**1.** In a class of 25 students, 12 have taken mathematics, 8 have taken mathematics and computer science. Also each student have taken at least one subject out of mathematics and computer science. The number of students who have taken computer science but not mathematics is :

(1) 8

(2) 13

(3) 4

(4) 17

**2.** If A and B are subsets of the set of integers such that $A=\{x:-4 \le x \le 10\}$ and $B=\{x:-3 < x < 9\}$, then $A \cap B$ equals :

(1) A

(2) $A-B$

(3) $B-A$

(4) B

**3.** The range of function $f(x)=\dfrac{1}{4-\sin 2x}$, $(x \in R)$ is :

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

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

(3) $\left[\frac{1}{5}, \frac{1}{3}\right]$

(4) $[5, 3]$

**4.** If the function $f: R \to R$ is defined by $f(x)=x^2+x$ then the function $f$ is :

(1) One - one but not onto

(2) Onto but not one - one

(3) Both one -one and onto

(4) Neither one - one nor onto

**5.** The domain of the function $f(x)=\dfrac{\log_2 (x+3)}{x^2+3x+2}$ is :

(1) $(-3, \infty)-\{-1,-2\}$

(2) $R-\{-1,-2\}$

(3) $(-2, \infty)$

(4) $R-\{-1,-2,-3\}$

TELEGRAM - @TEACHINGEXAM FOR UTET DSSSB KVS AND OTHER EXAM



6. For all $n \geqslant 1$, $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \cdots + \frac{1}{n(n+1)}$ is equal to :

(1) $\frac{1}{n+1}$

(2) $\frac{n}{n+1}$

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

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

7. In how many ways the letter of the word BALLOON be arranged so that two L do not come together ?

(1) 1260
(2) 360
(3) 900
(4) 1060

8. How many 9-digit numbers can be formed which have all different digits ?

(1) $10!$
(2) $9!$
(3) $9 \times 9!$
(4) $10 \times 10!$

9. If the number of points on a circle is 'n' and the number of different triangles formed by joining these points is 84, then the value of 'n' is :

(1) 9
(2) 7
(3) 8
(4) 6

10. If w is a complex cube root of unity, then $1 + w + w^2 + \ldots + w^{100}$ is equal to :

(1) 0
(2) $1 + w$
(3) $1 - w$
(4) w

11. If $|z+5| \leq 2$, $z = x + iy$, then the greatest value of $|z+2|$ is :

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

TELEGRAM - @TEACHINGEXAM FOR CTET DSSSB KVS AND OTHER EXAM



**12.** If $\left(1+\sqrt{3}\,\mathrm{i}\right)^{12} = x + iy$ then $y^{\frac{1}{12}}$ is equal to :

(1) 1

(2) 2

(3) $\sqrt{3}$

(4) 0

**13.** Find real values of θ such that $\dfrac{3+2\mathrm{i}\sin\theta}{1-2\mathrm{i}\sin\theta}$ is purely real.

(1) $\theta=\mathrm{n}\pi,\ \mathrm{n}\epsilon z$

(2) $\theta=(\mathrm{n}+1)\pi,\ \mathrm{n}\epsilon z$

(3) $\theta=\dfrac{\mathrm{n}\pi}{2},\ \mathrm{n}\epsilon z$

(4) $\theta=\dfrac{(\mathrm{n}+1)\pi}{2},\ \mathrm{n}\epsilon z$

**14.** The value of $\lim\limits_{x\to 0}\dfrac{\mathrm{e}^{x}-\sin x-1}{x}$ is :

(1) 1

(2) $\infty$

(3) 0

(4) $-1$

**15.** If $f:\mathrm{R}\to\mathrm{R}$ be given by $f(x)=\left(3-x^{3}\right)^{1/3}$, *then* $(f\circ f)(x)$ is :

(1) $x^{1/3}$

(2) $x^{3}$

(3) $x$

(4) $(3-x^{3})$

**16.** The values of '$x$' satisfying the inequalities

$3x-7<5+x$

$11-5x\leq 1$, are :

(1) $2\leq x\leq 8$

(2) $2\leq x<6$

(3) $2<x\leq 6$

(4) $2<x<8$

**17.** If $(1+x)^n = C_0 + C_1x + C_2x^2 + \cdots + C_nx^n$, then value of $\frac{C_0}{2} + \frac{C_1}{3} + \frac{C_2}{4} + \cdots + \frac{C_n}{n+2}$ is equal to :

