JELET–2017

For B. Sc. Candidates

Time Allowed : 2 Hours *Maximum Marks* : 100

80300127

Booklet No. .....

INSTRUCTIONS

Candidates should read the following instructions carefully before answering the questions:

1. This Question Paper contains **100** MCQ type objective questions. Each question has four answer options given, viz. A, B, C and D.
2. Only one answer is correct. Correct answer will fetch full marks 1. Incorrect answer or any combination of more than one answer will fetch $-\frac{1}{4}$ marks. No answer will fetch 0 marks.
3. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C, or D.
4. Use only **Black/Blue ball point pen** to mark the answer by complete filling up of the respective bubbles.
5. Mark the answers only in the space provided. Do not make any stray mark on the OMR.
6. Write question booklet number and your roll number carefully in the specified locations of the OMR. Also fill appropriate bubbles.
7. Write your name (in block letter), name of the examination centre and put your full signature in appropriate boxes in the OMR.
8. The OMRs will be processed by electronic means. Hence it is liable to become invalid if there is any mistake in the quesion booklet number or roll number entered or if there is any mistake in filling corresponding bubbles. Also it may become invalid if there is any discrepancy in the name of the candidate, name of the examination centre or signature of the candidate vis-a-vis what is given in the candidate's admit card. The OMR may also become invalid due to folding or putting stray marks on it or any damage to it. The consequence of such invalidation due to incorrect marking or careless handling by the candidate will be sole responsibility of candidate.
9. Rough work must be done on the question paper itself. Additional blank pages are given in the question paper for rough work.
10. Handover the OMR to the invigilator before leaving the Examination Hall.

Space for Rough Work

1. The modules and amplitude of $1+i\tan\frac{3\pi}{5}$ are

(A) $-\sec\frac{3\pi}{5},\frac{2\pi}{5}$ (B) $-\sec\frac{3\pi}{5},-\frac{2\pi}{5}$

(C) $\sec\frac{3\pi}{5},\frac{2\pi}{5}$ (D) $\sec\frac{3\pi}{5},-\frac{2\pi}{5}$

2. Let Z be a complex number and $Z=1-t+i\sqrt{t^2+t+2}$, where t is a real parameter, then the locus of Z is

(A) a straight line (B) a circle

(C) a hyperbola (D) an ellipse

3. The general value of i^i is

(A) $e^{-\left(2n+\frac{1}{2}\right)\pi}$ (B) $e^{\left(2n+\frac{1}{2}\right)\pi}$

(C) $e^{\left(2n-\frac{1}{2}\right)\pi}$ (D) $e^{-\left(2n-\frac{1}{2}\right)\pi}$

4. If $(1+x)^n=a_0+a_1x+a_2x^2+\cdots\cdots$, then the value of $a_0-a_2+a_4-a_6+\cdots\cdots$ is equal to

(A) $2^{\frac{n}{2}}\cos\left(\frac{n\pi}{4}\right)$ (B) $2^{\frac{n}{2}}\sin\left(\frac{n\pi}{4}\right)$

(C) $-2^{\frac{n}{2}}\cos\left(\frac{n\pi}{4}\right)$ (D) $-2^{\frac{n}{2}}\sin\left(\frac{n\pi}{4}\right)$

5. The relation between a and b in order that $(2x^4-7x^3+ax+b)$ may be exactly divisible by $(x-3)$ is

(A) $2a-3b=21$ (B) $3a+b=27$

(C) $3a-b=-27$ (D) $2a+3b=-21$

6. The lowest degree equation with rational coefficient whose two roots are i and $\frac{1}{\sqrt{2}}$ is

(A) $x^4-x^2+1=0$ (B) $2x^4-x^2+1=0$

(C) $x^4-x^2-1=0$ (D) $2x^4+x^2-1=0$

7. The condition that the equation $x^3+px^2+qx+r=0$ may have two roots equal but of opposite signs is

(A) $r^2=p-q$ (B) $r^2=p^2-q$

(C) $r=pq$ (D) $r^2=p^2q^2$

8. If the roots of the equation $x^n-1=0$ are $1, a_1, a_2 \cdots\cdots a_{n-1}$, then $(1-a_1)(1-a_2)\cdots\cdots(1-a_{n-1})$ is equal to

