

014/2018

Question Booklet
Alpha Code

A

Question Booklet
Serial Number

100029

Total No. of Questions: 100

Maximum : 100 Marks

Time : 75 Minutes

INSTRUCTIONS TO CANDIDATES

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet alpha code viz. A, B, C & D.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a question booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is un-numbered, please get it replaced by new question booklet with same alpha code.
6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball-Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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Maximum : 100 Marks

Time : 1 hour and 15 minutes

1. The newspaper owned by Vakkom Abdul Khadir Maulavi
(A) Malayalee (B) Swadesabhimani
(C) Vivekodayam (D) Kerala Kaumudi
2. Which woman leader of Travancore organized the Female Volunteer Corps called Desasevika Sangham ?
(A) Accamma Cherian (B) Rosamma Punnoose
(C) Lakshmi Menon (D) A.V. Kuttimalu Amma
3. An episode connected with the campaign against untouchability observed in the post independence period
(A) Paliyam Satyagraha (B) Vaikom Satyagraha
(C) Guruvayoor Satyagraha (D) Nivarthana Agitation
4. Who were the pioneers in the field of education in Malabar ?
(A) CMS (B) LMS
(C) Rulers of Malabar (D) Basal Mission
5. The person who was appointed as a Special Commissioner to enquire into the land tenure and tenant rights in Malabar in connection with the Mappila Riots.
(A) K. Kelappan (B) Herman Gundert
(C) William Logan (D) K. P. Keasava Menon
6. The Article of the Indian Constitution which provides special status to Jammu and Kashmir
(A) Article 25 (B) Article 92
(C) Article 320 (D) Article 370
7. India's first World Heritage City declared by UNESCO's World Heritage Committee
(A) Delhi (B) Ahmedabad
(C) Mumbai (D) Jaipur
8. Which country is not included in Malabar 2017, a joint midsummer exercise aimed at addressing shared threats to maritime security in the Asia Pacific region ?
(A) India (B) US
(C) China (D) Japan
9. Hanukkah, the festival of lights is associated with which religion ?
(A) Judaism (B) Zoroastrianism
(C) Islam (D) Buddhism
10. Garba is a popular folk dance of
(A) Himachal Pradesh (B) Gujarat
(C) Uttar Pradesh (D) Rajasthan

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11. Which among the following is not a factor that affects learning ?
(A) Individual variable (B) Task variable
(C) Method variable (D) Memory variable
12. Use of multiple choice questions for assessment leads to _____ type of thinking among learners.
(A) Divergent (B) Convergent
(C) Creative (D) Reflective
13. The method which ensures maximum participation of students in the teaching-learning process
(A) Discussion Method (B) Lecture Method
(C) Project method (D) Text-book Method
14. Who developed Heuristic Method of teaching ?
(A) J.B. Conant (B) Kilpatrick
(C) Henry Edward Armstrong (D) John Dalton
15. Teaching aids that provides multi sensory experiences to learners
(A) Audio aids (B) Audio-Visual aids
(C) Visual aids (D) None
16. Who is the proponent of Action Research ?
(A) S.M. Corey (B) William James
(C) Sigmund Freud (D) Carl Rogers
17. Method used to study about a single person, event or group in-depth is known as
(A) Experimental Method (B) Case study
(C) Observation (D) Introspection
18. The method which involves collection of data through observation experimentation, formulation and testing of hypotheses
(A) Scientific Method (B) Empirical Method
(C) Inductive Method (D) Syllogism
19. Which variable is considered as manipulated variable in an experimental research ?
(A) Dependent Variable (B) Extraneous Variable
(C) Independent Variable (D) None
20. The outcome variable that is measured in an experimental study
(A) Independent Variable (B) Predictor variable
(C) Extraneous Variable (D) Dependent Variable

