KCET – MATHEMATICS – 2017

1. $\int_{-\pi/2}^{\pi/2} \frac{dx}{\theta^{\sin x}+1}$ is equal to

   1) $-\frac{\pi}{2}$ 2) $\frac{\pi}{2}$ 3) 0 4) 1

Ans: (2)

2. A box has 100 pens of which 10 are defective. The probability that out of a sample of 5 pens drawn one by one with replacement and atmost one is defective is

   1) $\frac{9}{10}$ 2) $\frac{1}{2}\left(\frac{9}{10}\right)^4$

   3) $\left(\frac{9}{10}\right)^5+\frac{1}{2}\left(\frac{9}{10}\right)^4$ 4) $\frac{1}{2}\left(\frac{9}{10}\right)^5$

Ans: (3)

3. If $\left(\frac{1+i}{1-i}\right)^m = 1$, then the least positive integral value of m is

   1) 1 2) 4 3) 2 4) 3

Ans: (2)

4. The rate of change of volume of a sphere with respect to its surface area when the radius is 4 cm is

   1) 6 cm^3/cm^2 2) 8 cm^3/cm^2 3) 2 cm^3/cm^2 4) 4 cm^3/cm^2

Ans: (3)

5. Equation of line passing through the point (1, 2) and perpendicular to the line y = 3x – 1 is

   1) x + 3y + 7 = 0 2) x + 3y – 7 = 0 3) x + 3y = 0 4) x – 3y = 0

Ans: (2)

6. The value of cos2 45° - sin2 15° is

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

Ans: (4)

7. The function $f(x) = x^2 + 2x - 5$ is strictly increasing in the interval

   1) $(-\infty, -1)$ 2) $(-\infty, -1]$ 3) $[-1, \infty)$ 4) $(-1, \infty)$

Ans: (4)

8. If $\vec{a} = 2\hat{i} + \lambda\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}$ are orthogonal, then value of λ is

   1) 1 2) $\frac{3}{2}$ 3) $-\frac{5}{2}$ 4) 0

Ans: (3)

9. The value of C in Mean value theorem for the function $f(x) = x^2$ in [2, 4] is

   1) 4 2) 2 3) 7/2 4) 3

Ans: (4)

10. If $2\begin{bmatrix}1 & 3\\ 0 & x\end{bmatrix}+\begin{bmatrix}y & 0\\ 1 & 2\end{bmatrix}=\begin{bmatrix}5 & 6\\ 1 & 8\end{bmatrix}$, then the value of x and y are

1) x = 3, y = 3 2) x = -3, y = 3

2) x = 3, y = -3 4) x = -3, y = -3

Ans: (1)

11. If ${}^nC_{12} = {}^nC_8$ then is equal to

1) 12 2) 26 3) 6 4) 20

Ans: (4)

12. The total number of terms in the expansion of $(x + a)^{47} - (x - a)^{47}$ after simplification is

1) 24 2) 47 3) 48 4) 96

Ans: (1)

13. The plane $2x - 3y + 6z - 11 = 0$ makes an angle $\sin^{-1}(\alpha)$ with X-axis. The value of α is equal to

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

Ans: (1)

14. If coefficient of variation is 60 and standard deviation is 24, then Arithmetic mean is

1) 40 2) 1/40 3) 7/20 4) 20/7

Ans: (1)

15. If $f(x) = \begin{cases} Kr^2 & \text{if } x \le 2 \\ 3 & \text{if } x \ge 2 \end{cases}$ is continuous at x = 2, then the value of K is

1) 4/3 2) 3/4 3) 3 4) 4

Ans: (2)

16. If $|x - 2| \le 1$, then

1) $x \in (-1, 3)$ 2) $x \in (1, 3)$ 3) $x \in [1, 3]$ 4) $x \in [-1, 3)$

Ans: (3)

17. If A is a square matrix of order 3 x 3, then |KA| is equal to

1) $K^2|A|$ 2) $K^3|A|$ 3) $K|A|$ 4) $3K|A|$

Ans: (2)

18. The contrapositive statement of statement "If x is prime number, then x is odd" is

1) If x is not is prime number, then x is not odd

2) If x is not odd, then x is not a prime number

3) If x is a prime number, then x is not odd.

