IIT – JEE: 2019 | **TW TEST (3 YRS.)** | **DATE: 19/10/18**

TIME: 1 Hr. | **TOPIC: ALGEBRA** | **MARKS: 360**

SECTION-I (SINGLE ANSWER CORRECT TYPE)

This section contains **30 Multiple choice questions.** Each question has 4 choices (1), (2), (3) and (4) for its answer, out which **ONLY ONE** is correct. **(+4, –1)**

1. $11^3 - 10^3 + 9^3 - 8^3 + ... + 1^3$ is

(1) 756 (2) 724 (3) 648 (4) 812

2. If $a^2 + b^2 + c^2 = 1$ interval in which $ab + bc + ca$ lie in

(1) [0, 2) (2) $\left[-\frac{1}{2}, 1\right]$ (3) [1, 2] (4) $(0, \infty)$

3. The equation $|z - i| + |z + i| = k,\ k > 0,$ can represents an ellipse if k is greater than

(1) 1 (2) 2 (3) 4 (4) None of these

4. The least positive integer '*n*' for which $\left(\frac{1+i}{1-i}\right)^n = \frac{2}{\pi} \cdot \sin^{-1}\left(\frac{1+x^2}{2x}\right)$ and $x > 0$ is

(1) 8 (2) 16 (3) 4 (4) 2

5. If $z = 4 + 3\sqrt{20}i$ then the values of $\left(\sqrt{z} + \sqrt{\bar{z}}\right)^4$ and $\left(\sqrt{z} - \sqrt{\bar{z}}\right)^4$ is (are)

(1) 1296, 400 (2) 72, 16 (3) 36, 9 (4) 216, 25

6. If $x^3 + ax + 1 = 0$ and $x^4 + ax^2 + 1 = 0$ have common root then '*a*' is

(1) –2 (2) –1 (3) 1 (4) 2

7. If α, β are roots of $ax^2 + c = bx$ then the equation $(a + cy)^2 = b^2 y$ has roots

(1) $\frac{1}{\alpha}, \frac{1}{\beta}$ (2) α^2, β^2 (3) $\frac{\alpha}{\beta}, \frac{\beta}{\alpha}$ (4) $\frac{1}{\alpha^2}, \frac{1}{\beta^2}$

8. The number of solutions of $|[x] - 2x| = 4$ where $[.]$ denotes gen ….. integers $\le x$ is

(1) Infinitely many (2) 4 (3) 3 (4) 2

9. If $s = \sum_{n=1}^{99} \frac{5^{100}}{(25)^n + 5^{100}}$, then the value of $[s] = ...$ (when $[.]$ is G.T.F)

(1) 49 (2) 50 (3) 49.50 (5) 0

10. If $\text{Im}\left(\frac{az+z_1}{bz+z_2}\right)=1$ (z_1, z_2, z_3 are complex numbers and $a, b \in R$). Then z lie on

(1) circle (2) straight line (3) ellipse (4)parabola

11. If z_1 and $\overline{z}_2$ represent adjacent vertices of a regular polygon of 'n' sides whose center is origin and $\frac{\text{Im}|z_1|}{\text{Re}|z_1|}=\sqrt{2}-1$. Then number of diagonals in the polygon are

(1) 18 (2) 22 (3) 14 (4) 20

12. If $|z|=\min\{|z-1|, |z+1|\}$

(1) $|z+\overline{z}_1|=\frac{1}{2}$ (2) $z+\overline{z}=1$ (3) $|z+\overline{z}|=1$ (4) $z-\overline{z}=5$

13. $\alpha_0, \alpha_1, \alpha_2, ...\alpha_{n-1}$ are 'n' n^{th} root of unity then $\sum_{i=0}^{n-1}\frac{\alpha_i}{3-\alpha_i}$ is

(1) $\frac{n}{3^n-1}$ (2) $\frac{n-1}{3^n-1}$ (3) $\frac{n+1}{3^n-1}$ (4) $\frac{n+2}{3^n-1}$

14. The real values of 'a' for which the sum of the squares of roots of $x^2-(a-2)x-a-1=0$ assumes least value is

(1) 0 (2) 1 (3) 2 (4) 3

15. If $|z-1|+|z+3|\le 8$ then range of values of $|z-4|$ where $z=z+iy, x, y \in R$ and $i=\sqrt{-1}$ is

(1) (0, 7) (2) (1, 8) (3) [1, 9] (4) [2, 5]

