## 075/2024

Maximum : 100 marks
Time : 1 hour and 30 minutes

1. The principal features of the National Income Committee Report in 1954 were :
(1) During 1950-51, agriculture contributed nearly half of the national income.
(2) Mining, manufacturing, and handicrafts contributed about one-fourth of the national income.
(3) Commerce, transport, and communications accounted for a little more than one-sixth of the total national income.
(4) Other services such as professions and liberal arts, administrative services, domestic services, and house property accounted for about 15 percent of national income.
Choose the correct statements :
(A) All the above (1), (2), (3) and (4)
(B) (1), (2) and (3) only
(C) (1), (3) and (4) only
(D) (2), (3) and (4) only
2. Given below two statements, one is labelled as Assertion [A] and the other as Reason $[\mathrm{R}]$.

Assertion [A]: Devaluation is known as the Expenditure switching measure.
Reason $[R]$ : Devaluation encourages the switching of expenditure between foreign and domestic goods.
Select the correct answer from the codes given below :
(A) Both $[\mathrm{A}]$ and $[\mathrm{R}]$ are true and $[\mathrm{R}]$ is the correct explanation of $[\mathrm{A}]$
(B) Both $[A]$ and $[R]$ are true and $[R]$ is not the correct explanation of $[A]$
(C) $[\mathrm{A}]$ is true and $[\mathrm{R}]$ is false
(D) $[A]$ is false and $[R]$ is true
3. The main features of the Employment Guarantee Act, 2005 :
(1) Every household in rural India will have a right to at least 100 days of guaranteed employment every year for at least one adult member.
(2) Work should be given within 30 days of demanding it, and the work should be located within a 5 -kilometer distance.
(3) $5 \%$ of wages may be deducted as contributions to welfare schemes like health insurance, accident insurance, etc.
(4) The Grama Sabha will monitor the work of the Grama Panchayat by way of a social audit.
Choose the correct statements :
(A) (1), (2) and (3) only
(B) (2), (3) and (4) only
(C) (1), (3) and (4) only
(D) All the above
4. Which is/are not true in connection with the Fourth Industrial Revolution?
(1) Focused on automation of single machine and process
(2) Digitisation of product and service offerings
(3) Assembly line led mass production with the use of electrical energy
(4) Bring together technology forces such as IoT, cloud computing, big data analytics, Augmented Reality, robotics, etc
(A) (1) only
(B) (1), (2) and (3) only
(C) (3) only
(D) (1) and (3) only
5. If the Marginal Opportunity Cost (MOC) is constant, the Production Possibility Curve will be :
(A) Backward bending
(B) Convex to the Origin
(C) Concave to the Origin
(D) None of the above
6. Once the need for policy change is recognized, the government has to evaluate the possible alternative policies. It is termed as :
(A) Recognition lag
(B) Impact lag
(C) Decision lag
(D) Implementation lag
7. Given below two statements, one is labelled as Assertion $[A]$ and the other as Reason $[R]$.

Assertion [A]: Externalities can be a source of economic inefficiency
Reason $[R]$ : Externalities are not reflected in market prices.
Select the correct answer from the codes given below :
(A) Both $[A]$ and $[R]$ are true and $[R]$ is not the correct explanation of $[A]$
(B) $[A]$ is true and $[R]$ is false
(C) Both $[A]$ and $[R]$ are true and $[R]$ is the correct explanation of $[A]$
(D) $[A]$ is false and $[R]$ is true
8. The Objectives of the FRBM Act. 2003 :
(1) To introduce transparent fiscal management systems in the country.
(2) To introduce a more equitable and manageable distribution of the country's debts over the years.
(3) To aim for fiscal stability for India in the long run.
(4) To give necessary flexibility to the Reserve Bank of India for managing inflation in India.
(A) (4) only
(B) (1), (2) and (3) only
(C)
(1) and (4) only
(D) All the above
9. Which is/are not the cultural services provided by the ecosystem for human well-being?
(1) Climate regulation
(2) Education and inspiration
(3) Recreation and aesthetic values
(4) Fresh Water
(A) (1) and (4) only
(B) (1), (2) and (4) only
(C) (4) only
(D) (2) and (3) only
10. Which statement/s is / are not related to Green GDP?
(1) Green GDP (GGDP) incorporates quantifying the economic value of natural resources and ecosystems.
(2) GGDP doesn't allow policymakers to better understand the trade-offs between economic growth and environmental sustainability.