(1) $\frac{2^n + 1}{n\,(n+1)}$

(2) $\frac{2^n + 1}{(n+1)\,(n+2)}$

(3) $\frac{n\,.\,2^{\,n+1} + 1}{(n+1)\,(n+2)}$

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

**18.** In the expansion of $\left(\frac{3x^2}{2} - \frac{1}{3x}\right)^9$, the term free from $x$ is :

(1) ${}^9C_3\,.\,\frac{1}{6^3}$

(2) ${}^9C_3\left(\frac{3}{2}\right)^3$

(3) ${}^9C_3\,.\,\frac{-1}{6^3}$

(4) ${}^9C_3\left(\frac{-3}{2}\right)^3$

**19.** If A is a square matrix such that $A^2 = I$, then $(A-I)^3 + (A+I)^3 - 7A$ equals :

(1) A

(2) $I - A$

(3) $I + A$

(4) 3A

**20.** Let A be a $3 \times 3$ complex Hermitian matrix which is unitary. Then the distinct eigen values of A are :

(1) $\pm i$

(2) $1 \pm i$

(3) $\pm 1$

(4) $\frac{1}{2}\,(1 \pm i)$

TELEGRAM - @TEACHINGEXAM FOR OTET BOSSE HTO AND OTHER EXAM



**21.** Given $2x - y + 2z = 2$

$x - 2y + z = -4$

$x + y + \lambda z = 4$

Then the value of $\lambda$ such that the given system of equations has no solution is :

(1) 3

(2) $-3$

(3) 0

(4) 1

**22.** The median and Standard Deviation (S.D.) of a distribution are 20 and 4 respectively. If each item of the distribution is increased by 2, then

(1) Median and S.D. will be increased by 2

(2) Median will be increased by 2 but S.D. will remain same

(3) Median will increase by 2 but S.D. will be decreased by $\sqrt{2}$

(4) Median will remain same but S.D. will be increased by 2

**23.** Which among the following is wrong ?

(1) $\sin^{-1} x = \frac{\pi}{2} - \cos^{-1} x$

(2) $2\sin^{-1} x = \sin^{-1} 2x\sqrt{1 - x^2}$

(3) $3\sin^{-1} x = \sin^{-1} \left(4x^3 - 3x\right)$

(4) $\sec^{-1} x = \frac{\pi}{2} - \operatorname{cosec}^{-1} x$

**24.** For $0 \le x \le 4$, $y = |x - 2|$ represents :

(1) A straight line

(2) A circle with radius 2

(3) A hyperbola

(4) A pair of straight line segments

**25.** The number of common tangents to the circles $x^2 + y^2 - x = 0$ and $x^2 + y^2 + x = 0$ is :

(1) 2

(2) 1

(3) 4

(4) 3

**26.** Match the inverse trignometric functions with their ranges :

| | Function | | Range |
|---|---|---|---|
| 1. | $\sin^{-1}x$ | (a) | $[0, \pi] - \left\{\frac{\pi}{2}\right\}$ |
| 2. | $\operatorname{cosec}^{-1}x$ | (b) | $(0, \pi)$ |
| 3. | $\sec^{-1}x$ | (c) | $\left[-\pi/2, \pi/2\right] - \{0\}$ |
| 4. | $\cos^{-1}x$ | (d) | $\left[-\pi/2, \pi/2\right]$ |

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

**27.** If the order of matrix $A = 4 \times 3$, order of matrix $B = 4 \times 5$ and order of matrix $C = 7 \times 3$, then the order of $(A^t \times B)^t \times C^t$ is :
(1) $4 \times 5$
(2) $3 \times 7$
(3) $4 \times 3$
(4) $5 \times 7$

**28.** The first four terms of an A.P. are p, q, $3p - q$ and $3p + q$. The 2010$^{th}$ term of this A.P. is :
(1) 8041
(2) 8043
(3) 8045
(4) 8047

**29.** The least value of 'n' which satisfies $1 + 3 + 3^2 + \cdots + 3^{n-1} > 700$ is :
(1) 4
(2) 5
(3) 6
(4) 7

**30.** If A and B are square matrices of order 3 such that det $A = -1$ and det $B = 3$, then det(3AB) is :
(1) $-9$
(2) $-27$
(3) $-81$
(4) 81

**31.** The roots of the equation $|x^2| + |x| - 6 = 20$ are :
(1) One and only one real number
(2) Real with sum one
(3) Real with sum zero
(4) Real with product zero