21. By which Constitutional Amendment Act the word 'secularism' was incorporated in the Preamble of the Constitution of India ?
 (A) The Constitution (Forty-Sixth Amendment) Act
 (B) The Constitution (Forty-Fourth Amendment) Act
 (C) The Constitution (Forty-Second Amendment) Act
 (D) The Constitution (Forty-First Amendment) Act
22. Which of the following is not a fundamental right in the Part III of the Constitution of India ?
 (A) Right to property (B) Right to education
 (C) Right to equality (D) Right to personal liberty
23. Which article of the Indian Constitution empowers the President of India to promulgate Ordinances ?
 (A) Article 217 (B) Article 125
 (C) Article 213 (D) Article 123
24. Which commission was constituted in 2007 to examine and make recommendations on center - state relations in India ?
 (A) Punchhi Commission (B) Sarkaria Commission
 (C) Kothari Commission (D) Srikrishna Commission
25. Who presides over the joint sitting of two houses of Indian Parliament ?
 (A) Prime Minister (B) President
 (C) Speaker (D) Vice President
26. Under the Right to Information Act, 2005, the information sought for concerns the life or liberty of a person, the same shall be provided within _____ of the receipt of the application.
 (A) Twenty four hours (B) Forty eight hours
 (C) Twelve hours (D) Eighteen hours
27. The definition of 'child' in the Protection of Children from Sexual Offences Act, 2012 is
 (A) Any person below the age of eighteen years
 (B) Any person below the age of fifteen years
 (C) Any person below the age of six years
 (D) Any person below the age of twelve years
28. _____ conducts regular social audit under Mahatma Gandhi National Rural Employment Guarantee Act.
 (A) Block Development Officer (B) District Programme Coordinator
 (C) Gram Sabha (D) Gram Panchayath
29. The State Food Commission constituted for the purpose of monitoring and review of implementation of the National Food Security Act, 2013 shall consist of
 (A) A Chairperson, five other members and a member secretary
 (B) A Chairperson, three other members and a member secretary
 (C) A Chairperson, four other members and a member secretary
 (D) A Chairperson, one other member and a member secretary
30. The Transplantation of Human Organs (Amendment) Act received the assent of the President of India on
 (A) 19th June 2011 (B) 27th September 2011
 (C) 22nd October 2011 (D) 10th September 2011

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31. The partial-differential equation $\frac{\partial^2 u}{\partial x^2} - 4x^2 \frac{\partial^2 u}{\partial y^2} - \frac{1}{x} \frac{\partial u}{\partial x} = 0$ is
- (A) Elliptical (B) Parabolic
(C) Hyperbolic (D) Elliptic for $x < 0$ and hyperbolic for $x > 0$
32. The general solution of the equation $\frac{dy}{dx} = -\frac{x}{y}$ is
- (A) $x^2 + y^2 = a^2$ (B) $x^2 - y^2 = a^2$
(C) $x = -y$ (D) $x + y = a$
33. Differential equation associated with the primitive $y = Ax^2 + Bx + C$ is given by
- (A) $\frac{dy}{dx} = 2Ax + B$ (B) $\frac{d^2y}{dx^2} = 2A$
(C) $\frac{d^3y}{dx^3} = 0$ (D) none of the above
34. The singular solution of the differential equation $y = x \frac{dy}{dx} + \left(\frac{dy}{dx}\right)^2$ is
- (A) $y = \frac{x^2}{2}$ (B) $y = -\frac{x^2}{2}$
(C) $y = \frac{x^2}{4}$ (D) $y = -\frac{x^2}{4}$
35. The degree of the equation $y \frac{dy}{dx} = x \left(\frac{dy}{dx}\right)^2 + x$ is
- (A) zero (B) one
(C) two (D) three
36. If $y' - x \neq 0$, a solution of the differential equation $y'(y' + y) = x(x + y)$ is given by
- (A) $y = 1 - x - e^{-x}$ (B) $y = 1 - x + e^{-x}$
(C) $y = 1 + x + e^{-x}$ (D) $y = 1 + x + e^x$
37. The orthogonal trajectories of the family $x^2 - y^2 = a$ where a is a constant is given by
- (A) $x^2 + y^2 = c$ (B) $y = \frac{c}{x}$
(C) $y = cx$ (D) $x = cy$
38. Who were the two mathematicians that invented calculus ?
- (A) Newton and Laplace (B) Newton and Euler
(C) Newton and Gauss (D) Newton and Leibniz

