

# DR ACADEMY

DO RIGHT FOR GENUINE EDUCATION

KCET EXAMINATION – 2020  
SUBJECT : MATHEMATICS

**DATE :- 30-07-2020**

**TIME : 02.30 PM TO 03.50 PM**

1. If  $2^x + 2^y = 2^{x+y}$ , then  $\frac{dy}{dx}$  is  
 a)  $2^{y-x}$       b)  $-2^{y-x}$       c)  $2^{x-y}$       d)  $\frac{2^y - 1}{2^x - 1}$

**Ans. b**

2. If  $f(x) = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ , then  $f'(\sqrt{3})$  is  
 a)  $-\frac{1}{2}$       b)  $\frac{1}{2}$       c)  $\frac{1}{\sqrt{3}}$       d)  $-\frac{1}{\sqrt{3}}$

**Ans. b**

3. The right hand and left hand limit of the function

$$f(x) = \begin{cases} \frac{e^{1/x} - 1}{e^{1/x} + 1}, & \text{if } x \neq 0 \\ 0, & \text{if } x = 0 \end{cases}$$

are respectively

- a) 1 and 1      b) 1 and -1  
 c) -1 and -1      d) -1 and 1

**Ans. b**

4. If  $y = 2x^{n+1} + \frac{3}{x^n}$ , then  $x^2 \frac{d^2y}{dx^2}$  is  
 a)  $6n(n+1)y$       b)  $n(n+1)y$   
 c)  $x \frac{dy}{dx} + y$       d)  $y$

**Ans. b**

5. If the curves  $2x=y^2$  and  $2xy=K$  intersect perpendicularly, then the value of  $K^2$  is  
 a) 4      b)  $2\sqrt{2}$       c) 2      d) 8

**Ans. d**

6. if  $(xe)^y = e^y$ , then  $\frac{dy}{dx}$  is  
 a)  $\frac{\log x}{(1+\log x)^2}$       b)  $\frac{1}{(1+\log x)^2}$   
 c)  $\frac{\log x}{(1+\log x)}$       d)  $\frac{e^x}{x(y-1)}$

**Ans. a**

7. If the side of a cube is increased by 5%, then the surface area of a cube is increased by  
 a) 10%      b) 60%      c) 6%      d) 20%

**Ans. a**

8. The value of  $\int \frac{1+x^4}{1+x^6} dx$  is  
 a)  $\tan^{-1} x + \tan^{-1} x^3 + C$   
 b)  $\tan^{-1} x + \frac{1}{3} \tan^{-1} x^3 + C$   
 c)  $\tan^{-1} x - \frac{1}{3} \tan^{-1} x^3 + C$   
 d)  $\tan^{-1} x + \frac{1}{3} \tan^{-1} x^2 + C$

**Ans. b**

9. The maximum value of  $\frac{\log_e x}{x}$ , if  $x > 0$  is  
 a) e      b) 1      c)  $\frac{1}{e}$       d)  $-\frac{1}{e}$

**Ans. c**

10. The value of  $\int e^{\sin x} \sin 2x dx$  is  
 a)  $2e^{\sin x} (\sin x - 1) + C$   
 b)  $2e^{\sin x} (\sin x + 1) + C$   
 c)  $2e^{\sin x} (\cos x + 1) + C$   
 d)  $2e^{\sin x} (\cos x - 1) + C$

**Ans. a**

11. The value of  $\int_{-\frac{1}{2}}^{\frac{1}{2}} \cos^{-1} x dx$  is  
 a)  $\pi$       b)  $\frac{\pi}{2}$       c) 1      d)  $\frac{\pi^2}{2}$

**Ans. b**

12. If  $\int \frac{3x+1}{(x-1)(x-2)(x-3)} dx$   
 $= A \log|x-1| + B \log|x-2| + C \log|x-3| + C$ , then  
 the values of A, B and C are respectively.  
 a) 5, -7, -5      b) 2, -7, -5  
 c) 5, -7, 5      d) 2, -7, 5

**Ans. d**

13. The value of  $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$  is  
 a)  $\frac{\pi}{2} \log 2$       b)  $\frac{\pi}{4} \log 2$   
 c)  $\frac{1}{2}$       d)  $\frac{\pi}{8} \log 2$

**Ans. d**

14. The area of the region bounded by the curve  $y^2=8x$  and the line  $y=2x$  is  
 a)  $\frac{16}{3}$  sq.units      b)  $\frac{4}{3}$  sq.units  
 c)  $\frac{3}{4}$  sq.units      d)  $\frac{8}{3}$  sq.units