**32.** The angle of intersection of the curve $y=4-x^2$ and $y=x^2$ is :

(1) $\tan^{-1}\left[\frac{4\sqrt{2}}{7}\right]$

(2) $\tan^{-1}\left[\frac{2}{7}\right]$

(3) $\tan^{-1}\left[\frac{3\sqrt{2}}{7}\right]$

(4) $\pi/2$

**33.** The conic $x^2+xy+y^2+x+y=1$ is :

(1) an ellipse
(2) a hyperbola
(3) a parabola
(4) a pair of straight lines

**34.** The equation of the hyperbola where foci are $(0, \pm 12)$ and the length of the latus rectum is 36 is :

(1) $x^2-3y^2=108$
(2) $x^2-y^2=54$
(3) $y^2-x^2=54$
(4) $3y^2-x^2=108$

**35.** The plane $ax+by=0$ is rotated through an angle $\alpha$. The equation of plane in its new position is :

(1) $ax + by \pm z\sqrt{a^2+b^2}\tan\alpha = 0$

(2) $ax + by \pm z\sqrt{a^2-b^2}\tan\alpha = 0$

(3) $ax + by \pm z\sqrt{a^2-b^2}\cos\alpha = 0$

(4) $ax + by \pm z\sqrt{a^2+b^2}\cos\alpha = 0$

**36.** The coordinates of the point, where the line $\frac{x-2}{-1}=\frac{y+3}{1}=\frac{z-1}{6}$ intersects the plane $2x+y+z=7$, are :

(1) $(2, 1, -7)$
(2) $(7, -1, 2)$
(3) $(1, -2, 7)$
(4) $(2, -7, 1)$

TELEGRAM @TEACHINGEXAM FOR UTET DSSSB KVS AND OTHER EXAM



**37.** The equation of a sphere circumscribing a tetrahedron whose faces are $x=0$, $y=0$, $z=0$ and $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$ is :

(1) $x^2+y^2+z^2 = a^2+b^2+c^2$

(2) $x^2+y^2+z^2+2ax+2by+2cz=0$

(3) $x^2+y^2+z^2+ax+by+cz=0$

(4) $x^2+y^2+z^2-ax-by-cz=0$

**38.** The radius of the smallest sphere passing through (1, 0, 0) (0, 1, 0) (0, 0, 1) is :

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

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

(3) $\frac{\sqrt{3}}{2}$

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

**39.** The number of spheres that can be made to pass through the given three points (a, 0, 0), (0, a, 0) and (0, 0, a) is :

(1) 1

(2) 2

(3) 3

(4) Infinite

**40.** Two students Anil and Rashi appeared in an examination. The probability that Anil will qualify the examination is 0.05 and that Rashi will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. The probability that both will not qualify the examination is :

(1) 0.13

(2) 0.98

(3) 0.87

(4) 0.11

**41.** In a relay race there are five teams A, B, C, D and E. The probability that A, B and C are first three to finish the race (in any order) is :

(1) $\frac{1}{10}$

(2) $\frac{1}{60}$

(3) $\frac{1}{6}$

(4) $\frac{3}{10}$

TELEGRAM - @TEACHINGEXAM FOR UTET DSSSB KVS AND OTHER EXAM



**42.** If $f(x) = x^3$ and $g(x) = x^3 - 4x$ in $-2 \le x \le 2$, then consider the statements

(A) $f(x)$ and $g(x)$ satisfy mean value theorem.

(B) $f(x)$ and $g(x)$ satisfy Rolle's theorem.

(C) Only $g(x)$ satisfies Rolle's theorem.

Which among the following is true ?

(1) Statements (A) and (B) are correct.

(2) Only statements (A) is correct.

(3) No statements is correct.

(4) Statements (A) and (C) are correct.

**43.** $f(x) = \sin x + \cos 2x$, $(x > 0)$ has minima for value of $x$ equals to :

(1) $\frac{n\pi}{2}$

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

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

(4) $n\pi$

**44.** The interval in which the function $f(x) = 4x^3 - 6x^2 - 72x + 30$ decreases is :

(1) $(-\infty, -2)$

(2) $(-2, 3)$

(3) $(3, \infty)$

(4) $(-2, -3)$

**45.** The approximate change in the volume V of a cube of side $x$ meters caused by increasing the side by 2% is :

(1) $0.08\ x^3\ m^3$

(2) $0.04\ x^3\ m^3$

(3) $0.06\ x^3\ m^3$

(4) $0.008\ x^3\ m^3$

**46.** Which among the following is not correct ?

(1) $\int \frac{dx}{\sqrt{x^2 - a^2}} = \log \left| x + \sqrt{x^2 - a^2} \right| + C$

(2) $\int \sqrt{x^2 - a^2}\ dx = \frac{x}{2}\sqrt{x^2 - a^2} - \frac{a^2}{2} \log \left| x + \sqrt{x^2 - a^2} \right| + C$