39. Among the following sets, the one which has a non-zero Lebesgue measure is
- (A) the set of all rationals
 (B) set of all real numbers of the form $m\sqrt{2} + n\sqrt{3}$ where m and n are integers
 (C) the cantor set
 (D) the set of all irrationals
40. The length of the set $\bigcup_{k=1}^{\infty} \left\{ x \mid \frac{1}{k+1} \leq x < \frac{1}{k} \right\} =$
- (A) 1 (B) 2
 (C) -1 (D) 0
41. Let W be the subspace of \mathbb{R}^4 spanned by the vectors $(1, 3, 5, 10), (1, 0, 2, 4), (1, 2, 4, 8)$. Then the dimension of W is
- (A) 1 (B) 2
 (C) 3 (D) 4
42. Let A be a $m \times n$ matrix with row rank = r = column rank. The dimension of the space of solutions of the system of linear equations $AX = 0$ is
- (A) r (B) $n - r$
 (C) $m - r$ (D) $\min(m, n) - r$
43. An integrating factor for $ydx - xdy = 0$ is
- (A) $\frac{x}{y}$ (B) $\frac{y}{x}$
 (C) $\frac{1}{x^2 y^2}$ (D) $\frac{1}{x^2 + y^2}$
44. The inverse Laplace transform of $\frac{1}{(s+2)^2 + 16}$ is
- (A) $\frac{e^{-2t} \sin 4t}{4}$ (B) $\frac{e^{2t} \sin 4t}{4}$
 (C) $\frac{e^{-2t} \sinh at}{4}$ (D) $\frac{e^{-2t} \cosh at}{4}$
45. Let $f_n(t) = t^n, t \in \mathbb{R}, n \in \mathbb{N}$. Then $\{f_n\}$ is uniformly convergent in
- (A) $[0, 1]$ (B) $[1, 2]$
 (C) $\left[\frac{1}{2}, \frac{1}{2} \right]$ (D) $(-1, 1]$

46. Which of the following statements is true ?
- (A) A number is rational if and only if its square is rational.
 - (B) An integer n is odd if and only if $n^2 + 2n$ is odd.
 - (C) A number is irrational if and only if its square is irrational.
 - (D) A number n is odd if and only if $n(n+1)$ is even.

47. Let $A = \begin{bmatrix} 5 \\ 2 \\ 3 \\ 6 \end{bmatrix}$ and $B = [3 \ 2 \ 4]$, then rank of AB is

- (A) 1
- (B) 2
- (C) 3
- (D) 0

48. The value of k for which the system of linear equations
- $$3x - 2y = 3$$
- $$6x + ky = 4$$
- has no solution is

- (A) -4
- (B) 4
- (C) -3
- (D) 3

49. Consider the following language $L = \{a^n b^n c^n d^n | n \geq 1\}$; L is
- (A) CFL but not regular
 - (B) CSL but not CFL
 - (C) regular
 - (D) type 0 language but not type 1

50. The order of the permutation $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 8 & 2 & 6 & 3 & 7 & 4 & 5 & 1 \end{pmatrix}$ is

- (A) 3
- (B) 4
- (C) 6
- (D) 12

51. Which of the following is a level set of $f(x_1, x_2) = x_1 - x_2$?

- (A) $\{(x_1, x_2) | x_1 - 2 = x_2 + 1\}$
- (B) $\{(x_1, x_2) | x_1^2 = x_2\}$
- (C) $\{(x_1, x_2) | x_1 - 2 = 0\}$
- (D) $\{(x_1, x_2) | x_1^2 = x_2^2\}$

52. Which of the following is false ?

- (A) Product of T_1 - spaces is a T_1 - space.
- (B) Product of completely regular spaces is completely regular.
- (C) Product of first countable spaces is first countable.
- (D) Product of two second countable spaces is second countable.