(3) GGDP helps policy makers prioritize and allocate resources effectively.
(4) GGDP highlights the depletion of natural resources and encourages their sustainable management.
(A) (1) only
(B) (2) only
(C) (2) and (3) only
(D) (1), (3) and (4) only
11. Choose the true assumption about classical linear regression model :
(i) Regression model is linear in variables
(ii) The standard error measures the precision of the estimate
(iii) $X_{i}$ and $U_{i}$ are not correlated
(A) Only (i) and (ii)
(B) Only (ii) and (iii)
(C) Only (i) and (iii)
(D) All of the above (i), (ii) and (iii)
12. The fitted regression equation $\hat{Y}_{i}=-10+0.6 X$

Find the value of the residual at the point $X_{i}=60$ and $Y_{i}=50$
(A) 24
(B) 26
(C) $\quad-26$
(D) 30
13. Which of the following properties are true about $r^{2}$ ?
(i) Non-negative number
(ii) Explains proportional variation in a model
(iii) A measure of strength of relationship between dependent and independent variable
(A) Only (i) and (ii)
(B) Only (ii) and (iii)
(C) Only (i) and (iii)
(D) All of the above (i), (ii) and (iii)

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14. Pick out the wrong statement as an outcome of multicollinearity from the given options :
(i) Standard error of the explained variation is high
(ii) No correlation between explanatory variables
(iii) It is a feature of population
(A) Only (i) and (iii)
(B) Only (i) and (ii)
(C) Only (ii) and (iii)
(D) All the above (i), (ii) and (iii)
15. Which of the given options are not the assumptions of Durbin -Watson statistic?
(i) Regression model includes the intercept term
(ii) No missing observations in the data
(iii) Error term ( $u_{i}$ ) is normally distributed
(iv) Explanatory variables are stochastic
(A) (i)
(B) (ii)
(C) (iii)
(D) (iv)
16. If a qualitative variable has 3 categories, we can introduce :
(i) 1 dummy variable
(ii) 2 dummy variables
(iii) 3 dummy variables
(iv) 4 dummy variables
(A) (i)
(B) (ii)
(C) (iii)
(D) (iv)
17. In ANCOVA model, the regressors are :
(i) Only quantitative variables
(ii) Both quantitative and nominal variables
(iii) Only qualitative variables
(iv) Both quantitative and qualitative variables
(A) (i)
(B) (ii)
(C) (iii)
(D) (iv)
18. Choose the wrong the statement given about stationarity of time series :
(i) Dicky-Fuller test statistics tests the stationarity of time series.
(ii) Weak stationarity occurs when mean, variance and covariance are constant over time
(iii) Random walk without drift is a stationary stochastic process
(iv) None of these
(A) (i)
(B) (ii)
(C) (iii)
(D) (iv)
19. Which of the following statements are true about Box-Jenkins Approach?
(i) It handles stationary as well as non-stationary time series
(ii) Helpful for forecasting
(iii) Tests whether the residuals estimated from the model are white noise.
(A) (i) and (ii)
(B) (ii) and (iii)
(C) All of the above (i), (ii) and (iii)
(D) (i) and (iii)
20. Which of the following statements are true about panel data?
(i) It is collected at one point of time
(ii) The same-cross sectional units are surveyed over a period of time
(iii) If each entity has different number of observations, we have unbalanced panel
(A) Only (i) and (ii)
(B) Only (ii) and (iii)
(C) Only (i) and (iii)
(D) Only (iii)
21. To which country did India export the largest share of its total exports in the 2022-2023 financial year?
(A) China
(B) United states
(C) Netherland
(D) Saudi Arabia
22. What is the ratio of Indian General Government's debt to GDP in the 2022-23 financial year?
(A) $84.5 \%$
(B) $45.9 \%$
(C) $97.3 \%$
(D) $64.5 \%$
23. Which demographic group in India typically faces the highest educated unemployment rate?
(A) Rural Male
(B) Rural female
(C) Urban male
(D) Urban female
24. Which of the following represents the total money value of all goods and services produced in an economy in an accounting year?
(A) Net National Product (NNP)
(B) National Income (NI)
(C) Gross National Product (GNP)
(D) Gross Domestic Product (GDP)
25. Suppose in a country, the nominal GDP for the year 2020 is Rs. 10,000 and the real GDP (adjusted for inflation) for the same year is Rs.9,000. Then the value of GDP deflator is
(A) 90
(B) 100
(C) 111.11
(D) 124.98
26. Which sector attracted the highest Foreign Direct Investment (FDI) inflows into India in the last fiscal year?
(A) Computer Software and Hardware
(B) Telecommunication
(C) Drugs and Pharmaceuticals
(D) Trading

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27. According to the SDG India Index 2020, which Indian state ranked first in sustainable development achievement?
