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MATHEMATICS SAMPLE QUESTIONS – VOL.03

1. For any set A, B and n $(A' \cap B')$ is equal to

   a. n $((A \cup B))$

   b. n $((A \cup B'))$

   c. n $((A \cup B)')$

   d. n $((A' \cup B)')$

2. The total number of functions from A(has m elements) to B(Has n elements) is

   a. m^n

   b. n^m

   c. nm

   d. n+m

3. If A = {1, 2, 3}, B = {4, 5, 6}, which of the following are relations from A to B? Give reasons in support of your answer.

   (a) (b) R_2 = {(1, 5), (2, 4), (3, 6)}

   (b) R_1 = {(1, 4), (1, 5), (1, 6)}

   (c) R_3 = {(1, 4), (1, 5), (3, 6), (2, 6), (3, 4)}

   (d)(d) R_4 = {(4, 2), (2, 6), (5, 1), (2, 4)}

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4. Find the value of $2x^3 + 2x^2 - 7x + 72$, when $x = 3-5i/2$.

   a. 6

   b. 7

   c. 4

   d. 9

5. What is the smallest positive integer n, for which $(1 + i)^{2n} = (1 - i)^{2n}$?

   a. 2

   b. 3

   c. 4

   d. 5

6. What is the polar form of the complex number $(i^{25})^3$

   a. $\cos\frac{\pi}{2} - i\sin\frac{\pi}{2}$

   b. $-\cos\frac{\pi}{2} - i\sin\frac{\pi}{2}$

   c. $\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}$

   d. $-\sin\frac{\pi}{2}$

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7. If A s a skew – symmetric matrix and n is a positive integer, then A^n is

   (a) a symmetric matrix

   (b) skew – symmetric matrix

   (c) diagonal matrix

   (d) none of these

8. If A is a skew – symmetric matrix and n is odd positive integer, then A^n is

   (a) a symmetric matrix

   (b) a skew – symmetric matrix

   (c) diagonal matrix

   (d) none of these

9. If A is a skew – symmetric matrix and n is even positive integer, then A^n is

   (a) a symmetric matrix

   (b) a skew – symmetric matrix

   (c) diagonal matrix

   (d) none of these

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10. Let A b a non – singular square matrix of order 3×3. Then $|\text{adj } A|$ is equal to

    a. $|A|$

    b. $|A|^2$

    c. $|A|^3$

    d. $3|A|$

11. If A is an invertible matrix of order 2, then det (A^{-1}) is equal to

    a. $\det |A|$

    b. $\frac{1}{\det(A)}$

    c. 1

    d. 0

12. $x + 2y = 2$
    $2x + 3y = 3$ x and y are

    a. 1,1/2

    b. 1,0

    c. ½,1

    d. None

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13. If $x^{13}y^7 = (x + y)^{20}$, then $\frac{dy}{dx} =$

a. $-\frac{y}{x}$

b. $\frac{y}{x}$

c. $\frac{2y}{x}$

d. $3\frac{y}{x}$

14. If $x^{16}y^9 = (x^2 + y)^{17}$, then $x\frac{dy}{dx}$

a. 3y

b. 4y

c. 2y

d. y

15. If $x^y . y^x = 1$, then $\frac{dy}{dx}$ =

a. $-\frac{y\,(y+x\log y)}{x\,(y\log x+x)}$

b. $-\frac{y\,(y+x\log y)}{x\,(y\log x+x)}$

c. $-\frac{y\,(y+x\log y)}{x\,(y\log x+x)}$

d. $-\frac{y\,(y+x\log y)}{x\,(y\log x+x)}$

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16. The intervals in which the functions strictly increasing $x^2 + 2x - 5$

    a. $x>2$

    b. $x<-1$

    c. $x>-1$

    d. None

17. The intervals in which the functions strictly increasing $6 - 9x - x^2$

    a. $x<9/2$

    b. $x<-9/2$

    c. $x>9/2$

    d. $x>-9/2$

18. The intervals in which the functions strictly increasing $-2x^3 - 9x^2 - 12x + 1$

    a. (2,1)

    b. (-2,1)

    c. (-2,-1)

    d. (-2,-1)