53. Let (X, τ) be a topological space, where $X = \{a, b, c, d\}$ and $\tau = \{\emptyset, X, \{a\}, \{b\}, \{a,b\}, \{a,c\}, \{a,b,c\}\}$, then the limit point of the set $A = \{a, c, d\}$ are
- (A) a and b (B) b and c
(C) c and d (D) d and a
54. In a metric space (X, d)
- (A) every infinite set E has a limit point in E .
(B) every subset of a compact set is closed.
(C) every closed and bounded set is compact.
(D) every closed subset of a compact set is compact.
55. Let $f(z)$ and $\bar{f}(z)$ be analytic in a domain D , then
- (A) $f(z)$ is zero for all z .
(B) $f(z)$ is a constant function.
(C) $f(z)$ is a real valued function but not a constant.
(D) $f(z)$ is imaginary valued but not a constant.
56. The bilinear transformation that maps the points $z_1 = \infty, z_2 = i, z_3 = 0$ into the points $w_1 = 0, w_2 = i, w_3 = -\infty$
- (A) $w = -\frac{1}{z}$ (B) $w = \frac{1}{z}$
(C) $w = \frac{1}{z-i}$ (D) $w = -\frac{1}{z-i}$
57. At $z = 1$ the function $f(z) = \sin\left(\frac{1}{1-z}\right)$
- (A) has a pole
(B) has removable singularity
(C) has isolated essential singularity
(D) has non-isolated essential singularity
58. If $f(z)$ is analytic in a domain, then
- (A) $f''(z)$ is analytic in the domain
(B) $f''(z)$ is analytic in the domain but $f'(z)$ is not analytic in the domain
(C) $f'(z)$ is analytic in the domain but $f''(z)$ is not analytic in the domain
(D) $f'(z)$ and $f''(z)$ are not analytic in the domain.
59. Let $f: \mathbb{C} \rightarrow \mathbb{C}$ be given by $f(Z) = \begin{cases} \bar{Z}^2 & \text{when } Z \neq 0 \\ Z & \text{when } Z = 0 \end{cases}$, then
- (A) f is not continuous at $Z = 0$.
(B) f is differentiable but not analytic at $Z = 0$.
(C) f is analytic at $Z = 0$.
(D) f satisfies the Cauchy-Riemann equations at $Z = 0$.

60. The residue of $f(z) = \cot z$ at any of its poles is
 (A) 0 (B) 1
 (C) $\sqrt{3}$ (D) none of these
61. What is the fractal dimension of a cantor set ?
 (A) 0 (B) $\frac{\log 2}{\log 3}$
 (C) $\frac{\log 3}{\log 2}$ (D) $\frac{\log 4}{\log 3}$
62. The Lorenz Butterfly is an example of what type of fractal ?
 (A) Julia set (B) Mandelbrot set
 (C) Strange Attractor (D) None of the above
63. The four vectors $(1, 1, 0, 0)$, $(1, 0, 0, 1)$, $(1, 0, a, 0)$, $(0, 1, a, b)$ are linearly independent if
 (A) $a \neq 0, b \neq 2$ (B) $a \neq 0, b \neq 0$
 (C) $a \neq -2, b \neq 0$ (D) $a \neq 0, b \neq -2$
64. Determine which of the following matrices have the same row space :
 $E = \begin{bmatrix} 1 & -2 & -1 \\ 3 & -4 & 5 \end{bmatrix}$, $F = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 3 & -1 \end{bmatrix}$, $G = \begin{bmatrix} 1 & -1 & 3 \\ 2 & -1 & 10 \\ 3 & -5 & 1 \end{bmatrix}$
 (A) E and F (B) E and G
 (C) F and G (D) E, F and G
65. All the eigen values of the matrix $\begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ lie in the disc
 (A) $|\lambda - 1| \leq 2$ (B) $|\lambda - 1| \leq 1$
 (C) $|\lambda + 1| \leq 0$ (D) $|\lambda + 1| \leq 1$
66. The 2×2 real matrices $\begin{bmatrix} a & 0 \\ 0 & d \end{bmatrix}$ and $\begin{bmatrix} a & b \\ 0 & d \end{bmatrix}$, $b \neq 0$ are similar if and only if
 (A) $d \neq b$ (B) $a = d$
 (C) $a \neq d$ (D) $a \neq b$
67. What integral equation is equivalent to the initial value problem $y' = t^2 - y$, $y(-1) = 2$?
 (A) $y(t) = -1 + \int_2^t (s^2 - y(s)) ds$ (B) $y(t) = 2 + \int_{-1}^t (s^2 - y(s)) ds$
 (C) $y(t) = 2 + \int_{-1}^t sy(s) ds$ (D) None of the above