(3) $\int \sqrt{a^2 - x^2}\ dx = \frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + C$

(4) $\int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \log \left| \frac{x + a}{x - a} \right| + C$

TELEGRAM @TEACHINGEXAM FOR UTET DSSSB KVS AND OTHER EXAM



**47.** $\int \frac{\sin^2 x}{\cos^6 x}\, dx$, is :

(1) a polynomial of degree 5 in $\sin x$
(2) a polynomial of degree 4 in $e^x$
(3) a polynomial of degree 5 in $\cos x$
(4) a polynomial of degree 5 in $\tan x$

**48.** The value of the integral $\int_0^{100\pi} |\sin x|\, dx$ is :

(1) 100
(2) 1
(3) 200
(4) $100\pi$

**49.** The area bounded by the curve $y = x^2$ and $y = 2\,|x|$ is :

(1) $4/3$
(2) $2/3$
(3) $8/3$
(4) $1/3$

**50.** The residue at $z = \infty$ for the function $f(z) = z^3 \cos \frac{1}{Z}$ is :

(1) $-\frac{1}{24}$
(2) $-1$
(3) 0
(4) $1/12$

**51.** Which of the following is a linear differential equation ?

(1) $(y + x)\, y' + y = 1$
(2) $3y' + (x + 4)\, y = x^2 + y''$
(3) $y''' = \cos(2y)$
(4) $y^{(4)} + \sqrt{x}\, y''' + \cos x = e^y$

TELEGRAM - @TEACHINGEXAM FOR UTET DSSSB KVS AND OTHER EXAM



**52.** The value of $\int_c \frac{z^2 - z + 1}{z - 1}\, dz$, where c is the circle $|z| = 1$, is :

(1) $0$
(2) $2\pi i$
(3) $-2\pi i$
(4) $\pi i$

**53.** The analytic function whose real part is $e^x \cos y$ is :

(1) $ze^{2z} + ci$
(2) $ze^z + ci$
(3) $e^{2z} + ci$
(4) $e^z + ci$

**54.** The maximum value of $\sin\left(x + \frac{\pi}{6}\right) + \cos\left(x + \frac{\pi}{6}\right)$ in the interval $\left(0, \frac{\pi}{2}\right)$ is attained at the following value of $x$ :

(1) $\pi/12$
(2) $\pi/6$
(3) $\pi/3$
(4) $\pi/4$

**55.** $3^{4n+2} + 5^{2n+1}$ is completely divisible by :

(1) 15
(2) 14
(3) 13
(4) 12

**56.** The solution of the differential equation $(x + y + 1)\frac{dy}{dx} = 1$ is :

(1) $x = ce^y + y + 2$
(2) $x = ce^y - y + 2$
(3) $x = ce^y - y - 2$
(4) $x = ce^y + y - 2$

57. Match the following :

| Series | Radius of convergence |
|---|---|
| (i) $\sum_{n=0}^{\infty} n z^n$ | (a) 2 |
| (ii) $\sum_{n=0}^{\infty} \left(\frac{n+2}{3n+1}\right)^n (z-4)^n$ | (b) 1 |
| (iii) $\sum_{n=0}^{\infty} \frac{z^n}{2^n}$ | (c) 3 |

(1) (i) - (c), (ii) - (a), (iii) - (b)
(2) (i) - (b), (ii) - (c), (iii) - (a)
(3) (i) - (b), (ii) - (a), (iii) - (c)
(4) (i) - (a), (ii) - (c), (iii) - (b)

58. The order and degree of the differential equation $y = x\frac{dy}{dx} + \frac{2}{dy/dx}$ is :

(1) 1, 2
(2) 1, 3
(3) 2, 1
(4) 1, 1

59. If $\hat{i} \times (\hat{i} \times \vec{a}) + \hat{j} \times (\hat{j} \times \vec{a}) + \hat{k} \times (\hat{k} \times \vec{a}) = m.\vec{a}$, then m is equal to :

(1) 0
(2) $-2$
(3) 2
(4) 1

60. If $|\vec{a}| + |\vec{b}| = |\vec{c}|$ and $\vec{a} + \vec{b} = \vec{c}$, then angle between $\vec{a}$ and $\vec{b}$ is :

(1) 0°
(2) 45°
(3) 90°
(4) 180°

**61.** Given :

**Statement A :** $T : R^3 \rightarrow R^2$ defined by $T(a, b, c) = (|a|, 0)$ is linear.

**Statement B :** $T : R^3 \rightarrow R^3$ defined by $T(a, b, c) = (a+1, b+c, 0)$ is linear.

Which one of the following is correct ?