(A) 0 (B) 1

(C) n (D) $n+1$

9. If α, β, γ are the roots of the equation $x^3+qx+r=0$, then $\Sigma\frac{\alpha}{\beta+\gamma}$ is equal to

(A) 3 (B) –3

(C) $\frac{q}{r}$ (D) $q+r$

10. Removing the second term, the equation $x^3+6x^2+12x-19=0$ reduces to

(A) $x^3-19=0$ (B) $x^3-12=0$

(C) $x^3-25=0$ (D) $x^3-27=0$

11. Let A be a square matrix of order n, then det (Adj A) is equal to

(A) det A (B) $(\det A)^n$

(C) $(\det A)^{n-1}$ (D) $(\det A)^{n-2}$

12. If the matrix A is orthogonal, then

(A) A^T and A^{-1} are both orthogonal. (B) A^T is orthogonal but A^{-1} is not orthogonal.

(C) A^T is not orthogonal but A^{-1} is orthogonal. (D) none of these are orthogonal.

13. $\begin{vmatrix} 1 & 1 & 1 \\ {}^nC_1 & {}^{n+1}C_1 & {}^{n+2}C_1 \\ {}^nC_2 & {}^{n+1}C_2 & {}^{n+2}C_2 \end{vmatrix}$ is equal to

(A) 0 (B) $\frac{n(n+1)}{2}$

(C) $\frac{n(n-1)}{2}$ (D) 1

14. If $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = ka^2b^2c^2$, then k is equal to

(A) 4 (B) 3

(C) 2 (D) 1

15. If for some matrix A, $A^2 - A + I = 0$, then the inverse of matrix A is

(A) $A + I$ (B) $A - I$

(C) $I - A$ (D) A

16. If the rank of an $n \times n$ matrix A is $(n - 1)$, then the system of equations $Ax = b$ has

(A) no solution. (B) unique solution.

(C) one parameter family of solution. (D) $(n - 1)$ parameter family of curves.

17. If A and B are two square martices satisfying the condition $BA = A$ and $AB = B$, then $A^2 + B^2 =$

(A) AB (B) $A + B$

(C) BA (D) $2AB$

18. If origin be shifted to $(-1,2)$, the equation $9x^2 + 4y^2 + 18x - 16y = 11$ changes to

(A) $4x^2 + 9y^2 - 6y = 10$ (B) $9x^2 + 4y^2 = 36$

(C) $4x^2 + 9y^2 + 7x = 7$ (D) $9x^2 + 4y^2 = 0$

19. The angle between the pair of straight lines $3x^2 - 10xy + 3y^2 = 0$ is

(A) $\tan^{-1}\left(\frac{1}{3}\right)$ (B) $\tan^{-1}\left(\frac{2}{3}\right)$

(C) $\tan^{-1}\left(\frac{4}{3}\right)$ (D) $\tan^{-1}\left(\frac{3}{4}\right)$

20. Pole of the straight line $lx + my + n = 0$ w.r. to the circle $x^2 + y^2 = a^2$ is

(A) $\left(\frac{a^2l}{n}, \frac{a^2m}{n}\right)$ (B) $\left(-\frac{a^2l}{n}, -\frac{a^2m}{n}\right)$

(C) $\left(-\frac{a^2l}{n}, \frac{a^2m}{n}\right)$ (D) $\left(\frac{a^2l}{n}, -\frac{a^2m}{n}\right)$

21. The image of the point (1, 3, –4) in the place $3x + y - 2z = 0$ is

(A) (1, –5, 0)
(B) (–5, 0, 1)
(C) (0, –5, 1)
(D) (–5, 1, 0)

22. Value of $(\vec{r}.\hat{i})\hat{i}+(\vec{r}.\hat{j})\hat{j}+(\vec{r}.\hat{k})\hat{k}$ is

(A) $\hat{i}$
(B) $\hat{j}$
(C) $\hat{k}$
(D) $\vec{r}$

23. If θ be the angle between the non null vectors $\vec{a}$ and $\vec{b}$, such that $|\vec{a}\times\vec{b}| = |\vec{a}.\vec{b}|$, then θ is