(A) Tamil Nadu
(B) Karnataka
(C) Kerala
(D) Andhra Pradesh
28. In calculating the Sustainable Development Goals (SDG) India index, how many goals are considered?
(A) 5
(B) 17
(C) 30
(D) 3
29. In the United Nations Sustainable Development Goals (SDG) Index -2023, out of 166 countries, what was India's rank?
(A) $115^{\text {th }}$
(B) $117^{\text {th }}$
(C) $120^{\text {th }}$
(D) $\quad 112^{\text {nd }}$
30. Which is the current base year used for estimating national income in India as of 2023?
(A) 2004-05
(B) $2015-16$
(C) 2011-12
(D) $\quad 2018-19$
31. Whose theory affirms that humans have three motivational drivers regardless of age and gender?
(A) Maslow
(B) Herzberg
(C) Vrooms
(D) Mc Clelland
32. Which among the following is not a Quality management tool?
(A) Pareto Chart
(B) Histogram
(C) Scatter diagram
(D) Qlik
33. A transaction that involves an increase in current ratio but no change in working capital :
(A) Purchase of goods on credit
(B) Cash payment of non current liabilities
(C) Payment to trade creditors
(D) Sale of fixed assets for cash
34. Du Pont formula was developed by :
(A) Alfred Porter
(B) Donaldson Brown
(C) James Du Pont
(D) F.W. Taylor
35. A hypothesis is one which is at low level of abstraction.
(A) Refined hypothesis
(B) Null hypothesis
(C) Crude hypothesis
(D) Descriptive hypothesis
36. Longitudinal Research approach deals with :
(A) Long term Research
(B) Horizontal Research
(C) Short term Research
(D) Descriptive Research
37. Type I error occurs when
(A) Null hypothesis gets accepted even if false
(B) Null hypothesis gets rejected even if it is true
(C) Both Alternate and Null hypotheses are rejected
(D) None of the above
38. If the field of enquiry is not homogenous and contains variety of items, the sampling method adopted is :
(A) Systematic sampling
(B) Stratified sampling
(C) Snowball sampling
(D) None of the above
39. Which of the following statements is/are true regarding ARR method?
(i) It is based on cash flows generated by a project.
(ii) it does not differentiate between investments that yield different cash flows over the lifetime of the project.
(iii) It ignores time value of money
(A) (i), (ii) and (iii)
(B) (i) and (ii) only
(C) (i) only
(D) (iii) only
40. $\qquad$ is commonly referred to as index investing.
(A) Active Portfolio management
(B) Passive Portfolio management
(C) Indexed Portfolio management
(D) Integrative Portfolio management
41. The key factor that distinguishes project management from just 'management' is that it :
(A) Is an ongoing process
(B) Has a finite time span
(C) Needs professional skills
(D) Requires effective team work
42. Which among the following is a type of project audit?
(A) Performance audit
(B) Compliance audit
(C) Financial audit
(D) All of the above
43. ——causes Over capitalisation.
(i) Raising higher amount through issue of shares or debentures than company needs.
(ii) Provision for depreciation is not made properly.
(iii) Huge payment for the acquisition of fictitious assets like high payment is made to purchase goodwill etc.
(A) (i) and (iii)
(B) (iii) only
(C) (i), (ii) and (iii)
(D) (i) only
44. Which of the following statements are true regarding CAPM?
(i) It establishes relationship between risk and average rate of return.
(ii) Beta is a measure of a security's risk relative to the risk of market portfolio.
(iii) The value of Beta measures both systematic and unsystematic risks of a security.