68. Let $f(x) = \begin{cases} 1 & \text{if } x \text{ is rational in } [0, 1] \\ -1 & \text{if } x \text{ is irrational in } [0, 1] \end{cases}$ then in $[0, 1]$
- (A) $f(x)$ is continuous everywhere.
 (B) $f(x)$ is Riemann integrable.
 (C) $f(x)$ is Lebaque integrable.
 (D) $f(x)$ is not Riemann integrable.
69. If $f(x)$ is a real valued functions defined on $[0, \infty)$ such that $f(0) = 0$ and $f''(x) > 0$ for all x , then the function $h(x) = \frac{f(x)}{x}$ is
- (A) increasing in $(0, \infty)$
 (B) decreasing in $(0, \infty)$
 (C) increasing in $(0, 1]$ and decreasing in $(1, \infty)$
 (D) decreasing in $(0, 1]$ and increasing in $(1, \infty)$
70. $\lim_{n \rightarrow \infty} \left[\left(\frac{2}{1} \right) \left(\frac{3}{2} \right)^2 \left(\frac{4}{3} \right)^3 \dots \left(\frac{n+1}{n} \right)^n \right]^{\frac{1}{n}} =$
- (A) 1 (B) -1
 (C) e (D) -e
71. The sequence $\{f_n\}$ where $f_n(x) = nx(1-x)^n$
- (A) converges uniformly on $[0, 1]$
 (B) does not converges uniformly on $[0, 1]$
 (C) diverges in $[0, 1]$
 (D) none of these
72. The function $f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right) & \text{for } x \neq 0 \\ 0 & \text{for } x = 0 \end{cases}$ is
- (A) continuous at the origin
 (B) discontinuous at the origin
 (C) continuous but not differentiable at the origin
 (D) continuous and differentiable at the origin
73. For the differential equation $4x^3 y'' + 6x^2 y' + y = 0$ the point at infinity is
- (A) an ordinary point (B) a critical point
 (C) an irregular singular point (D) a regular singular point
74. Let G be a finite abelian group of odd order and let $H = \{x^2 \mid x \in G\}$ then
- (A) H is a sub-group of G only if G is cyclic
 (B) H is a proper sub-group of G
 (C) $H = G$
 (D) H may not be a sub-group of G

75. Identify the true statement.
- (A) Any two groups of order 4 are isomorphic.
 - (B) Any two abelian groups of the same order are isomorphic.
 - (C) An abelian group can be isomorphic to a non-abelian group.
 - (D) An additive group can be isomorphic to a multiplicative group.
76. The number of elements of order 3 in the group $Z_6 \times Z_{15}$ is
- (A) 3
 - (B) 8
 - (C) 9
 - (D) 15
77. If a and a^2 are both generator of a cyclic group of order n , then
- (A) n must be odd
 - (B) n must be even
 - (C) n must be prime
 - (D) n must not be prime
78. The alternating group A_4 on 4 symbols has a normal sub-group of order
- (A) 2
 - (B) 3
 - (C) 4
 - (D) 6
79. Which among the following is not possible ?
- (A) A field with 7 elements
 - (B) A field with 8 elements
 - (C) A field with 9 elements
 - (D) A field with 10 elements
80. Let PID, ED, UFD denote the set of all principal ideal domains, Euclidean domains, unique factorization domains respectively. Then
- (A) $UFD \subseteq ED \subseteq PID$
 - (B) $PID \subseteq ED \subseteq UFD$
 - (C) $ED \subseteq PID \subseteq UFD$
 - (D) $PID \subseteq UFD \subseteq ED$
81. In the ring of integers, which one of the following is true ?
- (A) All subrings are ideals.
 - (B) All ideals are prime ideals.
 - (C) Not all prime ideals are maximal ideals.
 - (D) Not all maximal ideals are prime ideals.
82. The number of Sylow 7-subgroups in a group of order 392 is
- (A) 2 or 3
 - (B) 3 or 7
 - (C) 2 or 7
 - (D) 1 or 8
83. Let G be the Galois group of the splitting field of $x^5 - 2$ over Q . Then which of the following statement is true ?
- (A) G is cyclic
 - (B) G is non-abelian
 - (C) The order of G is 20
 - (D) G has an element of order 4