16. If $x \in R$ then maximum value of $y=2|a-x|\left(x+\sqrt{x^2+b^2}\right)$ is

(1) a^2+b^2 (2) a^2 (3) $\sqrt{a^2+b^2}$ (4) $a\sqrt{a^2+b^2}$

17. If α, β, γ such that $\alpha+\beta+\gamma=2; \alpha^2+\beta^2+\gamma^2=6; \alpha^3+\beta^3+\gamma^3=8$ then $\alpha^4+\beta^4+\gamma^4$ is

(1) 5 (2) 18 (3) 12 (4) 36

18. The number of integral roots of $x^4+\sqrt{x^4+20}=22$

(1) 0 (2) 2 (3) 4 (4) 1

19. If $ax+by=1$ and $cx^2+dy^2=1$ has only one solution then

(1) $\frac{a^2}{c}+\frac{b^2}{d}=1$ (2) $x=a$ (3) $y=d$ (4) $x=y=a$

20. Let α, β roots of $x^2-4x+A=0$ and γ, δ are roots of $x^2-36x+B=0$. If $\alpha, \beta, \gamma, \delta$ forms an increasing G.P. then

(1) $\frac{B}{A}=81$ (2) $B=3$ (3) $A=\frac{1}{27}$ (4) $A+B=\frac{82}{27}$

21. Let A, B are two $n \times n$ matrices such that $A + B = AB$ then

(1) $AB = I_n$ (2) $A = I_n$ or $B = I_n$ (3) $AB = BA$ (4) $A = 0$ and $B = 0$ only

22. $\begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix} \begin{pmatrix} 1 & 2 & -1 \end{pmatrix}$ is

(1) not defined (2) (– 1) (3) $\begin{pmatrix} 1 \\ 4 \\ 1 \end{pmatrix}$ (4) Not invertible

23. $A = \begin{pmatrix} \alpha & 2 \\ 2 & \alpha \end{pmatrix}$ and $|A^3| = 125$ then α is

(1) ± 3 (2) ± 2 (3) 0 (4) ± 5

24. $p = \begin{pmatrix} \cos 30^o & \sin 30^o \\ -\sin 30^o & \cos 30^o \end{pmatrix}$, $A = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$ and $Q = PAP^T$ then $P^T Q^{2017} P$ is

(1) $\begin{pmatrix} 1 & 2017 \\ 0 & 1 \end{pmatrix}$ (2) $\begin{pmatrix} \frac{\sqrt{3}}{2} & 2017 \\ 0 & 1 \end{pmatrix}$ (3) $\begin{pmatrix} 1 & \frac{\sqrt{3}}{2} \\ 0 & 2017 \end{pmatrix}$ (4) $\begin{pmatrix} \frac{\sqrt{3}}{2} & -\frac{1}{2} \\ 1 & 2017 \end{pmatrix}$

25. The number of values of 'k' for which $(k+1)x + 8y = 4k;\ kx + (k+3)y = 3k - 1$ has no solution is

(1) 0 (2) 3 (3) 2 (4) Infinitely many

26. Let $\omega = \frac{-1 + i\sqrt{3}}{2}$ then $\Delta = \begin{vmatrix} 1 & 1 & 1 \\ 1 & -1-\omega^2 & \omega^2 \\ 1 & \omega^2 & \omega \end{vmatrix}$ is

(1) 3ω (2) $3\omega(1-\omega)$ (3) $3\omega^2$ (4) $3\omega(\omega - 1)$

27. If a, b, c are all different from zero and $\Delta = \begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$ is zero then $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$ is

(1) – 1 (2) $a + b + c$ (3) 0 (4) $-(a + b + c)$

28. If $\log 2, \log(2^x - 1), \log(2^x + 3)$ are in A.P. then x is

(1) $\frac{5}{2}$ (2) $\log\frac{5}{2}$ (3) $\log\frac{2}{3}$ (4) $\frac{2}{3}$

29. Sum of $\frac{1}{3}, \frac{1}{15}, \frac{1}{35}, \frac{1}{63}, ...2n$ terms is

(1) $\frac{1}{2n+1}$ (2) $\frac{1}{n+1}$ (3) $\frac{n}{2n+1}$ (4) $\frac{1}{2n-1}$