(A) (i) and (ii)
(B) (ii) only
(C) (iii) only
(D) (i), (ii) and (iii)
45. WACC for a given firm is the :
(A) Discount rate a firm applies on projects
(B) Maximum rate of return on any of the projects undertaken
(C) Rate of interest on the next bond issue
(D) Blended cost of capital of common shares, preferred stock, and debt
46. The framework introduced by SEBI mandating certain listed companies to disclose their ESG related information is :
(A) TCFD
(B) BRSR
(C) SASB
(D) CDP
47. The scale that reports the ranking of the data without actually establishing the degree of variation between them :
(A) Nominal scale
(B) Ordinal scale
(C) Interval scale
(D) Ratio scale
48. In —— Research design method, researchers manipulate one or more independent variables and measure their effects on dependent variables :
(A) Observational
(B) Case study
(C) Experimental
(D) Cross sectional
49. In order to achieve construct validity in measurement, which of the following is necessary :
(A) Face validity
(B) Content validity
(C) Criterion validity
(D) All of the above
50. Comparative statements are also known as:
(A) Dynamic analysis
(B) Horizontal analysis
(C) Vertical analysis
(D) External analysis
51. Let $A$ and $B$ be two events with $P(A)>0, P(B \mid A)=0.4$ and $P\left(A \cap B^{c}\right)=0.2$. Then $P(A)$ is :
(A) $1 / 2$
(B) $1 / 3$
(C) $1 / 4$
(D) $1 / 5$
52. Let $X$ and $Y$ be two independent random variables following exponential distributions with mean 2 and 4, respectively. Then $P(X<Y)$ is :
(A) $1 / 2$
(B) $3 / 4$
(C) $2 / 3$
(D) $1 / 4$
53. If $\varphi(t)$ is a characteristic function, then which of the following is not a characteristic function :
(A) Real part of $\varphi(t)$
(B) Imaginary part of $\varphi(t)$
(C) Complex conjugate of $\varphi(t)$
(D) $\varphi^{2}(t)$
54. Let $\left\{X_{n}\right\}$ be a sequence of independent random variables with $P\left(X_{n}= \pm n^{\alpha}\right)=1 / 2$. The value of $\alpha$ for which $\left\{X_{n}\right\}$ satisfies strong law of large numbers is :
(A) $3 / 4$
(B) $1 / 2$
(C) $1 / 3$
(D) $2 / 3$
55. Let $\left(X_{1}, X_{2}\right)$ have a bivariate normal distribution with parameters $\mu_{1}=1, \mu_{2}=0, \sigma_{1}^{2}=1$, $\sigma_{2}^{2}=4$ and $\rho=1 / 2$. Then $P\left(X_{2}>1 \mid X_{1}=2\right)$ is :
(A) $\quad 1 / 2$
(B) $1 / 3$
(C) $2 / 3$
(D) $3 / 4$
56. From a population of size 30 , a systematic sample of size 5 is drawn. If the first selected unit is 4 , then the other units will be :
(A) $9,14,19,24$
(B) $8,12,16,22$
(C) $10,16,22,28$
(D) $9,13,17,21$
57. Suppose there is a population consisting of 40 units. A sample of size 7 is to be taken from the population using simple random sampling (SRS). Then, the ratio of the variances of sample mean in SRS with replacement and SRS without replacement is :
(A) $10 / 13$
(B) $13 / 11$
(C) 10/11
(D) $13 / 10$
58. A finite population is divided into three strata of sizes $(40,30,50)$ having variances $(1,2,3)$. A stratified random sample of size 12 was drawn using proportional allocation. Let $n_{1}, n_{2}, n_{3}$ be the number of units to be selected from respective strata. Then, the values of $n_{1}, n_{2}, n_{3}$ are respectively :
(A) $4,3,5$
(B) $2,4,6$
(C) $3,4,5$
(D) $4,4,4$
59. In a randomized block design with 6 blocks and 5 treatments, the sum of squares for blocks and treatments are 200 and 180 , respectively, If the total sum of squares is 500 , then the mean square error (MSE) will be:
(A) 9
(B) 6
(C) 4
(D) 8

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60. In a $2^{2}$ factorial experiment with factors $A$ and $B$ conducted in 3 replicates, the total yields of the treatment combinations $a_{0} b_{0}, a_{1} b_{0}, a_{0} b_{1}$ and $a_{1} b_{1}$ are $12,14,20$, and 28 , respectively. Then the sum of squares for the interaction AB is equal to :
(A) 4
(B) 6
(C) 5
(D) 3
61. Let $X_{1}, X_{2}, X_{3}, X_{4}$ be a random sample form $N\left(0, \sigma^{2}\right)$. Then the value of $k$ for which the estimator $k \sum_{i=1}^{4}\left|X_{i}\right|$ is an unbiased estimator of $\sigma$ is :
(A) $\sqrt{\frac{2}{3 \pi}}$
(B) $\sqrt{\frac{\pi}{24}}$
(C) $\sqrt{\frac{24}{\pi}}$
(D) $\sqrt{\frac{\pi}{32}}$
62. Let $X$ be a random variable with p.d.f. $f(x)=1-\theta+2 \theta x ; 0<x<1,-1 \leq \theta \leq 1$. Based on a sample of size one, the most powerful critical region for testing $H_{0}: \theta=0$ against $H_{1}: \theta=1$ at level $\alpha=0.1$ is :
(A) $x>0.75$
(B) $x>0.9$
(C) $x>0.8$
(D) $x \leq 0.75$
63. A random sample of 20 students was selected from a class. Their marks in the first and second semesters are noted down. To test the hypothesis that there is no change in the average performance of the students in that class against the hypothesis that it has improved, which of the following tests is to be used?
