TELANGANA
ECET 2015

Set Code : S2
Booklet Code : C

Note: *(1) Answer **all** questions.*

*(2) Each question carries **1** mark. There are no negative marks.*

*(3) Answer to the questions must be enetered only on OMR Response Sheet provided separately by completely shading with **Ball Point Pen (Blue/Black),** only one of the circles 1, 2, 3 or 4 provided against each question, and which is most appropriate to the question.*

(4) The OMR Response Sheet will be invalidated if the circle is shaded using pencil or if more than one circle is shaded against each question.

MATHEMATICS

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

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

2. If $y = \sqrt{x + \sqrt{x + \sqrt{x + \cdots\cdots\infty}}}$, then $\frac{dy}{dx}$ is

(1) 0 (2) $\frac{1}{2x-1}$ (3) $\frac{1}{2y-1}$ (4) 1

3. If $y = \log(\sin(\cos x))$, then $\frac{dy}{dx}$ is

(1) $\operatorname{cosec}(\cos x)$ (2) $\sin x \cot(\cos x)$ (3) $-\sin x \cot(\cos x)$ (4) $\sec(\cos x)$

4. If $y = A \cos x + B \sin x$, then $\frac{d^2y}{dx^2}$ is

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

5. If $x = at^2$; $y = 2at$ then $\frac{dy}{dx}$ is

(1) 0 (2) t (3) $1/t$ (4) 1

6. If $u = \log(e^x + e^y)$, then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y}$ is equal to

(1) 0 (2) 1 (3) 2 (4) 3

7. If u is a homogeneous function of order n, then : $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}$ is equal to

(1) 0 (2) nu (3) xu (4) yu

8. If $u=\frac{x^4+y^4}{x+y}$ then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}$ is equal to

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

9. The maximum value of the function : $y = 2x^3 - 6x^2 - 18x + 21$ is

(1) 21 (2) 31 (3) -1 (4) 3

10. $\int e^x dx =$

(1) e^x (2) $e^x + c$ (3) e (4) $\log x$

11. $\int\frac{1}{x}dx =$

(1) e^x (2) $\log x + c$ (3) $\log x$ (4) $1/x$

12. $\int e^{\log x}dx =$

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

13. $\int \log e^x dx =$

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

14. $\int_0^{\pi} \sin x\, dx =$

(1) 0 (2) 1 (3) 2 (4) $-\cos x$

15. $\int_0^{\pi} e^{\sin^2 x}\sin 2x\, dx =$

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

16. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x\, dx =$

(1) 0 (2) 1 (3) 2 (4) $\sin x$

17. $\int_0^{\frac{\pi}{2}} \log(\tan x)dx =$

(1) 0 (2) 1 (3) 2 (4) cot x

18. The area enclosed by the curve y = f(x), X - axis and ordinates x = a and x = b is

(1) $\int_a^b \pi f(x)dx$ (b) $\int_a^b |f(x)|dx$ (3) $\int |f(x)|dx$ (4) $\int \pi f(x)dx$

19. The volume of the solid generated by the curve $y = f(x)$ between $x = a$ and $x = b$ when it is revolved about the X-axis is given by

(1) $\int_a^b \pi f(x)dx$ (b) $\int_a^b \pi^2 f(x)dx$ (c) $\int_a^b \pi[f(x)]^2 dx$ (d) $\int_a^b \pi^2[f(x)]^2 dx$

20. The mean value of $f(x)$ over $[a, b]$ is

(1) $\frac{1}{2}\int_a^b f(x)dx$ (2) $\frac{1}{b-a}\int_a^b f(x)dx$ (c) $\frac{1}{a+b}\int_a^b f(x)dx$ (d) $\frac{1}{a-b}\int_a^b f(x)dx$

21. The root mean square value of $f(x)$ over $[a, b]$ is

(1) $\sqrt{\frac{1}{2}\int_a^b f(x)dx}$ (2) $\sqrt{\frac{1}{b-a}\int_a^b f(x)dx}$

(3) $\sqrt{\frac{1}{b-a}\int_a^b [f(x)]^2 dx}$ (4) $\sqrt{\frac{1}{2}\int_a^b [f(x)]^2 dx}$

22. Differential equation corresponding to $y = \sqrt{5x + c}$ is :

(1) $y^2 = 5x + c$ (2) $y' = \frac{2.5}{\sqrt{5x+c}}$ (3) $yy' = 5$ (4) $yy' = 2.5$

23. The differential equation : $(y')^2 + 5y^{1/3} = x$ is :

(1) linear of order 1 and degree 2 (2) non-linear of order 1 and degree 2

(3) linear of order 1 and degree 6 (4) non-linear of order 1 and degree 6

24. The differential equation : $(x + x^8 + ay^2)\,dx + (y^8 - y + bxy)\,dy = 0$ is exact if

(1) $b = a$ (2) $b = 2a$ (3) $a = 1, b = 3$ (4) $b = 2a$

25. Complementary function of $y'' + 4y = 0$ is :

(1) $\cos 2x + \sin 2x$ (2) $C_1 \cos 2x + C_2 \sin 2x$

(3) $C_1 \cos x + C_2 \sin x$ (4) $C_1 \cos 4x + C_2 \sin 4x$

26. Integrating factor of differential equation : $x^2 y' = 3x^2 - 2xy + 1$ is :

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

27. Particular integral of $(D^2 + 4)\, y = \cos 2x$ is :

(1) $\frac{\sin 2x}{4}$ (2) $\frac{\cos 2x}{4}$ (3) $\frac{x \sin 2x}{4}$ (4) $\frac{x \cos 2x}{4}$

28. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then AA^T is

(1) 0 (2) A (3) A^{-1} (4) I

29. The determinant of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{bmatrix}$ is :

(1) 0 (2) 1

(3) (a + b) (b + c) (c + a) (4) (a – b) (b – c) (c – a)

30. If $A = \begin{bmatrix} 2 & -1 & 1 \\ x & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ is singular matrix then x is equal to :

(1) 0 (2) 1 (3) 2 (4) 5

31. The determinant of the matrix $\begin{bmatrix} a & b & c \\ b & c & a \\ c & a & b \end{bmatrix}$ is

(1) 0 (2) 1

(3) $3abc + a^3 + b^3 + c^3$ (4) $3abc - a^3 - b^3 - c^3$

32. Using Cramer's rule, the x value from the equations
$x + y + z = 9$; $2x + 5y + 7z = 52$; $2x + y - z = 0$; is :

(1) 0 (2) 1 (3) 2 (4) 3

33. Partial fractions of $\frac{x-1}{(x-2)(x-3)}$ is :

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

34. If A + B + C = 90^0, then tanA tanB + tanB tanC + tanC tanA is equal to :

(1) 0 (2) 1 (3) 2 (4) 3

35. If $x+\frac{1}{x}=2\cos\theta$ then $x^2+\frac{1}{x^2}$ is :

(1) $4\cos^2\theta$ (2) $4\cos 2\theta$ (3) $2\cos^2\theta$ (4) $2\cos 2\theta$

36. If A + B + C = 180^0, then sin2A + sin2B + sin2C is equal to :

(1) sin2A sin 2B sin2C (2) sinA sinB sinC

(3) 4sin2A sin2B sin2C (4) 4 sinA sinB sinC

37. If $\tan^{-1}x + \tan^{-1}y + \tan^{-1}z = \pi$, then $x + y + z$ is equal to :

(1) 0 (2) 1 (3) xyz (4) $x - y - z$

38. The general solution of $\tan^2\theta = 3$ is :

(1) $n\pi$ (2) $n\pi \pm (\pi/3)$ (3) $n\pi/3$ (4) π

39. In any triangle ABC, if R is a circum radius, then the value of $\frac{\sin A}{a}+\frac{\sin B}{b}+\frac{\sin C}{c}$ is

(1) $\frac{1}{R}$ (2) $\frac{1}{2R}$ (3) $\frac{3}{R}$ (4) $\frac{3}{2R}$

40. If a, b, c are the sides of the triangle, then the angle A can be obtained by cosA =

(1) $\frac{a^2+b^2+c^2}{2bc}$ (2) $\frac{a^2-b^2+c^2}{2bc}$ (3) $\frac{a^2+b^2-c^2}{2bc}$ (4) $\frac{-a^2+b^2+c^2}{2bc}$

41. $(\cosh x + \sinh x)^n$ is equal to

(1) $\cos nhx + \sin nhx$ (2) $\cos^n hx + \sin^n hx$

(3) $\cosh^n x + \sinh^n x$ (4) $\cosh nx + \sinh nx$

42. $(\cos\theta + i \sin\theta)^n$ is equal to

(1) $\cos^n\theta + i \sin^n\theta$ (2) $\cos\theta^n + i \sin\theta^n$

(3) $\cos\theta + i \sin\theta$ (4) $\cos n\theta + i \sin n\theta$

43. If $z = (\cos\theta + i \sin\theta)$, then $z^3+\frac{1}{z^3}$ is equal to

(1) $\cos^3\theta$ (2) $\cos 3\theta$ (3) $2\cos^3\theta$ (4) $2\cos 3\theta$

44. If $y = x + c$ is a tangent to the circle $x^2 + y^2 = 8$, then c is equal to

(1) 4 (2) ± 4 (3) 8 (4) ± 8

45. The vertex of the parabola $y^2 - 4y + 6x - 8 = 0$ is

(1) (2, 2) (2) (4, 4) (3) (6, 6) (4) (8, 8)

46. The eccentricity of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$; $a > b$; is

(1) $\frac{\sqrt{a^2 + b^2}}{a}$ (2) $\frac{\sqrt{a^2 - b^2}}{a}$ (3) $\frac{\sqrt{b^2 - a^2}}{b}$ (4) $\frac{\sqrt{a^2 + b^2}}{b}$

47. The foci of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ $(a > b)$ is

(1) (a, b) (2) $(\pm ae, 0)$ (3) $(0, 0)$ (4) $(0, \pm be)$

48. $\underset{x \to \infty}{Lt} \left(1 + \frac{1}{x}\right)^x =$

(1) 0 (2) 1 (3) e (4) x

49. $\underset{x \to 0}{Lt} \left(\frac{e^x - 1}{x}\right) =$

(1) 0 (2) 1 (3) e (4) x

50. $\underset{x \to 0}{Lt} \left(\frac{a^x - b^x}{x}\right) =$

(1) 0 (2) 1 (3) $\log(ab)$ (4) $\log(a/b)$

ANSWERS

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