(1) **A** is true, **B** is false.

(2) **B** is true, **A** is false.

(3) **A** and **B** both are true.

(4) **A** and **B** both are false.

**62.** Let T be the linear transformation from $R^3$ into $R^3$ defined by $T(x, y, z) = (x-y+2z, 2x+y, -x-2y+2z)$ then rank and nullity of T are respectively :

(1) 3, 0

(2) 0, 3

(3) 2, 1

(4) 1, 2

**63.** If the vectors $(0, 1, x)$, $(x, 1, 0)$ and $(1, x, 1)$ of vector space $R^3(R)$ are linearly independent, then $x$ will be :

(1) $\pm\sqrt{2}$

(2) $+1$

(3) $-1$

(4) $\pm 2$

**64.** If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors, then $|\hat{a}-\hat{b}|^2 + |\hat{b}-\hat{c}|^2 + |\hat{c}-\hat{a}|^2$ does not exceed :

(1) 4

(2) 9

(3) 8

(4) 6

**65.** If $x = 2 + 2^{2/3} + 2^{1/3}$, Then the value of $x^3 - 6x^2 + 6x$ is :

(1) 3

(2) 2

(3) 1

(4) 0

**66.** The number of elements in the power set of the set $S = \{a, \{b, c\}, d, \{\phi\}\}$ is :

(1) 4

(2) 5

(3) 8

(4) 16

**67.** If n is a +ve integer, $3^{2n} - 8n - 1$ is divisible by :

(1) 84

(2) 64

(3) 81

(4) 49

**68.** The longest side of a triangle is 4 times the shortest side and the third side is 3 cm shorter than the longest side. If the perimeter of the triangle is at least 42 cm, the minimum length of the shortest side is :

(1) 6 cm

(2) 5 cm

(3) 9 cm

(4) 7 cm

**69.** The term independent of '$x$' in $\left(x^2 - \frac{1}{x}\right)^9$ is :

(1) 84

(2) $-84$

(3) 126

(4) $-126$

**70.** Three numbers are in G.P. If we double the middle term, we get an A.P. The common ratio of the G.P is :

(1) $2 \pm \sqrt{3}$

(2) $3 \pm \sqrt{2}$

(3) $\sqrt{2} \pm 3$

(4) $\sqrt{3} \pm 2$

**71.** If $x$, $3x+2$, $6x+4$ are first three terms of a G.P., then the fifth term of the G.P. is :

(1) $-16$

(2) $+16$

(3) $-32$

(4) $+32$

**72.** If $2x^{1/4} + 3x^{-1/4} = 7$, then $x$ is equals to :

(1) 16 or 81

(2) $\frac{1}{16}$ or 81

(3) $-\frac{1}{16}$ or $\frac{1}{81}$

(4) $-16$ or $-81$

**73.** If one root of the equation $(x-4)(x-6)=p$, is four times the other, then p equals to :

(1) 6
(2) 8
(3) $-6$
(4) $-8$

**74.** The angles of a triangle are in A.P. and the largest angle is 75°. The smallest angle is :

(1) 55°
(2) 50°
(3) 45°
(4) 40°

**75.** $\dfrac{\cos 30° - \sin 30°}{\cos 30° + \sin 30°}$ is equal to :

(1) tan 15°
(2) tan 30°
(3) tan 45°
(4) tan 60°

**76.** The smallest positive angle satisfying the equation $\cos^2\theta - 2\sin\theta + \dfrac{1}{4} = 0$ is :

(1) 30°
(2) 45°
(3) 60°
(4) 90°

**77.** The variance of the observations 13, 17, 10, 20, 16 and 14 is :

(1) 8
(2) 9
(3) 10
(4) 11

**78.** The mean of first 3 observations is 23, next 2 observations is 18 and the last 3 observations is 21. The mean of all the 8 observations is :

(1) 20
(2) 20.6
(3) 21
(4) 22

TELEGRAM - @TEACHINGEXAM FOR UTET DSSSB KVS AND OTHER EXAM



**79.** A box contains 8 red balls, 12 blue balls and 5 yellow balls, 3 balls are drawn at random from the box. The probability of drawing all 3 blue balls is :

(1) $\frac{3}{25}$

(2) $\frac{12}{25}$

(3) $\frac{12}{115}$

(4) $\frac{11}{115}$

**80.** In how many ways can the number 5040 be resolved into two factors ?

(1) 12
(2) 20
(3) 30
(4) 60