30. If a, b, c are there positive real numbers minimum value of $\frac{b+c}{a}+\frac{c+a}{b}+\frac{a+b}{c}$ is

(1) 1 (2) 2 (3) 3 (4) 6

31. A class contains 4 boys and *g* girls. Every Sunday five students including at least three boys go for a picnic, a different group being sent every week. During, the picnic class teacher gives each girl in the group a doll. If the total number of dolls distributed was 85, then value of *g* is

(1) 15 (2) 12 (3) 8 (4) 5

32. Let $a=\sum_{i<j}\left(\frac{1}{{}^nC_i}+\frac{1}{{}^nC_j}\right)$ and $b=\sum_{i<j}\left(\frac{i}{{}^nC_i}+\frac{j}{{}^nC_j}\right)$, then

(1) $b=(n-1)a$ (2) $b=(n+1)a$ (3) $b=\frac{n}{2}a$ (4) $b=na$

33. In a certain test there are *n* question. In this test 2^k students gave wrong answers to at least $(n-k)$ questions, where $k = 0, 1, 2, \ldots, n$. If the total number of wrong answers is 4095, then value of *n* is

(1) 11 (2) 12 (3) 13 (4) 15

34. Five distinct letters are to be transmitted through a communication channel. A total number of 15 blanks is to be inserted between the two letters with at least three between every two. The number of ways in which this can be done is

(1) 1200 (2) 1800 (3) 2400 (4) 3000

35. There are *P* copies of *n* different books. The number of different ways in which a non-empty selection can be made from them, is :

(1) $(p+1)^n-1$ (2) p^n-1 (3) $(p+1)^{n-1}-1$ (4) $(p+1)^n$

36. Two straight lines intersect at a point *O*. Points $A_1, A_2, \ldots\ldots, A_n$ are taken on one line and points $B_1, B_2, \ldots, B_n$ on the other. If the point *O* is not to be used, the number of triangles that can be drawn using these points as vertices, is

(1) $n(n-1)$ (2) $n(n-1)^2$ (3) $n^2(n-1)$ (4) $n^2(n-1)^2$

37. There are three papers of 100 marks each in an examination. Then the no. of ways can a student get 150 marks such that gets at least 60% in two papers

(1) ${}^3C_2\times{}^{32}C_2$ (2) ${}^3C_4\times{}^{32}C_2$ (3) ${}^3C_4\times{}^{36}C_2$ (4) ${}^3C_4\times{}^{36}C_3$

38. If *N* is the number of positive integral solution of $x_1x_2x_3x_4=770$. Then

(1) *N* is 250 (2) *N* is 252 (3) *N* is 254 (4) *N* is 256

39. The sum $1\cdot{}^{20}C_1-2\cdot{}^{20}C_2+3\cdot{}^{20}C_3-\ldots\ldots-20\cdot{}^{20}C_{20}$ is equal to

(1) 2^{19} (2) 0 (3) 2^{20} -1 (4) 2^{20}

40. When 5^{99} is divided by 13, the remainder is

(1) 8 (2) 9 (3) 10 (4) 7

41. Let $n \in N$ and $n = \left(\sqrt{2}+1\right)^6$. Then the integer just greater than n is

(1) 199 (2) 198 (3) 197 (4) 196

42. Given that the 4th term in the expansion of $\left(2+\frac{3x}{8}\right)^{10}$ has the maximum numerical value, then x can lie anywhere in the interval

(1) $\left(2, \frac{64}{21}\right)$ (2) $\left(-\frac{60}{23}, -2\right)$ (3) $\left(-\frac{64}{21}, 5\right)$ (4) $\left(2, -\frac{100}{21}\right)$

43. If $\left(x^{2016}+x^{2008}+2\right)^{2010} = a_0 + a_1x + a_2x^2 + ... + a_nx^n$ the value of $a_0 - \frac{1}{2}a_1 - \frac{1}{2}a_2 + a_3 - \frac{1}{2}a_4 - \frac{1}{2}a_5 + a_6 + ...$ is

(1) Less than two (2) less than zero (3) equal to zero (4) greater than two

44. The expression $C_0 + 2C_1 + 3C_2 + ... + (n+1)C_n$ is equal to

(1) 2^{n-1} (2) $n\left(2^{n-1}\right)$ (3) $n\left(2^{n-1}\right)+2^n$ (4) $(n+1)2^n$