**Ans. b**

15. The value of  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\cos x}{1+e^x} dx$  is  
 a) 2      b) 0      c) 1      d) -2

**Ans. c**

16. The order of the differential equation obtained by eliminating arbitrary constants in the family of curves  $c_1y = (c_2 + c_3)e^{x+c_4}$  is  
 a) 1      b) 2      c) 3      d) 4

**Ans. a**

17. The general solution of the differential equation  $x^2 dy - 2xy dx = x^4 \cos x dx$  is  
 a)  $y = x^2 \sin x + cx^2$       b)  $y = x^2 \sin x + c$   
 c)  $y = \sin x + cx^2$       d)  $y = \cos x + cx^2$

**Ans. a**

18. The area of the region bounded by the line  $y=2x+1$ , x-axis and the ordinates  $x=-1$  and  $x=1$  is  
 a)  $\frac{9}{4}$       b) 2      c)  $\frac{5}{2}$       d) 5

**Ans. c**

19. The two vectors  $\hat{i} + \hat{j} + \hat{k}$  and  $\hat{i} + 3\hat{j} + 5\hat{k}$  represent the two sides  $\overline{AB}$  and  $\overline{AC}$  respectively of a  $\Delta ABC$ . The length of the median through A is  
 a)  $\frac{\sqrt{14}}{2}$       b) 14      c) 7      d)  $\sqrt{14}$

**Ans. d**

20. If  $\vec{a}$  and  $\vec{b}$  are unit vectors and  $\theta$  is the angle between  $\vec{a}$  and  $\vec{b}$ , then  $\sin \frac{\theta}{2}$  is  
 a)  $|\vec{a} + \vec{b}|$       b)  $\frac{|\vec{a} + \vec{b}|}{2}$       c)  $\frac{|\vec{a} - \vec{b}|}{2}$       d)  $|\vec{a} - \vec{b}|$

**Ans. c**

21. The curve passing through the point (1, 2) given that the slope of the tangent at any point  $(x, y)$  is  $\frac{3x}{y}$  represents  
 a) Circle      b) Parabola  
 c) Ellipse      d) Hyperbola

**Ans. d**

22. If  $|\vec{a} \times \vec{b}|^2 + |\vec{a} \cdot \vec{b}|^2 = 144$  and  $|\vec{a}| = 6$  then  $|\vec{b}|$  is equal to  
 a) 6      b) 3      c) 2      d) 4

**Ans. c**

23. The point (1, -3, 4) lies in the octant  
 a) Second      b) Third      c) Fourth      d) Eighth

**Ans. c**

24. If the vectors  $2\hat{i} - 3\hat{j} + 4\hat{k}$ ,  $2\hat{i} + \hat{j} - \hat{k}$  and  $\lambda\hat{i} - \hat{j} + 2\hat{k}$  are coplanar, then the value of  $\lambda$  is  
 a) 6      b) -5      c) -6      d) 5

**Ans. a**

25. The distance of the point (1, 2, -4) from the line  $\frac{x-3}{2} = \frac{y-3}{3} = \frac{z+5}{6}$  is  
 a)  $\frac{293}{7}$       b)  $\frac{\sqrt{293}}{7}$       c)  $\frac{293}{49}$       d)  $\frac{\sqrt{293}}{49}$

**Ans. b**

26. The sine of the angle between the straight line  $\frac{x-2}{3} = \frac{3-y}{-4} = \frac{z-4}{5}$  and the plane  $2x - 2y + z = 5$  is  
 a)  $\frac{3}{\sqrt{50}}$    b)  $\frac{3}{50}$    c)  $\frac{4}{5\sqrt{2}}$    d)  $\frac{\sqrt{2}}{10}$

**Ans. G**

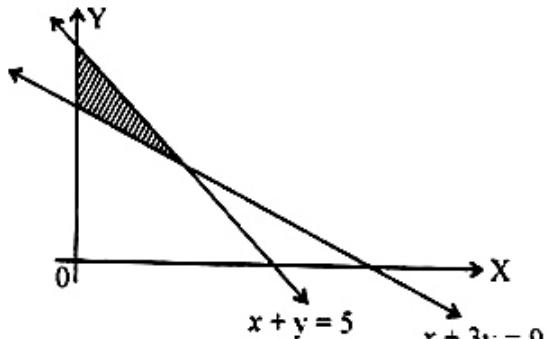
27. If a line makes an angle of  $\frac{\pi}{3}$  with each of x and y-axis, then the acute angle made by z-axis is  
 a)  $\frac{\pi}{4}$    b)  $\frac{\pi}{6}$    c)  $\frac{\pi}{3}$    d)  $\frac{\pi}{2}$

