (d) 12

103. How many female graduates are not self-employed ?
(a) 4 (b) 10 (c) 12 (d) 15

104. How many female graduates are self-employed ?
(a) 12 (b) 13 (c) 20 (d) 15

105. How many non-graduate females are self-employed ?
(a) 11 (b) 12 (c) 9 (d) 21

106. In a survey, 30% of the people surveyed owned a cellular telephone and 75% owned a personal computer. If 25% owned both a cellular telephone and a personal computer, the percentage of people who owned a cellular telephone or a personal computer or both is :
(a) 60% (b) 80% (c) 70% (d) 75%

Directions Questions No.107 to 111. Data on the candidates, who took an examination in Social Sciences, Mathematics and Science are given below :

Passed in all subjects	167
Failed in all subjects	60
Failed in Social Sciences	175
Failed in Mathematics	199
Failed in Science	191
Passed in Social Science only	62
Passed in Mathematics only	48
Passed in Science only	52

Answer the following questions based on above data :

107. How many failed in one subject only ?
(a) 56 (b) 61 (c) 144 (d) 152

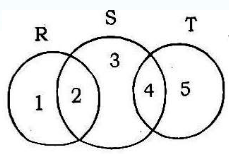
108. How many failed in two subject only ?
(a) 56 (b) 61 (c) 144 (d) 162

109. How many failed in Social Sciences only ?
(a) 15 (b) 21 (c) 30 (d) 42

110. How many passed at least in one subject ?
(a) 167 (b) 304 (c) 390 (d) 450

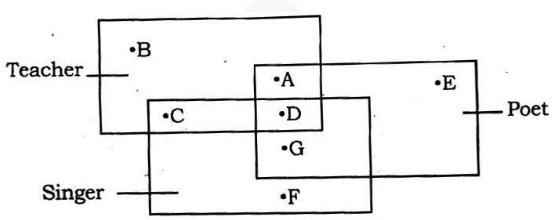
111. How many passed in Mathematics and at least in one more subject ?
(a) 94 (b) 170 (c) 203 (d) 210

112. In the following diagram, R represents businessmen, S represents rich men, T represents honest men. Which number will represent honest rich men ?



(a) 2 (b) 3 (c) 5 (d). 4

Directions : Question No. 113 to 116. In the following figure, there are given some rectangles which represent. The particular qualities. Read the questions and find out the appropriate answer from the figure.



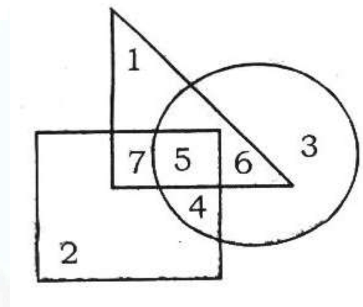
113. The teacher who is neither a singer nor a poet is :
(a) A (b) B (c) D (d) G

114. The teacher who is a singer but not a poet is :
(a) A (b) B (c) C (d) D

115. The teacher, who is singer and poet both is :
(a) A (b) B (c) C (d) D

116. The poet, who is neither a singer nor a teacher is :
(a) D (b) E (c) G (d) A

Directions : Questions No. 117 to 119. These questions are based on the diagram given below. In the diagram, the triangle stands for graduates, square for membership of professional organisations and the circle for membership of social organisations. Read each statement and find out appropriate numbers to represent the people covered by statement.

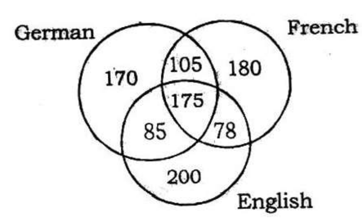


117. Number of graduates in social organisations is represented by :
(a) 1 (b) 5 (c) 6 (d) 5 and 6

118. Number of graduates in social organisations only, is represented by :
(a) 3 (b) 4 (c) 5 (d) 6

119. Number of graduates in professional organisation is represented by :
(a) 5 and 7 (b) 4, 5 and 6
(c) 6 and 7 (d) 5, 6 and 7

120. A survey was conducted on a sample of 1000 persons with reference to their knowledge of English, French and German. The result is presented in the Venn diagram. The ratio of the number of persons who do not know the three languages to those who know all the three languages is :



(a) $\frac{1}{27}$ (b) $\frac{1}{25}$ (c) $\frac{7}{550}$ (d) $\frac{175}{1000}$

ANSWER KEY (BHU MCA ACTUAL 2016)

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