84. Every closed unit sphere in a normed linear space is
 (A) a bounded set (B) a compact set
 (C) an open set (D) a convex set
85. If x, y be vectors in a real inner product vector space such that $\|x\| = \|y\|$, then $\langle x+y, x-y \rangle =$
 (A) 1 (B) 2
 (C) 0 (D) -1
86. The statement "The dual space of a non-empty normed linear space is non-empty" follows from
 (A) Uniform boundedness principal
 (B) Hahn-Banach theorem
 (C) Reiesz representation theorem
 (D) Closed graph theorem
87. The Fourier series of the 2π -periodic function $f(x) = x + x^2, -\pi < x \leq \pi$ at $x = \pi$ converges to
 (A) π (B) 2π
 (C) π^2 (D) $\pi + \pi^2$
88. The largest interval in which $\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{n}$ converges is
 (A) $(-1, 1]$ (B) $[-1, 1)$
 (C) $(-1, 1)$ (D) $[-1, 1]$
89. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{3n+k}$ is
 (A) $\log \frac{4}{3}$ (B) $\log \frac{3}{4}$
 (C) $\log \frac{3}{2}$ (D) $\log \frac{5}{4}$
90. $A^2 - A = 0$, where A is a 9×9 matrix. Then
 (A) A must be a zero matrix (B) A is an identity matrix
 (C) rank of A is 1 or 0 (D) A is diagonalizable
91. The minimal polynomial of $\begin{bmatrix} 2 & 1 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 5 \end{bmatrix}$ is
 (A) $(x-2)$ (B) $(x-2)(x-5)$
 (C) $(x-2)^2(x-5)$ (D) $(x-2)^3(x-5)$

A

92. The dimension of the subspace of $M_{2 \times 2}$ spanned by $\begin{bmatrix} 1 & -5 \\ -4 & 2 \end{bmatrix}$, $\begin{bmatrix} 1 & 1 \\ -1 & 5 \end{bmatrix}$ and $\begin{bmatrix} 2 & -4 \\ -5 & 7 \end{bmatrix}$ is
 (A) 1 (B) 2
 (C) 3 (D) 4
93. If rank of a 7×5 matrix A is 5 and of a 5×7 matrix B is 3, then rank of AB is
 (A) 2 (B) 3
 (C) 4 (D) 5
94. Sum of the Eigen values of $\begin{bmatrix} -1 & -2 & -1 \\ -2 & 3 & 2 \\ -1 & 2 & -3 \end{bmatrix}$ is
 (A) -1 (B) -3
 (C) 1 (D) 3
95. Let A be an $n \times n$ matrix which is both Hermitian and Unitary. Then
 (A) $A^2 = I$.
 (B) A is real.
 (C) the Eigen values of A are 0, 1, -1.
 (D) the characteristic and minimal polynomial of A are the same.
96. Let $f: [0, 10] \rightarrow [0, 10]$ be a continuous mapping. Then
 (A) f need not have any fixed point
 (B) f has at least 10 fixed point
 (C) f has at least 9 fixed point
 (D) f has at least one fixed point
97. A topological space (X, τ) in which every τ -open cover of X has a countable sub-cover is
 (A) Compact space (B) Hausdorff space
 (C) Normal space (D) Lindelof space
98. The order of convergence in Newton-Raphson method is
 (A) 2 (B) 3
 (C) 0 (D) none of the above
99. If n is a positive integer and a is any integer relatively prime to n, then
 (A) $a^{\phi(n)} \equiv 1 \pmod{n}$ (B) $a^{\phi(n)} \equiv 0 \pmod{n}$
 (C) $a^{\phi(n)} \equiv 2 \pmod{n}$ (D) $a^{\phi(n)} \equiv n + 1 \pmod{n}$
100. Geodesics on a plane are
 (A) Parabola (B) Straight lines
 (C) Ellipse (D) Cycloid