(A) 0°
(B) 45°
(C) 60°
(D) 180°

24. What is the volume of the tetrahedron with vertices (0,0,0),(1,1,1),(2,1,1) and (1,2,1)?

(A) $\frac{1}{6}$
(B) $\frac{1}{3}$
(C) $\frac{1}{2}$
(D) 1

25. The value of $\left[\vec{a}\times\vec{b}\ \ \vec{b}\times\vec{c}\ \ \vec{c}\times\vec{a}\right]$ is

(A) $2\left[\vec{a}\,\vec{b}\,\vec{c}\right]^2$
(B) $4\left[\vec{a}\,\vec{b}\,\vec{c}\right]^2$
(C) $\left[\vec{a}\,\vec{b}\,\vec{c}\right]^2$
(D) $2\left[\vec{a}\,\vec{b}\,\vec{c}\right]^4$

26. The mapping $f:\mathbb{N}\to\mathbb{R}$ given by $f(x)=x^2+1(x\in\mathbb{N})$, is

(A) surjective but not injective.
(B) injective but not surjective.
(C) neither injective nor surjective.
(D) bijective.

27. Let f: A → B; g: B → C and h: B → C be the mapping such that fog = foh, then

(A) f = g
(B) g = h
(C) g = h if h is injective
(D) g = h if f is surjective

28. A relation ρ is defined on a set $\mathbb{N}$ by "$a\rho b$ iff a is divisible by b" for $\forall\, a, b \in \mathbb{N}$, then ρ is

(A) reflexive and transitive.
(B) symmetric and transitive.
(C) reflexive and symmetric.
(D) equivalence.

29. A function $f(x)=|x-1|+|x|+|x+1|$ is defined in (0.2). Then $f(x)$

(A) is continuous at $x=1$.
(B) has a removable discontinuity at $x=1$.
(C) has a jump discontinuity at $x=1$.
(D) may not be continuous at $x=1$.

30. If $\underset{x\to 0}{Lt}\dfrac{a\sin x-\sin 2x}{\tan^3 x}$ exists and is finite, then the value of 'a' must be

(A) 1
(B) $\dfrac{1}{3}$
(C) $\dfrac{1}{4}$
(D) 2

31. $\dfrac{d^n}{dx^n}\{\log(x+a)\}$ is equal to

(A) $\dfrac{(-1)^n n!}{(x+a)^{n+1}}$
(B) $\dfrac{(-1)^{n-1}(n-1)!}{(x+a)^n}$
(C) $\dfrac{(-1)^n(n+1)!}{(x+a)^{n-1}}$
(D) $\dfrac{(-1)^{n+1}(n+1)!}{(x+a)^{n+1}}$

32. Determine which of the following function satisfy the condition of Rolle's Theorem in the given interval:

(A) $f(x)=\sin x\cos x,\left[0,\dfrac{\pi}{2}\right]$
(B) $f(x)=1-x^{\frac{2}{3}},[-1,1]$
(C) $f(x)=|x|,[-1,1]$
(D) $f(x)=\cos\left(\dfrac{1}{x}\right),[-1,1]$