(A) Z-test
(B) Paired $t$-test
(C) Two sample independent $t$-test
(D) $\chi^{2}$-test
64. Which of the following is not an assumption for simple linear regression?
(A) Multicollinearity
(B) Constant variance
(C) Linear relationship
(D) Normally distributed residuals
65. In a multiple regression model $y=\beta_{0}+\beta_{1} x_{1}+\beta_{2} x_{2}+\beta_{3} x_{3}+\varepsilon$, $\operatorname{MSE}=20, n=54$, and SST $($ total $)=4000$. What is the $R^{2}$ of the regression model?
(A) 0.25
(B) 0.50
(C) 0.75
(D) 0.90
66. Which one of the following is a subspace of $\mathbb{R}^{3}$ ?
(A) $\{(1, b, 1) \mid b \in \mathbb{R}\}$
(B) $\{(a, 1,1) \mid \alpha \in \mathbb{R}\}$
(C) $\{(a, b, c) \mid a+b+c=1\}$
(D) $\{(0, b, 0) \mid b \in \mathbb{R}\}$
67. Which of the following statements is false?
(A) Similar matrices have the same characteristic polynomial
(B) The matrix $A=\left[\begin{array}{cc}0 & -1 \\ -1 & 0\end{array}\right]$ has no characteristic value in $\mathbb{R}$.
(C) The matrix $A=\left[\begin{array}{cc}0 & -1 \\ -1 & 0\end{array}\right]$ has no characteristic value in $\mathbb{C}$.
(D) None of the above
68. The standard matrix for the reflection about the $x y$-plane in $\mathbb{R}^{3}$ is :
(A) $\left[\begin{array}{ccc}1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1\end{array}\right]$
(B) $\left[\begin{array}{ccc}-1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1\end{array}\right]$
(C) $\left[\begin{array}{ccc}1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1\end{array}\right]$
(D) $\left[\begin{array}{ccc}-1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1\end{array}\right]$
69. Which one of the following statements is false?
(A) For any group G and $G^{\prime}$, there is always at least one homomorphism $\phi: G \rightarrow G^{\prime}$
(B) A group homomorphism $\phi: G \rightarrow G^{\prime}$ is a one-to-one map if and only if $\operatorname{Ker}(\phi)=\{e\}, e$ is the identity element of $G$
(C) If $\phi: G \rightarrow G^{\prime}$ is a group homomorphism, then $\operatorname{Ker}(\phi)$ is a normal subgroup of G
(D) Every homomorphism is a one-to-one map
70. The orbits of the permutation $\sigma=\left(\begin{array}{llllllll}1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 3 & 8 & 6 & 7 & 4 & 1 & 5 & 2\end{array}\right)$ are :