45. If $\sum_{r=1}^{n} r(r+1)\frac{C_r}{C_{r-1}} = 77$, then n equals

(1) 5 (2) 6 (3) 7 (4) 11

46. If n is an odd natural number, then number of zeros at the end of $99^n + 1$ is

(1) 2 (2) n (3) $2n$ (4) $3n$

47. If three successive coefficient in the expansion of $(1+x)^n$ are in A.P. then $n+2$ is

(1) At least 19 (2) At most 19 (3) A perfect square (4) A perfect cube

48. If the number $(z-1)/(z+1)$ is purely imaginary, then

(1) $|z|=1$ (2) $|z|>1$ (3) $|z|<1$ (4) $|z|>2$

49. In a hurdle race, a runner has probability p of jumping over a specific hurdle. Given that in 5 trials, the runner succeeded 3 times, the conditional probability that the runner had succeeded in the first trial is

(1) $\frac{3}{5}$ (2) $\frac{2}{5}$ (3) $\frac{1}{5}$ (4) $\frac{4}{5}$

50. Three numbers are chosen at random without replacement from {1, 2, … 15}. Let E_1 be the event that minimum of the chosen numbers is 5 and E_2 their maximum is 10 then which of the following is not true?

(1) $p(E_1) = \frac{9}{91}$ (2) $p(E_2) = \frac{36}{455}$

(3) $p(E_1 \cap E_2) = \frac{4}{455}$ (4) $p\left(\frac{E_1}{E_2}\right) = \frac{1}{8}$

51. If X follows a binomial distribution with parameters $n = 8$ and $p = \frac{1}{2}$, then $p\left(\left|X-4\right| \le 2\right)$ equal

(1) $\frac{118}{128}$ (2) $\frac{119}{128}$ (3) $\frac{117}{128}$ (4) $\frac{113}{128}$

52. The mean of the data set comprising of 16 observations is 16. If one of the observation valued 16 is deleted and three new observations valued 3, 4, 5 are added to the data, then the mean of the resultant data is

(1) 16.8 (2) 16.0 (3) 15.8 (4) 14.0

53. The negation of $\sim s \vee (\sim r \wedge s)$ is equivalent to

(1) $s \wedge \sim r$ (2) $s \wedge (r \wedge \sim s)$ (3) $s \vee (r \vee \sim s)$ (4) $s \wedge r$

54. An ordinary dice is rolled a certain number of times the probability getting an odd number 2 times is equal to the probability of getting an even number three times then the probability of getting an odd number odd number of times is

(1) $\frac{1}{32}$ (2) $\frac{5}{16}$ (3) $\frac{1}{2}$ (4) $\frac{1}{4}$

55. If the angles of elevation of the top of a tower from three collinear points A, B and C, on a line leading to the foot of the tower, are 300, 450 and 600 respectively, then the ratio, $AB : BC$ is

(1) $\sqrt{3}:1$ (2) $\sqrt{3}:\sqrt{2}$ (3) $1:\sqrt{3}$ (4) $2:3$

56. If $A\begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then which one of the following holds for all $n \ge 1$, by the principal of mathematical induction

(1) $A^n = nA - (n-1)I$ (2) $A^n = 2^{n-1}A - (n-1)I$

(3) $A^n = nA + (n-1)I$ (4) $A^n = 2^{n-1}A + (n-1)I$

57. If $y = x - \frac{x^2}{2} + \frac{x^3}{3} - ....$, y then x is equal to

(1) $\log(1+y)$ (2) e^y (3) $y + \frac{y^2}{2!} + \frac{y^3}{3!} - ...$ (4) $e^{-y} - 1$

58. The sum and product of the mean and variance of binomial distribution are 24 and 128 respectively. The distribution is :

(1) $\left(\frac{1}{7}+\frac{1}{8}\right)^{12}$ (2) $\left(\frac{1}{4}+\frac{3}{4}\right)^{16}$ (3) $\left(\frac{1}{6}+\frac{5}{6}\right)^{24}$ (4) $\left(\frac{1}{2}+\frac{1}{2}\right)^{32}$

59. The median of the following items 25, 15, 23, 40, 27, 25, 23, 25 and 20 is

(1) 27 (2) 40 (3) 25 (4) 23

60. The mean and S.D. of 63 children on an arithmetic test are respectively 27.6 and 7.1. To them are added a new group of 26 who had less training and whose mean is 19.2 and S.D.6.2. The values of the combined group for (i) the mean and (ii) the S.D. is