4) If x is not a prime number, then x is odd.

Ans: (2)

19. If A and B are finite sets and $A \subset B$, then

1) $n(A \cap B) = \phi$ 2) $n(A \cup B) = n(B)$ 3) $n(A \cap B) = n(B)$ 4) $n(A \cup B) = n(A)$

Ans: (2)

20. The range of the function $f(x) = \sqrt{9 - x^2}$ is

1) (0, 3] 2) [0, 3) 3) (0, 3) 4) [0, 3]

Ans: (4)

21. If a matrix A is both symmetric and skew symmetric, then

1) A is diagonal matrix 2) A is a zero matrix

3) A is scalar matrix 4) A is square matrix

Ans: (4)

22. If f (x) = $8x^3$, g (x) = $x^{1/3}$, then fog (x) is

1) 8^3x 2) $(8x)^{1/3}$ 3) $8x^3$ 4) 8x

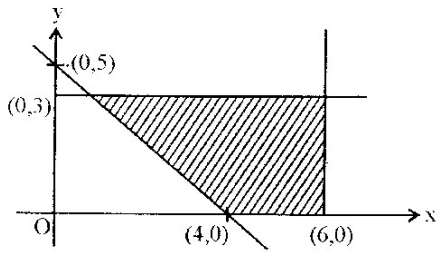
Ans: (4)

23. The perpendicular distance of the point P (6, 7, 8) from XY-plane is

1) 8 2) 6 3) 7 4) 5

Ans: (1)

24. The shaded region in the figure is the solution set of the inequations.



1) $5x + 4y \geq 20, x \leq 6, y \geq 3, x \geq 0, y \geq 0$
2) $5x + 4y \geq 20, x \geq 6, y \leq 3, x \geq 0, y \geq 0$
3) $5x + 4y \geq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$
4) $5x + 4y \leq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

Ans: (3)

25. The area of triangle with vertices (K, 0), (4, 0), (0, 2) is 4 square units, then value of K is

1) 0 or -8 2) 0 or 8 3) 8 4) 0

Ans: (1)

26. The probability distribution of X is

X	0	1	2	3
P(x)	0.3	k	2k	3k

The value of k is

1) 0.14 2) 0.7 3) 1 4) 0.3

Ans: (1)

27. The degree of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^2 = \frac{d^2y}{dx^2}$ is

1) 4 2) 1 3) 2 4) 3

Ans: (2)

28. The integrating factor of the differential equation $x.\frac{dy}{dx} + 2y = x^2$ is $(x \neq 0)$

1) x 2) log |x| 3) $e^{\log.x}$ 4) x^2

Ans: (4)

29. $\int_{0.2}^{3.5}[x]dx$ is equal to

1) 3 2) 3.5 3) 4.5 4) 4

Ans: (3)

30. Reflexion of the point (α, β, γ) in XY plane is

1) $(-\alpha, -\beta, \gamma)$ 2) $(\alpha, \beta, 0)$ 3) $(0, 0, \gamma)$ 4) $(\alpha, \beta, -\gamma)$

Ans: (4)

31. The range of $\sec^{-1}x$ is

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

Ans: (2)

32. Two events A and B will be independent if

1) $P(A' \cap B') = (1 - P(A))(1- P(B))$ 2) $P(A) + P(B) = 1$

3) $P(A) = P(B)$ 4) A and B are mutually exclusive

Ans: (1)

33. If $\vec{a}$ & $\vec{b}$ are unit vectors, then angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}\,\vec{a}-\vec{b}$ to be unit vector is

1) 60° 2)45° 3) 30° 4) 90°

Ans: (3)

34. The point on the curve $y^2 = x$ where the tangent makes an angle of $\pi / 4$ with X – axis is

1) (4, 2) 2) $\left(\frac{1}{4},\frac{1}{2}\right)$ 3) (1, 1) 4) $\left(\frac{1}{2},\frac{1}{4}\right)$

Ans: (2)

