

**KCET EXAMINATION – 2020**  
**SUBJECT : MATHEMATICS**

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

**TIME : 02.30 PM TO 03.50 PM**

1. If  $2^{x+2y}=2^{x+y}$ , 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

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

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  $c_1 y = (c_2 + c_3) e^{x+c_4}$  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**

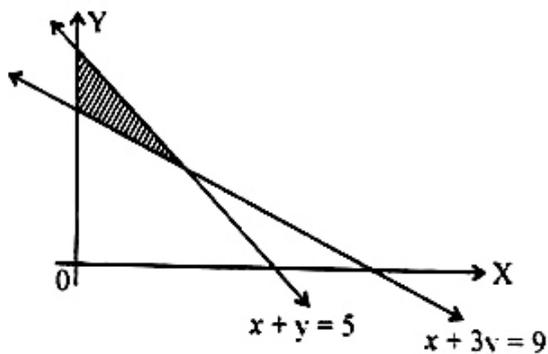
27. If a line makes an angle of  $\frac{\pi}{3}$  with each of x and y-axis, then the acute angle made by z-axis is
- a)  $\frac{\pi}{4}$     b)  $\frac{\pi}{6}$     c)  $\frac{\pi}{3}$     d)  $\frac{\pi}{2}$

**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  $\tan^4 A + \cot^4 A =$
- 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**