(1) 25.1, 7.8 (2) 2.3, 0.8 (3) 1.5, 0.9 (4) 25.9, 7.7

61. If $\vec{a}=x\hat{i}+y\hat{j}+2\hat{k},\ \vec{b}=\hat{i}-\hat{j}+\hat{k}, \vec{c}=\hat{i}+2\hat{j}, \left(\vec{a}\wedge\vec{b}\right)=\frac{\pi}{2}$ and $\vec{a}\cdot\vec{c}=4$, then

(1) $\left[\vec{a}\ \ \vec{b}\ \ \vec{c}\right]^2=|\vec{a}|$ (2) $\left[\vec{a}\ \ \vec{b}\ \ \vec{c}\right]=|\vec{a}|$

(3) $\left[\vec{a}\ \ \vec{b}\ \ \vec{c}\right]=0$ (4) $\left[\vec{a}\ \ \vec{b}\ \ \vec{c}\right]=|\vec{a}|^2$

62. The value of m for which the straight line $2x-3y+4=0=x-4y+4z+5$ is parallel to the plane $2x-y+mz-2=0$ is

(1) 3 (2) 2 (3) $\frac{-16}{5}$ (4) – 4

63. A line L passing through the point $P(0,1,-1)$ and is perpendicular to both the lines $\frac{x-2}{2}=\frac{y-4}{1}=\frac{z+2}{4}$ and $\frac{x+2}{3}=\frac{y+4}{2}=\frac{z-1}{-2}$. If the position vector of point Q on L is (a, b, c) such that $(PQ)^2=357$, then $a+2b+3c$ is equal to

(1) 26 (2) 24 (3) – 24 (4) 7

64. Let O be the interior point of ΔABC such that $3\overrightarrow{OA}+4\overrightarrow{OB}+4\overrightarrow{OC}=0$, then $\frac{\text{Area of }\Delta ABC}{\text{Area of }\Delta AOB}$ is equal to

(1) $\frac{13}{7}$ (2) $\frac{13}{6}$ (3) $\frac{8}{7}$ (4) $\frac{7}{13}$

65. If $\vec{a}=3\hat{i}+2\hat{j}+3\hat{k}$ and $\vec{b}=2\hat{i}-3\hat{j}-3\hat{k}$ then the vector $\left(\hat{a}\times\hat{b}\right)\times\left(\hat{a}+\hat{b}\right)$ is collinear to the vector

(1) $4\hat{i}+\hat{j}+4\hat{k}$ (2) $\hat{i}+5\hat{j}+6\hat{k}$ (3) $5\hat{i}+4\hat{j}+5\hat{k}$ (4) $5\hat{i}+5\hat{k}$

66. If $\vec{a},\vec{b}$ and $\vec{c}$ are three non-zero non-coplanar vectors and $\vec{x}=\vec{a}+2\vec{b}-\vec{c},\ \vec{y}=\vec{a}-2\vec{b}-2\vec{c}$ and $\vec{z}=\vec{a}-4\vec{b}+2\vec{c}$ are three vectors such that volume of the parallelopiped formed by $\vec{a},\vec{b},\vec{c}$ and $\vec{x},\vec{y},\vec{z}$ as their coterminous edges are v_1 and v_2 respectively. Then $\frac{v_2}{v_1}$ is

(1) 10 (2) 15 (3) 18 (4) None of these

67. If $\sum_{k=0}^{100}\left(\frac{k}{k+1}\right){}^{100}C_k=\frac{x\left(2^{100}\right)+y}{z}$ where $x, y, z\in N$ then least value of xy^2z is equal to

(1) 9999 (2) 1010 (3) 9090 (4) None of these

68. A two digit positive number is selected at random then the probability that its tens digit is at least four more than its unit digit, is

(1) $\frac{1}{6}$ (2) $\frac{7}{30}$ (3) $\frac{14}{45}$ (4) None of these

69. Consider the system of equations $\alpha x-y+x=\alpha;\ x-\alpha y+z=1; x-y+\alpha z=1$. If L, M and N denotes the number of integral values of α in interval [–5, 7] for which the system of equation has unique solution, no solution and infinite solution respectively, then the value of $L^2+M^2+N^2$ is

(1) 125 (2) 13 (3) 15 (4) 121

70. If α, β, γ be the roots of the equation $3x^3 - 5x^2 + 6x - 2 = 0$ and $A(\alpha, \beta, \gamma), B(\beta, \gamma, \alpha), C(\gamma, \alpha, \beta)$ are the vertices of the triangle, then centroid of ΔABC lies on the line