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19. cos2x cos 4x cos 6x

a. $\frac{1}{5}\left[x+\frac{1}{12}\sin 12x+\frac{1}{8}\sin 8x+\frac{1}{4}\sin 4x\right]+C$

b. $\frac{1}{2}\left[x+\frac{1}{12}\sin 12x+\frac{1}{8}\sin 8x+\frac{1}{4}\sin 4x\right]+C$

c. $\frac{1}{4}\left[x+\frac{1}{12}\sin 12x+\frac{1}{8}\sin 8x+\frac{1}{4}\sin 4x\right]+C$

d. $\frac{1}{6}\left[x+\frac{1}{12}\sin 12x+\frac{1}{8}\sin 8x+\frac{1}{4}\sin 4x\right]+C$

20. $\sin^3(2x+1)$

a. $-\frac{1}{2}\cos(4x+1)+\frac{1}{6}\cos^3(2x+1)+C.$

b. $\frac{1}{2}\cos(3x+1)+\frac{1}{6}\cos^3(2x+1)+C.$

c. $\frac{1}{2}\cos(2x-1)+\frac{1}{6}\cos^3(2x+1)+C.$

d. $-\frac{1}{2}\cos(2x+1)+\frac{1}{6}\cos^3(2x+1)+C.$

21. $\sin^3 x \cos^3 x$

a. $\frac{1}{6}\cos^6 y-\frac{1}{4}\cos^4 x+C$

b. $\frac{1}{2}\cos^6 x-\frac{1}{4}\cos^4 x+C$

c. $\frac{1}{5}\cos^6 x-\frac{1}{4}\cos^4 x+C$

d. $\frac{1}{6}\cos^6 x-\frac{1}{4}\cos^4 x+C$

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22. In a triangle ABC, angle B = 60^0, then

a) $(a - b)^2 + ab = c^2$
b) $(b - c)^2 + bc = a^2$
c) $(c - a)^2 + ca = b^2$
d) $a^2 + b^2 + c^2 = 2b^2 + ac$

23. If one side of a triangle is double the other and the angles opposite to these sides differ by 60^0, then the triangle is

(a) Obtuse angled
(b) Acute angled
(c) Isosceles
(d) Right angled

24. In a ΔABC, if a + b = 3c, then the value of $\cot\frac{A}{2}\cot\frac{B}{2}$ *is*

(a) 1
(b) 2
(c) 3
(d) 4

25. Find the value of $\cos 570^o \sin 510^o + \sin(-330^o)\cos(-390^o)$

a.4
b.5
c.0
d.2

26. If $\sin A = \frac{3}{5}$ and $\cos B = \frac{9}{41}$, $0 < A < \frac{\pi}{2}$, $0 < B < \frac{\pi}{2}$, find the value $\sin(A - B)$

a.-16/64
b.-16/67
c. -16/65
d.-16/63

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27. If $\sin A = \frac{3}{5}, 0 < A < \frac{\pi}{2}$ and $\cos B = \frac{-12}{13}$, $\pi < B < \frac{3\pi}{2}$, find $\tan(A - B)$

a. 16/23
b. 16/24
c. 16/27
d. 16/26

28. If $\cos A = \frac{4}{5}, \cos B = \frac{12}{13}, \frac{3\pi}{2} < A, B < 2\pi$ find the value of cos(A+B)

a.33/65
b.33/67
c.33/78
d.33/76

29. What is the relation between a_n and S_n where a_n is the nth term and and S_n is the sum of n terms

(a) $a_{n-1} = S_n - S_{n-1}$
(b) $a_{n+1} = S_n - S_{n-1}$
(c) $a_n = S_n + S_{n-1}$
(d) $a_n = S_n - S_{n-1}$

30. If the sum of three numbers in G.P. is 38 and their product is 1728, find them.

(a) 8, 12, 18
(b) 8, 10, 12
(c) 14, 16, 18
(d) 18, 20, 22

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31. Find the sum of 7 terms of the G.P. 3, 6, 12, …