33. In a curve $r=a\theta$, the length of the polar subnormal is

(A) $-a$
(B) $\dfrac{1}{a}$
(C) $\dfrac{1}{a^2}$
(D) a

34. Asymptotes of the curve $\left(\dfrac{a^2}{x^2}-\dfrac{b^2}{y^2}\right)=1$ are

(A) $x=\pm a$
(B) $y=\pm b$
(C) $x=\pm b$
(D) $y=\pm a$

35. The curvature of the curve $s = a\psi$ is

(A) a (B) $\frac{1}{a}$

(C) a^r (D) $\frac{1}{a^r}$

36. If $lx + my + n = 0$ be a normal to the circle $x^2 + y^2 = a^2$, then

(A) $n = 0$ (B) $n = a^2$

(C) $n = a$ (D) $n = 1$

37. The locus of the point of intersection of two perpendicular tangents to the parabola is

(A) a circle (B) any straight line

(C) directrix (D) a hyperbola

38. The pedal equation of the cosine spiral $r^m = a^m \cos m\theta$ is

(A) $a^m = pr^{m+1}$ (B) $a^{m-1} = pr^{m+1}$

(C) $r^{m+1} = a^m p$ (D) $r^m = a^{m-1} p$

39. If $y = f(x+ct) + \phi(x-ct)$, then

(A) $c^2 \frac{\partial^2 y}{\partial t^2} = \frac{\partial^2 y}{\partial x^2}$ (B) $c^2 \frac{\partial^2 y}{\partial t^2} \neq \frac{\partial^2 y}{\partial x^2}$

(C) $\frac{\partial^2 y}{\partial t^2} \neq c^2 \frac{\partial^2 y}{\partial x^2}$ (D) $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$

40. The double limit $\underset{(x,y)\to(0,0)}{Lt} \frac{xy}{x^2 + y^2}$

(A) exist and equal to 0 (B) exist and equal to 1

(C) exist and equal to 2 (D) does not exists

41. If $u = \sin^{-1} \frac{x+y}{\sqrt{x} + \sqrt{y}}$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$

(A) $\sin 2u$ (B) $\tan 2u$

(C) $\frac{1}{2}\tan 2u$ (D) $\frac{1}{2}\tan u$

42. Consider the differential equations:

(I) $x^2\left(\frac{d^2y}{dx^2}\right)^2 + y^{-\frac{2}{3}}\sqrt{1+\left(\frac{dy}{dx}\right)^2} = 0$

(II) $\frac{dy}{dx} - 6x = \left(ay + bx\frac{dy}{dx}\right)^{\frac{3}{2}}$

The sum of the degree of 1st and 2nd differential equation is

(A) 6 (B) 7

(C) 8 (D) 9

43. Which of the following is a linear differential equation?

(A) $\frac{d^2y}{dx^2} - x^2\frac{dy}{dx} + y^2 = 0$ (B) $x^3\frac{d^2y}{dx^2} - xy\frac{dy}{dx} + y = 0$

(C) $4\frac{d^3y}{dx^3} - x^3\frac{dy}{dx} + x^5y = 0$ (D) $\frac{dy}{dx} - \left(\frac{dy}{dx}\right)^2 = xe^x$

44. The solution of $x\frac{dy}{dx} = y + x\tan\left(\frac{y}{x}\right)$ is

(A) $\sin\left(\frac{x}{y}\right) = xc$ (B) $\sin\left(\frac{y}{x}\right) = xc$

(C) $\left|\sin\frac{y}{x}\right| = |xc|$ (D) $\left|\sin\frac{y}{x}\right| = xc$

45. Particular integral of $\frac{d^2y}{dx^2} - a^2y = e^{ax}$ is

(A) $-\frac{xe^{ax}}{2a}$ (B) $-\frac{xe^{2ax}}{2a}$

(C) $\frac{xe^{ax}}{2a}$ (D) $\frac{xe^{-ax}}{2a}$

46. Solution curve of the equation $x\frac{dy}{dx} = 2y$ passes through (1,2), it also passes through

(A) (2, 3) (B) (24, 5)

(C) (4, 12) (D) (0, 0)

47. The orthogonal trajectories of the family of parabolas $y = ax^2$ are given by the solution of the differential equation

(A) $\frac{dy}{dx} = \frac{2y}{x}$ (B) $\frac{dy}{dx} = -\frac{2y}{x}$

(C) $\frac{dy}{dx} = -\frac{x}{2y}$ (D) $\frac{dy}{dx} = \frac{x}{2y}$

48. The subtangent of the curve $y = f(x)$ at any point $P(x,y)$ is

(A) $y\frac{dy}{dx}$ (B) $\frac{1}{y}\frac{dy}{dx}$

(C) $\frac{y}{\frac{dy}{dx}}$ (D) $\frac{2y}{\frac{dy}{dx}}$

49. The value of $\alpha \in R$ for which the curves $x^2 + \alpha y^2 = 1$ and $y = x^2$ intersect orthogonally is

(A) –2 (B) $-\frac{1}{2}$

(C) $\frac{1}{2}$ (D) 2

50. The value of $\lim_{x\to 0} \frac{x}{1-e^{x^2}} \int_0^x e^{t^2} dt$ is

(A) 1 (B) –1

(C) 2 (D) –2

51. If $I_n = \int_0^{\frac{\pi}{4}} \tan^n x \, dx$ where n is a positive integer (>1), then $I_n + I_{n-2}$ is equal to