(1) $x = 2y = 3z$ (2) $x = y = z$ (3) $x = -2y = z$ (4) $-x = y = -z$

71. The coefficient of x^{20} x in the polynomial $(1+x)^{22} + x(1+x)^{21} + x^2(1+x)^{20} + ... + x^{20}(1+x)^2$ is

(1) ${}^{22}C_{19}$ (2) ${}^{23}C_3$ (3) ${}^{22}C_2$ (4) ${}^{23}C_{19}$

72. Number of complex numbers z such that $|z| < \frac{1}{3}$ and $\sum_{r=1}^{n} a_r z^r = 1$ (where $|a_r| < 2$) is

(1) 1 (2) 2 (3) n (4) 0

73. Let $A_k = \cos\frac{k\pi}{20} + i\sin\frac{k\pi}{20}$ where $\sqrt{-1} = i$, then $\dfrac{\sum_{k=0}^{2018} |A_{k+1} - A_k|}{\sum_{k=1}^{673} |A_{2k+1} - A_{2k+2}|}$ is equal to

(1) 3 (2) $\frac{2018}{673}$ (3) $\frac{2019}{674}$ (4) None of these

74. The value of $\begin{vmatrix} (a-p)^{-2} & (a-p)^{-1} & p^{-1} \\ (a-q)^{-2} & (a-q)^{-1} & q^{-1} \\ (a-r)^{-2} & (a-r)^{-1} & e^{-1} \end{vmatrix}$ is

(1) $\frac{a^2\Pi(p-q)}{pqr\Pi(a-p)^2}$ (2) $\frac{-a^2\Pi(p-q)}{pqr\Pi(a-p)^2}$ (3) $\frac{b^2\Pi(p-q)}{pqr\Pi(a-p)^2}$ (4) $\frac{c^2\Pi(p-q)}{pqr\Pi(a-p)^2}$

75. If $a_r, b_r, c_r\ (r = 1, 2, 3)$ are non-negative real numbers and $\sum_{r=1}^{3}(a_r + b_r + c_r) = A$, then maximum value of $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}$ is

(1) A^3 (2) $\frac{A^3}{8}$ (3) $\frac{A^3}{27}$ (4) $\frac{A^2}{9}$

76. If a point z_1 satisfying $|z+8| \le 2$ and z_2 satisfying $|z+3| + |z-3| \le 10$ then the range of $|z_1 - z_2|$ is

(1) [10, 15] (2) [1, 15] (3) [2, 10] (4) None of these

77. Area of the triangle whose vertices are $A(-3 - 2i)$, $B(2 - 3i)$ and $C(-1 -5i)$, is

(1) $\frac{\sqrt{7}}{4}$ (2) $\frac{\sqrt{14}}{2}$ (3) $\frac{\sqrt{13}}{2}$ (4) $2\sqrt{14}$

78. If k_1 is the number of arrangements of the letters of the word "EQUATION" in which all vowels are together and k_2 is the number of arrangements of the letters of the word "EQUATION" in which vowels are in alphabetical order then $\frac{7k_1}{k_2}$ is

(1) 120 (2) $4!\times 5!$ (3) 60 (4) $\frac{8!}{5!}$

79. 100 identical objects are distributed among 10 persons in which 1st person gets at least one object, 2nd person gets at least 2 objects, 3rd person gets at least 3 objects, ... , 10th person gets at least 10 objects, then total number of ways of distribution is

(1) ${}^{55}C_{10}$ (2) ${}^{55}C_{9}$ (3) ${}^{54}C_{9}$ (4) ${}^{54}C_{44}$

80. A palindrome is a word, number, phrase or sequence of words that reads the same backwards as forwards e.g. "SOLOS". The number of palindromes that can be formed using the letters AABBBBCCCDDDD are

(1) $\frac{6!}{2!}$ (2) $\frac{6!}{2!\times 2!}$ (3) $\frac{7!}{2!\times 2!}$ (4) None of these

81. Two cards are missing from a pack of 52 playing cards. One card is selected at random then the probability that it is a king, is

(1) $\frac{3}{26}$ (2) $\frac{1}{13}$ (3) $\frac{10}{13}$ (4) $\frac{4}{13}$

82. All the words formed using the letters of the word "ALGEBRA" taken all at a time and one of the word is selected from it, then the probability that the word contains the word "AGE", is