**Ans. a**

28. Corner points of the feasible region determined by the system of linear constraints are (0, 3), (1, 1) and (3, 0). Let  $z = px + qy$ , where  $p, q > 0$ . Condition on p and q so that the minimum of z occurs at (3, 0) and (1, 1) is  
 a)  $p = 2q$    b)  $p = \frac{q}{2}$    c)  $p = 3q$    d)  $p = q$

**Ans. b**

29. The feasible region of an LPP is shown in the figure. If  $Z = 11x + 7y$ , then the maximum value of Z occurs at



- a) (0,5)   b) (3,3)   c) (5,0)   d) (3,2)

**Ans. d**

30. A die is thrown 10 times, the probability that an odd number will come up atleast one time is  
 a)  $\frac{1}{1024}$    b)  $\frac{1023}{1024}$    c)  $\frac{11}{1024}$    d)  $\frac{1013}{1024}$

**Ans. b**

31. If A and B are two events such that  $P(A) = \frac{1}{3}$ ,  $P(B) = \frac{1}{2}$  and  $P(A \cap B) = \frac{1}{6}$ , then  $P(A'/B)$  is  
 a)  $\frac{2}{3}$    b)  $\frac{1}{3}$    c)  $\frac{1}{2}$    d)  $\frac{1}{12}$

**Ans. a**

32. Events  $E_1$  and  $E_2$  from a partition of the sample space S. A is any event such that  $P(E_1) = P(E_2) = \frac{1}{2}$ ,  $P(E_2 / A) = \frac{1}{2}$  and  $P(A / E_2) = \frac{2}{3}$ , then  $P(E_1 / A)$  is  
 a)  $\frac{1}{2}$    b)  $\frac{2}{3}$    c) 1   d)  $\frac{1}{4}$

**Ans. a**

33. The probability of solving a problem by three persons A, B and C independently is  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{3}$  respectively. Then the probability of the problem is solved by any two of them is  
 a)  $\frac{1}{12}$    b)  $\frac{1}{4}$    c)  $\frac{1}{24}$    d)  $\frac{1}{8}$

**Ans. b**

34. If  $n(A) = 2$  and total number of possible relations from Set A to set B is 1024, then  $n(B)$  is  
 a) 512   b) 20   c) 10   d) 5

**Ans. d**

35. The value of  $\sin^2 51^\circ + \sin^2 39^\circ$  is  
 a) 1   b) 0   c)  $\sin 12^\circ$    d)  $\cos 12^\circ$

**Ans. a**

36. If  $\tan A + \cot A = 2$ , then the value of  $\tan^4 A + \cot^4 A$  is  
 a) 2   b) 1   c) 4   d) 5

**Ans. a**

37. If  $A = \{1, 2, 3, 4, 5, 6\}$ , then the number of subsets of A which contain atleast two elements is  
 a) 64   b) 63   c) 57   d) 58

**Ans. c**

38. If  $z = x + iy$ , then the equation  $|z+1|=|z-1|$  represents  
 a) a circle      b) a parabola  
 c) x-axis      d) y-axis

**Ans. d**

39. The value of  ${}^{16}C_9 + {}^{16}C_{10} - {}^{16}C_6 - {}^{16}C_7$  is  
 a) 0      b) 1      c)  ${}^{17}C_{10}$       d)  ${}^{17}C_3$

**Ans. a**

40. The number of terms in the expansion of  $(x+y+z)^{10}$  is  
 a) 66      b) 142      c) 11      d) 110

**Ans. a**

41. If  $P(n): 2^n < n!$

Then the smallest positive integer for which  $P(n)$  is true if

- a) 2      b) 3      c) 4      d) 5

**Ans. c**

42. The two lines  $lx + my = n$  and  $l'x + m'y = n'$  are perpendicular if  
 a)  $ll' + mm' = 0$       b)  $lm' = ml'$   
 c)  $lm + l'm' = 0$       d)  $lm' + ml' = 0$

**Ans. a**

43. If the parabola  $x^2=4ay$  passes through the point  $(2, 1)$ , then the length of the latus rectum is  
 a) 1      b) 4      c) 2      d) 8

**Ans. b**

44. If the sum of  $n$  terms of an A.P is given by  $S_n = n^2 + n$ , then the common difference of the A.P is  
 a) 4      b) 1      c) 2      d) 6