(A) $\frac{1}{n-1}$ (B) $\frac{1}{n}$

(C) $\frac{1}{n+1}$ (D) 0

52. For the expansion of $f(x)$ by Maclaurin's theorem, the Lagranges form of remainder after four terms is

(A) $\frac{x^5}{5!} f^{V}(\theta x)$ (B) $\frac{x^5}{4!} f^{V}(\theta x)$

(C) $\frac{x^4}{4!} f^{IV}(\theta x)$ (D) $\frac{x^4}{4!} f^{V}(\theta x)$

Where $0 < \theta < 1$

53. If $y=\sqrt{\log x+\sqrt{\log x+\sqrt{\log x+\cdots upto\ \alpha}}}$, then the value of $x\,(2y-1)\frac{dy}{dx}$ is

(A) -1 (B) -2
(C) 2 (D) 1

54. If $\frac{1}{3}$ be taken as 0·333 then the percentage error is

(A) 1% (B) 0·1%
(C) 10% (D) 0·01%

55. If the interval of differencing be 1, then the value of $\left(\frac{\Delta^2}{E}\right)x^2$ is ....

(A) 2 (B) 3
(C) 4 (D) 6

56. For two intervals the value of $\int_1^3 f(x)\,dx$ is 2 by Trapizoidal rule and 4 by Simpson's $\frac{1}{3}$ rule, the value of $f(2)$ is

(A) 2 (B) 0
(C) 4 (D) 3

57. In the mean value Theorem, $f(h)=f(0)+hf'(\theta h), 0<\theta<1$, the limiting value of θ as $h\to 0$ for $f(x)=\cos x$ is

(A) $\frac{1}{2}$ (B) $\frac{1}{3}$
(C) $\frac{1}{4}$ (D) $\frac{1}{5}$

58. The value of $\underset{n\to\infty}{Lt}\left\{\left(1+\frac{1}{n}\right)\left(1+\frac{2}{n}\right)\cdots\cdots\left(1+\frac{n}{n}\right)\right\}^{\frac{1}{n}}$ is

(A) $2e$ (B) $\frac{2}{e}$
(C) $4e$ (D) $\frac{4}{e}$

59. $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx$ is equal to

(A) $2\sqrt{\sin x} + c$ (B) $2\sqrt{\tan x} + c$

(C) $2\sqrt{\cos x} + c$ (D) $2\sqrt{\cot x} + c$

60. $\int \frac{\sec x \, dx}{\log(\sec x + \tan x)}$ is

(A) $\log|\log(\sec x + \tan x)| + c$ (B) $\log(\sec x + \tan x) + c$

(C) $\frac{1}{\log|\sec x + \tan x|} + c$ (D) $\log|\sec x - \tan x| + c$

61. If $\int \frac{\cos x \, dx}{2\sin x + 3\cos x} = Kx + \frac{2}{13}\log|2\sin x + 3\cos x| + c$, then $K =$

(A) $\frac{3}{13}$ (B) $\frac{2}{13}$

(C) $\frac{4}{13}$ (D) $\frac{5}{13}$

62. If $y = \int_0^x \sqrt{\sin t} \, dt$. then $\left(\frac{dy}{dx}\right)_{x=\frac{\pi}{2}} =$

(A) 1 (B) $\frac{\pi}{2}$

(C) $\frac{1}{2}$ (D) π

63. The value of $\int_0^{\infty} e^{-x^2} dx$ is

(A) $\frac{\pi}{2}$ (B) $\frac{\sqrt{\pi}}{2}$

(C) $\frac{\pi}{\sqrt{2}}$ (D) $\sqrt{\frac{\pi}{2}}$

64. Which of the following can be a non-degenerate basic feasible solution in a system of 2 equations with 4 unknown?

(A) (0, 2, 3, 0)
(B) (1, –2, 0. 0)
(C) (1, 0, 0, 0)
(D) (10, 1, –5, 0)