(1) $\frac{{}^{7}C_{2}}{5!}$ (2) $\frac{5!}{7!}$ (3) $\frac{1}{{}^{7}P_{2}}$ (4) $\frac{1}{{}^{7}C_{2}}$

83. If $I_n = \int_0^{\pi/4} \tan^n x dx$ and $\frac{1}{I_2+I_4}, \frac{1}{I_3+I_5}, \frac{1}{I_4+I_6}, \frac{1}{I_5+I_7}$ form an A.P., then the common difference of the A.P. is

(1) 1 (2) 2 (C) 3 (4) None of these

84. The sum of the series $\frac{8}{5}+\frac{16}{65}+\frac{24}{325}+\frac{32}{1025}$..... upto 20 terms is

(1) $\frac{1280}{841}$ (2) $\frac{1680}{841}$ (3) $\frac{1880}{841}$ (4) None of these

85. If x^2, A_1, A_2, y^2 are in arithmetic progression, x^2, G_1, G_2, y^2 are in geometric progression and x^2, H_1, H_2, y^2x are in harmonic progression, then the value of $(G_1G_2)(H_1+H_2)-H_1H_2(A_1+A_2)$ is

(1) 0 (2) 1 (3) 2 (4) None of these

86. Let A and B are two events such that $P(A)$ = 0.4, $P(B)$ = 0.6 and $P\left(\frac{B}{A}\right)=0.5$. Then $P\left(\frac{\overline{A}}{\overline{B}}\right)$ equals to

(1) $\frac{1}{4}$ (2) $\frac{2}{3}$ (3) $\frac{1}{2}$ (4) $\frac{1}{3}$

87. If $f(x)=x^2+\alpha x+\beta$ (where $\alpha,\beta\in R$) and $f(f(x))=0$ has two roots 1 and 2, then $f(0)$ is equal to

(1) 1 (2) – 2 (3) $\frac{-3}{2}$ (4) – 1

88. A bag contains 5 balls of unknown colours. A ball is drawn at random from it and is found to be white. The probability that bag contains only white balls is

(1) $\frac{3}{5}$ (2) $\frac{1}{5}$ (3) $\frac{2}{3}$ (4) $\frac{1}{3}$

89. The arithmetic mean of a set of observation is $\overline{x}$. If each observation is divided by α and then increased by 10, then mean of the new series is

(1) $\frac{\overline{x}}{\alpha}$ (2) $\frac{\overline{x}+10}{\alpha}$ (3) $\frac{\overline{x}+10\alpha}{\alpha}$ (4) $\alpha\overline{x}+10$

90. The coefficient of x^{203} in the expression $(x-1)(x^2-2)(x^3-3)......(x^{20}-20)$ is

(1) 11 (2) 12 (3) 13 (4) 15

IIT – JEE: 2019 **TW TEST (3 YRS.)** **DATE: 19/10/18**

TOPIC: ALGEBRA

ANSWER KEY

1.	(1)	2.	(2)	3.	(2)	4.	(3)	5.	(1)
6.	(1)	7.	(4)	8.	(2)	9.	(3)	10.	(1)
11.	(4)	12.	(3)	13.	(1)	14.	(2)	15.	(3)
16.	(1)	17.	(2)	18.	(2)	19.	(1)	20.	(1)
21.	(3)	22.	(4)	23.	(1)	24.	(3)	25.	(2)
26.	(4)	27.	(1)	28.	(2)	29.	(3)	30.	(4)
31.	(4)	32.	(3)	33.	(2)	34.	(3)	35.	(1)
36.	(3)	37.	(1)	38.	(4)	39.	(2)	40.	(1)
41.	(2)	42.	(1)	43.	(1)	44.	(3)	45.	(2)
46.	(1)	47.	(3)	48.	(1)	49.	(1)	50.	(4)
51.	(2)	52.	(4)	53.	(4)	54.	(3)	55.	(1)
56.	(1)	57.	(3)	58.	(4)	59.	(3)	60.	(1)
61.	(4)	62.	(3)	63.	(2)	64.	(2)	65.	(2)
66.	(3)	67.	(1)	68.	(2)	69.	(1)	70.	(2)
71.	(2)	72.	(4)	73.	(1)	74.	(2)	75.	(3)
76.	(2)	77.	(3)	78.	(3)	79.	(3)	80.	(2)
81.	(2)	82.	(4)	83.	(1)	84.	(2)	85.	(1)
86.	(3)	87.	(3)	88.	(4)	89.	(3)	90.	(3)