35. The derivative of $\cos^{-1}(2x^2- 1)$ w.r.t $\cos^{-1}x$ is

1) $\frac{-1}{2\sqrt{1-x^2}}$ 2) $\frac{2}{x}$ 3) 2 4) $1-x^2$

Ans: (3)

36. $\int\frac{(x+3)e^x}{(x+4)^2}dx$ is equal to

1) $\frac{1}{(x+4)^2}+C$ 2) $\frac{e^x}{(x+3)}+C$ 3) $\frac{e^x}{(x+4)^2}+C$ 4) $\frac{e^x}{(x+4)}$

Ans: (4)

37. If $A = \frac{1}{\pi}\begin{bmatrix}\sin^{-1}(\pi x) & \tan^{-1}\left(\frac{x}{\pi}\right)\\ \sin^{-1}\left(\frac{x}{\pi}\right) & \cot^{-1}(\pi x)\end{bmatrix}$, $B = \begin{bmatrix}-\cos^{-1}(\pi x) & \tan^{-1}\left(\frac{x}{\pi}\right)\\ \sin^{-1}\left(\frac{x}{\pi}\right) & \tan^{-1}(\pi x)\end{bmatrix}$ then A- B is equal to

1) 0 2) 2I 3) I 4) $\frac{1}{2}I$

Ans: (4)

38. $\int_0^{\pi/2}\frac{\tan^7 x}{\cot^7 x+\tan^7 x}dx$ is equal to

1) $\frac{\pi}{6}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{2}$ 4) $\frac{\pi}{3}$

Ans: (2)

39. General solution of differential equatin $\frac{dy}{dx}+y=1(y\neq 1)$ is

1) $\log\left|\frac{1}{1-y}\right|=x+C$ 2) $\log|1-y|= x+C$

3) $\log|1+y|=x+C$ 4) $\log\left|\frac{1}{1-y}\right|= - x + C$

Ans: (1)

40. If $\tan^{-1}x+\tan^{-1}y = \frac{4\pi}{5}$, then $\cot^{-1} x + \cot^{-1}y$ is equal to

1) $\frac{\pi}{5}$ 2) $\frac{3\pi}{5}$ 3) π 4) $\frac{2\pi}{5}$

Ans: (1)

41. 3 + 5 + 7 + ….. to n term is

1) n (n – 2) 2) $(n + 1)^2$ 3) n (n + 2) 4) n^2

Ans: (3)

42. If $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ then x is equal to

1) $\pm 2\sqrt{2}$ 2) 4 3) 8 4) 2

Ans: (1)

43. If an LPP admits optimal solution at two consecutive vertices of a feasible region, then

1) the LPP under consideration must be reconstructed
2) the required optimal solution is at the midpoint of the line joining two points.
3) the LPP under consideration is not solvable
4) the optimal solution occurs at every point on the joining these two points.

Ans: (4)

44. $\int \sqrt{x^2 + 2x + 5}\ dx$ is equal to

1) $(x + 1)\sqrt{x^2 + 2x + 5} + \frac{1}{2}\log\left|x + 1 + \sqrt{x^2 + 2x + 5}\right| + C$

2) $(x + 1)\sqrt{x^2 + 2x + 5} + 2\log\left|x + 1 + \sqrt{x^2 + 2x + 5}\right| + C$

3) $(x + 1)\sqrt{x^2 + 2x + 5 - 2}\ \log\left|x + 1 + \sqrt{x^2 + 2x + 5}\right| + C$

4) $\frac{1}{2}(x + 1)\sqrt{x^2 + 2x + 5} + 2\log\left|x + 1 + \sqrt{x^2 + 2x + 5}\right| + C$

Ans: (4)

45. The distance of the point (-2, 4, -5) from the line $\frac{x+3}{3} = \frac{y-4}{5} = \frac{z+8}{6}$ is

1) $\frac{37}{\sqrt{10}}$ 2) $\frac{37}{10}$ 3) $\sqrt{\frac{37}{10}}$ 4) $\frac{\sqrt{37}}{10}$

Ans: (3)

46. $\int_{-5}^{5} |x + 2|\, dx$ is equal to

1) 27 2) 30 3) 29 4) 28

Ans: (3)