65. Which of the following is an open half space?

(A) $\{X : CX = Z\}$
(B) $\{X : CX > Z\}$
(C) $\{X : CX \leq Z\}$
(D) $\{X : CX \geq Z\}$

66. Which one of the following is a convex set?

(A) $\{(x,y): 1 \leq x^2 + y^2 \leq 9\}$
(B) $\{(x,y): y = 2x + 3\}$
(C) $\{(x,y): y^2 \geq x\}$
(D) $\{(x,y): x^2 + y^2 = 16\}$

67. The number of optimal solutions of the L.P.P. Max $Z = 6x_1 + 10x_2$

Subject to : $3x_1 + 5x_2 \leq 10$

$5x_1 + 3x_2 \leq 15$

and $x_1, x_2 \geq 0$ is

(A) one
(B) two
(C) finite
(D) infinite

68. Limit of the sequence $\frac{x^n}{n!}$ as $n \to \infty$ is

(A) 0
(B) 1
(C) 2
(D) $\frac{1}{2}$

69. The series $1^3 + 2^3 + 3^3 + \cdots\cdots + n^3 + \cdots\cdots$ is

(A) convergent
(B) divergent
(C) oscillating
(D) conditionally convergent

70. The line segment $x + y = 1, 0 \leq y \leq 1$ is revolved about y-axis through 360°. Area of the surface generated is

(A) 3π
(B) 2π
(C) $\sqrt{2}\pi$
(D) $\sqrt{3}\pi$

71. The volume of solid generated by revolving the part of the parabola $x^2 = 4ay$, $a > 0$,between the ordinates $y = 0$ and $y = a$ about its axis is

(A) πa^3 (B) $\frac{1}{2}\pi a^3$

(C) $\frac{2}{3}\pi a^3$ (D) $2\pi a^3$

72. If λ be an eigen value of a real orthogonal matrix A, then which one is an eigen value of A^T ?

(A) 2λ (B) $\frac{1}{\lambda}$

(C) $\frac{1}{2\lambda}$ (D) $-\lambda$

73. If the binary operation '$\bullet$' be defined on I, the set of all integers by $a \bullet b = a + b + 1$, $a, b \in I$, then the inverse of "a" with respect to $\bullet$ is

(A) $-a-2$ (B) $-a+2$

(C) $a+2$ (D) $a-2$

74. In Simpson's $\frac{1}{3}$ rule the curve $y = f(x)$ is assumed to be a

(A) circle (B) hyperbola

(C) parabola (D) ellipse

75. The trapizoidal rule of integration, when applied, $\int_a^b f(x)\,dx$ will give the exact value of the integral, if $f(x)$ is

(A) a quadratic function of x. (B) a cubic function of x.

(C) any function of x. (D) a linear function of x.

76. If the normal at the point $\left(ct_1, \frac{c}{t_1}\right)$ on the hyperbola $xy = c^2$ meets it again at the point $\left(ct_2, \frac{c}{t_2}\right)$, then

(A) $t_1^2 t_2 = -1$ (B) $t_2^2 t_1 = -1$

(C) $t_2 t_1^3 = -1$ (D) $t_2^3 t_1 = -1$

77. A particle moves along a straight line according to the law $s^2 = 6t^2 + 4t + 3$. Then acceleration varies as

(A) $\frac{1}{s^3}$ (B) $\frac{1}{s^2}$

(C) $\frac{1}{s}$ (D) $\frac{1}{\sqrt{s}}$

78. If the radial velocity is proportional to the transverse velocity, then path in polar co-ordinates is (k is constant of variation)