(a) 382

(b) 381

(c) 325

(d) 380

32. Evaluate $\lim_{x\to 1} \frac{x^3+3x^2-6x+2}{x^3+3x^2-3x-1}$

a.1/5

b.1/2

c.1/6

d.1/7

33. Evaluate $\lim_{x\to 5} \frac{x^3-125}{x^2-7x+10}$

a.22

b.24

c.25

d.23

34. Evaluate $\lim_{x\to 2}\left(\frac{1}{x-2}-\frac{4}{x^3-2x^2}\right)$

a.1

b.3

c.5

d.7

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35. How many three digit odd numbers are there.

a.430
b.440
c.450
d.460

36. How many different five-digit number licence plates can be made if
(i) First digit cannot be zero and the repetition of digits is not allowed.
(ii) The first digit cannot be zero, but the repetition of digits is allowed?

a. (i) 27216 (ii) 90000
b. (i) 27316 (ii) 99000
c. (i) 26216 (ii) 95000
d. (i) 28216 (ii) 96600

37. How many four-digit numbers can be formed with the digits 3,5,7,8,9 which are greater than 7000, if repetition of digits is not allowed?

a.72
b.766
c.76
d.87

38. Eight chairs are numbers 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 the men select the chairs from amongst the remaining. The number of possible arrangements is

a. $4C_3.4C_2$ b. $4C_2.4P_3$ c. $4P_3.4P_3$ d.none

39. The probability of a certain event is

a. 0
b. 1
c. 1/2
d.non existent

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40. The probability of an impossible event is

a. 0
b. 1
c. 1/2
d. non existent

41. What is the probability that a non leap year has 53 Sundays?

a. $\frac{6}{7}$
b. $\frac{1}{7}$
c. $\frac{5}{7}$
d. None of these

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

a. $2n^2-9n+7=0$ b. $2n^2-5n+7=0$ c. $n^2-9n+7=0$ d. $2n^2-5n-7=0$

43. The sum of the coefficients in the expansion of $(1-x)^{10}$ is

a.1024 b.0 c.1 d.10^2

44. If the sum of the coefficients in the expansion of $(x+y)^n$ is 4096, then the greatest coefficient in the expansion is

a.1594 b.792 c.924 d.none

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45. If p and q are the roots of the equation $x^2 - px + q = 0$, then

(a) p = 1, q = -2 (b) b = 0, q = 1

(c) p = -2, q = 0 (d) q = -2, q = 1

46. If a and b can take values 1, 2, 3, 4. Then the number of the equation of the form $ax^2 + bx + 1 = 0$ having real roots is

(a) 10 (b) 7 (c) 6 (d) 12

47. The number of quadratic equations having real roots and which do not change by squaring their roots is

(a) 4 (b) 3 (c) 2 (d) 1

48. The function f(x) = $|x| + \frac{|x|}{x}$ is

(a) Discontinuous at the origin because $|x|$ is discontinuous there

(b) Continuous at the origin

(c) Discontinuous at the origin because $|x|$ and $\frac{|x|}{x}$ is discontinuous there

(d) Discontinuous at the origin because $\frac{|x|}{x}$ is discontinuous there

49. Consider f(x) = $\frac{x^2}{|x|}$. x ≠ 0, f(0) =0, then

(a) f(x) is discontinuous every where

(b) f(x) is continuous every where

(c) f(x) is not continuous only at x = 0

(d) f(x) is continuous only at x = 0

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50. The value of f(2) so that f(x) $\frac{2^{x+2}-16}{4^{x}-16}$ is continuous at x = 2 is

(a) 2

(b) $\frac{1}{2}$

(c) -2

(d) - $\frac{1}{2}$

ANSWER KEYS:

1	B	11	B	21	D	31	B	41	B
2	B	12	A	22	C	32	B	42	A
3	B	13	B	23	D	33	C	43	B
4	C	14	C	24	D	34	A	44	C
5	A	15	A	25	C	35	C	45	A
6	A	16	D	26	C	36	A	46	A
7	D	17	D	27	A	37	A	47	C
8	B	18	B	28	A	38	D	48	D
9	A	19	C	29	D	39	B	49	B
10	B	20	D	30	A	40	A	50	B