47. $\int_0^{\pi/2} \frac{1}{a^2.\sin^2 x + b^2.\cos^2 x}\, dx$ is equal to

1) $\frac{\pi a}{4b}$ 2) $\frac{\pi b}{4a}$ 3) $\frac{\pi a}{2b}$ 4) $\frac{\pi}{2ab}$

Ans: (4)

48. Binary operation * on R – { -1} defined by a * b = $\frac{a}{b+1}$ is

1) * is associative and commutative
2) * is neither associative nor commutative
3) * is commutative but not associative
4) * is associative but not commutative

Ans: (2)

49. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, then the value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a}$ is equal to

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

Ans: (4)

50 Let $\Delta = \begin{vmatrix} Ax & x^2 & 1 \\ By & y^2 & 1 \\ Cz & z^2 & 1 \end{vmatrix}$ and $\Delta_1 = \begin{vmatrix} A & B & C \\ x & y & z \\ zy & zx & xy \end{vmatrix}$ then

1) $\Delta_1 = \Delta$
2) $\Delta_1 = 2\Delta$
3) $\Delta_1 = -\Delta$
4) $\Delta_1 \neq \Delta$

Ans: (1)

51. if $y = \begin{vmatrix} f(x) & g(x) & h(x) \\ 1 & m & n \\ a & b & c \end{vmatrix}$, then $\frac{dy}{dx}$ is equal to

1) $\begin{vmatrix} f(x) & g'(x) & h'(x) \\ 1 & m & n \\ a & b & c \end{vmatrix}$
2) $\begin{vmatrix} 1 & m & n \\ f'(x) & g'(x) & h'(x) \\ a & b & c \end{vmatrix}$
3) $\begin{vmatrix} f'(x) & 1 & a \\ g'(x) & m & b \\ h'(x) & n & c \end{vmatrix}$
4) $\begin{vmatrix} 1 & m & n \\ a & b & c \\ f'(x) & g'(x) & h'(x) \end{vmatrix}$

Ans: (1, 3, 4)

52. The area of the region bounded by the curve $y = x^2$ and the line $y = 16$ is

1) $\frac{128}{3}$ sq..units
2) $\frac{64}{3}$ sq.units
3) $\frac{32}{3}$ sq.units
4) $\frac{256}{3}$ sq.units

Ans: (1)

53. If $\sin x = \frac{2t}{1+t^2}$, $\tan y = \frac{2t}{1-t^2}$, then $\frac{dy}{dx}$ is equal to

1) -1
2) 2
3) 0
4) 1

Ans: (4)

54. Let $f : R \to R$ be defined by $f(x) = x^{4,}$ then

1) f may be one-one and onto
2) f is one-one and onto
3) f is one-one but not onto
4) f is neither one-one nor onto

Ans: (4)

55. If $y = \log(\log x)$ then $\frac{d^2y}{dx^2}$ is equal to

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

Ans: (3)

56. Area of the region bounded by the curve y = cos x, x = 0 and x = π is

1) 3 sq. units 2) 1 sq. unit 3) 4 sq. units 4) 2 sq. units

Ans: (4)

57. If $y = \tan^{-1}\left(\frac{\sin x + \cos x}{\cos x - \sin x}\right)$, then $\frac{dy}{dx}$ is equal to

1) 1 2) 1/2 3) 0 4) $\pi/4$

Ans: (1)

58. The eccentricity of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$ is

1) $\frac{2\sqrt{5}}{4}$ 2) $\frac{2\sqrt{13}}{6}$ 3) $\frac{2\sqrt{5}}{6}$ 4) $\frac{2\sqrt{13}}{14}$

Ans: (3)

59. $\int \frac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta} dx$ is equal to

1) 2(sin x + x cos θ) + C 2) 2(sin x - x cos θ) + C

3) 2(sin x + 2x cos θ) + C 4) 2(sin x - 2x cos θ) + C

Ans: (1)

60. The value of $\lim_{\theta \to 0} \frac{1 - \cos 4\theta}{1 - \cos 6\theta}$ is

1) 9/4 2) 3/4 3) 4/9 4) 9/3

Ans: (3)