(A) $r=e^{\frac{k}{2}\theta}$

(B) $r=ce^{k\theta}$

(C) $r=2ck\theta$

where c is an arbitrary constant

(D) $r=ce^{k\frac{\theta}{2}}$

79. For a symmetric binomial distribution the standard deviation is 3. Find the mean

(A) 9

(B) 12

(C) 15

(D) 18

80. Three unbiased coins are tossed together. What is the probability of getting at least one head?

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

(B) $\frac{5}{8}$

(C) $\frac{7}{8}$

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

81. If A and B be two events connected to a random experiment, then

(A) $P(AB)=P(A)P(B)$

(B) $P(A+B)=P(A)+P(B)$

(C) $P(AB)=\frac{P(A)}{P(B)}$

(D) $P(A+B)=P(A)+P(B)-P(AB)$

82. If a, b, c are +ve integers such that gcd (a,bc) = 1, then gcd (a,b) is

(A) 4

(B) 3

(C) 2

(D) 1

83. gcd of 315 and 4235 is

(A) 35

(B) 30

(C) 13

(D) 315

84. Decimal equivalent of the binary number (10010011) is

(A) $(117)_{10}$ (B) $(137)_{10}$

(C) $(147)_{10}$ (D) $(157)_{10}$

85. The value of $\phi(260)$ is

(A) 48 (B) 96

(C) 260 (D) 106

86. The identification number of Mr. Roy's credit card is 5368 2358 9683 1135. The account number of this card is

(A) 3589683113 (B) 3598863311

(C) 1133869853 (D) 6831133589

87. Given A = 1100110110 B = 1110000111 C = 1010010110

Then the value of A . $(\overline{B + C})$ is

(A) 0000110000 (B) 0000100000

(C) 0001000100 (D) 0011000111

88. Which of the following statement is true?

(A) A digital computer is so called because it works on decimal digits.

(B) COBOL is a compiler oriented language.

(C) FORTRAN is a machine dependent programming language.

(D) A compiler is a part of the hardware of a computing system.

89. With the help of Boolean Algebra, the value of the expression $XYZ + X'YZ + XY'Z + YZ'$ is

(A) $X + YZ$ (B) $Z + XY$

(C) $Y + XZ$ (D) $X + Y + Z$

90. Value of multiplication of $(1101)_2$ by $(1011)_2$ is

(A) $(11001100)_2$ (B) $(10001111)_2$

(C) $(00110110)_2$ (D) $(11101101)_2$

91. Binary equivalent of $(231)_8$ is

(A) $(010011001)_2$ (B) $(101011101)_2$

(C) $(100011101)_2$ (D) $(111000111)_2$

92. Decimal equivalent of $(11000{\cdot}0001)_2$ is

(A) 12 (B) 24·05

(C) 24·0625 (D) 24·16

93. $f(x)=\int_0^x \log\left(t+\sqrt{1+t^2}\right)dt$ is

(A) a periodic function (B) an even function

(C) an odd function (D) decreasing function

94. Infinite series expansion of $\log(1+x)$ is valid for

(A) $x > -1$ only (B) $x < 1$ only

(C) $|x| < 1$ only (D) $-1 < x \leq 1$

95. Length of the normal to the catenary $y = c \cosh\left(\frac{x}{c}\right)$ is

(A) $\frac{c}{x}$ (B) $\frac{c^2}{y}$

(C) $\frac{y^2}{c}$ (D) c^2y^2

96. If the pair of straight lines $x^2 - 2pxy - y^2 = 0$ and $x^2 - 2qxy - y^2 = 0$ be such that each pair bisects the angles between the other pair, then

(A) $pq + 1$ (B) $pq - 1 = 0$

(C) $p^2 - q^2 = 1$ (D) $p^2 + q^2 = 1$

97. If A be an orthogonal matrix and P be a skew-symmetric matrix, then $A^{-1}PA$ is

(A) a skew-symmetric matrix. (B) a symmetric matrix.

(C) an orthogonal matrix. (D) congruent matrix.