**Ans. a**

45. The negation of the statement "For all real numbers  $x$  and  $y$ ,  $x + y = y + x$ " is  
 a) For all real numbers  $x$  and  $y$ ,  $x + y \neq y + x$   
 b) For some real numbers  $x$  and  $y$ ,  $x + y = y + x$   
 c) For some real number  $x$  and  $y$ ,  $x + y \neq y + x$   
 d) for some real numbers  $x$  and  $y$ ,  $x - y = y - x$

**Ans. a**

46. The standard deviation of the data 6, 7, 8, 9, 10 is  
 a)  $\sqrt{2}$       b)  $\sqrt{10}$       c) 2      d) 10

**Ans. a**

47.  $\lim_{x \rightarrow 0} \left( \frac{\tan x}{\sqrt{2x+4}-2} \right)$  is equal to  
 a) 2      b) 3      c) 4      d) 6

**Ans. a**

48. If a relation  $R$  on the set {1, 2, 3} be defined by  $R=\{(1, 1)\}$ , then  $R$  is  
 a) Reflexive and symmetric  
 b) Reflexive and transitive  
 c) symmetric and transitive  
 d) Only symmetric

**Ans. a**

49. Let  $f : [2, \infty) \rightarrow \mathbb{R}$  be the function defined  $f(x) = x^2 - 4x + 5$ , then the range of  $f$  is  
 a)  $(-\infty, \infty)$       b)  $[1, \infty)$       c)  $(1, \infty)$       d)  $[5, \infty)$

**Ans. b**

50. If A, B, C are three mutually exclusive and exhaustive events of an experiment such that  $P(A) = 2P(B) = 3P(C)$ , then  $P(B)$  is equal to  
 a)  $\frac{1}{11}$       b)  $\frac{2}{11}$       c)  $\frac{3}{11}$       d)  $\frac{4}{11}$

**Ans. c**

51. The domain of the function defined by  $f(x) = \cos^{-1} \sqrt{x-1}$  is  
 a)  $[1, 2]$       b)  $[0, 2]$       c)  $[-1, 1]$       d)  $[0, 1]$

**Ans. a**

52. The value of  $\cos \left( \sin^{-1} \frac{\pi}{3} + \cos^{-1} \frac{\pi}{3} \right)$  is  
 a) 0      b) 1      c) -0  
 d) Does not exist

**Ans. a**

53. If  $A = \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$ , then  $A^4$  is equal to  
 a) A      b) 2A      c) I      d) 4A

**Ans. a**

54. If  $A = \{a, b, c\}$ , then the number of binary operations on  $A$  is  
 a) 3      b)  $3^6$       c)  $3^3$       d)  $3^9$

**Ans. a**

55. If  $\begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix} A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ , then the matrix  $a$  is  
 a)  $\begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}$   
 b)  $\begin{pmatrix} 2 & -1 \\ -3 & 2 \end{pmatrix}$   
 c)  $\begin{pmatrix} -2 & 1 \\ 3 & -2 \end{pmatrix}$   
 d)  $\begin{pmatrix} 2 & -1 \\ 3 & 2 \end{pmatrix}$

**Ans. b**

56. If  $f(x) = \begin{vmatrix} x^3 - x & a+x & b+x \\ x-a & x^2 - x & c+x \\ x-b & x-c & 0 \end{vmatrix}$  then  
 a)  $f(1) = 0$       b)  $f(2) = 0$   
 c)  $f(0) = 0$       d)  $f(-1) = 0$

**Ans. c**

57. If  $A$  and  $B$  are square matrices of same order and  $B$  is a skew symmetric matrix, then  $A'BA$  is  
 a) Symmetric matrix  
 b) Null matrix  
 c) Diagonal matrix  
 d) Skew symmetric matrix

**Ans. a**

58. If  $A$  is a square matrix of order 3 and  $|A|=5$ , then  $|A \text{ adj. } A|$  is  
 a) 5      b) 125      c) 25      d) 625

**Ans. b**

59. If  $f(x) = \begin{cases} \frac{1 - \cos Kx}{x \sin x}, & \text{If } x \neq 0 \\ \frac{1}{2}, & \text{If } x = 0 \end{cases}$  is continuous at  $x=0$ , then the value of  $K$  is

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

**Ans. d**

60. If  $a_1 a_2 a_3 \dots a_9$  are in A.P. then the value of  $\begin{vmatrix} a_1 & a_2 & a_3 \\ a_4 & a_5 & a_6 \\ a_7 & a_8 & a_9 \end{vmatrix}$  is  
 a)  $\frac{9}{2}(a_1 + a_9)$       b)  $a_1 + a_9$   
 c)  $\log_e(\log_e e)$       d) 1

**Ans. c**