98. If A_i, B_i, C_i be the respective cofactors of $a_i, b_i, c_i (i=1,2,3)$ in $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$, then the value of $\begin{vmatrix} B_1+C_1 & C_1+A_1 & A_1+B_1 \\ B_2+C_2 & C_2+A_2 & A_2+B_2 \\ B_3+C_3 & C_3+A_3 & A_3+B_3 \end{vmatrix}$ is

(A) Δ

(B) 2Δ

(C) Δ^2

(D) $2\Delta^2$

99. The value of λ so that the matrix $A = \begin{pmatrix} 1 & 0 \\ 1 & \lambda \end{pmatrix}$ is its own inverse is

(A) 1

(B) -1

(C) 2

(D) -2

100. The general solution of the equation $y = px + \frac{a}{p}$, where $p = \frac{dy}{dx}$ is

(A) $y = cx + \frac{a}{c}$

(B) $y = ax + \frac{c}{a}$

(C) $y = cx + \frac{c}{a}$

(D) $y = ax + \frac{a}{c}$

Space for Rough Work

JELET–2017

For B. Sc. Candidates

Time Allowed : 2 Hours | *Maximum Marks* : 100

Booklet No. .....

নির্দেশাবলি

পরীক্ষার্থীদের উত্তর দেওয়ার পূর্বে নির্দেশাবলি ভালো করে পড়ে নিতে হবে ঃ

১। এই প্রশ্নপত্রে 100টি MCQ ধরনের প্রশ্ন দেওয়া আছে। প্রতিটি প্রশ্নের A, B, C এবং D এই চারটি সম্ভাব্য উত্তর দেওয়া আছে।

২। সঠিক উত্তর দিলে 1 নম্বর পাবে। ভুল উত্তর দিলে অথবা যে কোনো একাধিক উত্তর দিলে –¼ নম্বর পাবে। কোনো উত্তর না দিলে শূন্য পাবে।

৩। OMR পত্রে A, B, C অথবা D চিহ্নিত সঠিক ঘরটি ভরাট করে উত্তর দিতে হবে।

৪। OMR পত্রে উত্তর দিতে শুধুমাত্র কালো/নীল বল পয়েন্ট পেন ব্যবহার করবে।

৫। OMR পত্রে নির্দিষ্ট স্থান ছাড়া অন্য কোথাও কোনো দাগ দেবে না।

৬। OMR পত্রে নির্দিষ্ট স্থানে প্রশ্নপত্রের নম্বর এবং নিজের রোল নম্বর অতি সাবধানতার সাথে লিখতে হবে এবং প্রয়োজনীয় ঘরগুলি পূরণ করতে হবে।

৭। OMR পত্রে নির্দিষ্ট স্থানে নিজের নাম ও পরীক্ষাকেন্দ্রের নাম লিখতে হবে এবং নিজের সম্পূর্ণ স্বাক্ষর দিতে হবে।

৮। OMR উত্তরপত্রটি ইলেকট্রনিক যন্ত্রের সাহায্যে পড়া হবে। সুতরাং, প্রশ্নপত্রের নম্বর বা রোল নম্বর ভুল লিখলে অথবা ভুল ঘর ভরাট করলে উত্তরপত্রটি অনিবার্য কারণে বাতিল হতে পারে। এছাড়া পরীক্ষার্থীর নাম, পরীক্ষাকেন্দ্রের নাম বা স্বাক্ষরে কোনো ভুল থাকলেও উত্তরপত্র বাতিল হয়ে যেতে পারে। OMR উত্তরপত্রটি ভাঁজ হলে বা তাতে অনাবশ্যক দাগ পড়লেও বাতিল হয়ে যেতে পারে। পরীক্ষার্থীর এই ধরনের ভুল বা অসতর্কতার জন্য উত্তরপত্র বাতিল হলে একমাত্র পরীক্ষার্থী নিজেই তার জন্য দায়ী থাকবে।

৯। প্রশ্নপত্রে রাফ কাজ করার জন্য ফাঁকা জায়গা দেওয়া আছে। অন্য কোনো কাগজ এই কাজে ব্যবহার করবে না।

১০। পরীক্ষাকক্ষ ছাড়ার আগে OMR পত্র অবশ্যই পরিদর্শককে দিয়ে যাবে।