(A) $\{1,3,6\},\{2,8\},\{4,5,7\}$
(B) $\{1,2,8\},\{3,6\},\{4,5,7\}$
(C) $\{1,4,5\},\{2,8\},\{3,6,7\}$
(D) $\{1,3,6\},\{4,5\},\{2,8,7\}$
71. Which of the following intervals represent $C=\left\{x \in \mathbb{R}: \frac{2 x+1}{x+2}<1\right\}$ ?
(A) $\quad(-1,2)$
(B) $(-2,1)$
(C) $(-2,-1)$
(D) $(-1,1)$
72. Which of the following sets is not denumerable?
(A) $\mathbb{N} \times \mathbb{N}$
(B) $E=\{2 n: n \in \mathbb{N}\}$
(C) $[0,1]$
(D) $\mathbb{Q}$
73. Let $f:[a, b] \rightarrow \mathbb{R}$. Then $f$ need not be Riemann integrable on $[a, b]$ if :
(A) $f$ is a step function
(B) $f$ is a continuous function on $[a, b]$
(C) $f$ is monotone on $[a, b]$
(D) None of the above
74. The Maclaurin series expansion of $f(z)=\frac{1}{(1-z)^{2}}$ is :
(A) $\sum_{k=1}^{\infty} k z^{k-1}$
(B) $\sum_{k=1}^{\infty} k z^{k+1}$
(C) $\sum_{k=1}^{\infty} z^{k}$
(D) $\sum_{k=1}^{\infty} k z^{k}$
75. The residue of the function $f(z)=\frac{1}{(z-1)^{2}(z-3)}$ at $z=1$ is :
(A) $\frac{1}{4}$
(B) $-\frac{1}{4}$
(C) $\frac{3}{4}$
(D) $-\frac{3}{4}$
76. What is the indicial equation of the differential equation $2 x^{2} y^{\prime \prime}+x(2 x+1) y^{\prime}-y=0$ ?
(A) $m(m-1)+\frac{1}{2} m-\frac{1}{2}$
(B) $\quad m(m+1)+\frac{1}{2} m-\frac{1}{2}$
(C) $\quad m(m-1)-\frac{1}{2} m-\frac{1}{2}$
(D) $m(m-1)+\frac{1}{2} m+\frac{1}{2}$
77. What is the general solution of the differential equation $\frac{1}{y} d x-\frac{x}{y^{2}} d y=0$ ?
(A) $x y=c$
(B) $\frac{x}{y}=c$
(C) $x^{2} y=c$
(D) $(x y)^{2}=c$
78. Which of the following statements is false for the function $f(x, y)=x y$ ?
(A) Satisfies a Lipschitz condition on any rectangle $a \leq x \leq b$ and $c \leq y \leq d$
(B) Satisfies a Lipschitz condition on any strip $a \leq x \leq b$ and $-\infty<y<\infty$
(C) Does not satisfy a Lipschitz condition on the entire plane
(D) None of the above
79. What is the complete integral of the first order partial differential equation $\left(u_{x}+u_{y}\right)\left(u-x u_{x}-y u_{y}\right)=1$ ?
(A) $u=a x+b y+\frac{1}{a+b}$
(B) $\quad u=a x-b y+\frac{1}{a+b}$
(C) $u=a x-b y-\frac{1}{a+b}$
(D) None of the above
80. What is the solution of the partial differential equation $u_{x}+u_{y}=2$ subject to the initial condition $u(x, 0)=x^{2}$ ?
(A) $u(x, y)=4 y+(x-y)^{2}$
(B) $u(x, y)=y+(x-y)^{3}$
(C) $u(x, y)=2 y+(x-y)^{2}$
(D) $u(x, y)=2 y^{2}+(x-y)^{2}$
81. Which of the following statements is true for a discrete topology?
(A) Every point is an accumulation point of any set
(B) No point is an accumulation point of any set
(C) Number of accumulation points depend on the cardinality of the set
(D) None of the above
82. Which of the following is an example of a totally disconnected space?
(A) $\mathbb{R}$ with usual topology
(B) $\quad \mathbb{R}$ with semi-open interval topology
(C) $\mathbb{R}$ with cofinite topology
(D) None of the above
83. Which of the following statements in false?
(A) Every path-connected space is connected
(B) Subsets of the real line $\mathbb{R}$ are connected if and only if they are path-connected
(C) Topologist's sine curve is path-connected
(D) None of the above
84. Let $X$ and $Y$ be normed spaces and $F: X \rightarrow Y$ be a linear map. Which of the following statements is not equivalent to the statement ' F is continuous on X '?
(A) F is continuous at 0
(B) F is uniformly continuous on $X$
(C) $\|F(x)\| \leq \alpha\|x\|$ for all $x \in X$ and some $\alpha>0$
(D) None of the above

A
85. Which one of the following normed space is not a Banach space?
(A) The vector space $\mathbb{R}$ over $\mathbb{R}$ under the norm $\|x\|=|x|$
(B) The vector space $C[a, b]=\{f:[a, b] \rightarrow \mathbb{R} \mid f$ is a continuous function $\}$ over $\mathbb{R}$ under the norm $\|f\|=\max _{x \in[a, b]}|f(x)|$.
(C) The vector space $C[0,1]=\{f:[0,1] \rightarrow \mathbb{R} \mid \mathrm{f}$ is a continuous function $\}$ over $\mathbb{R}$ under the norm $\|f\|=\int_{0}^{1} f(t) \mid d t$
(D) The vector space $\mathbb{C}^{\mathrm{n}}=\left\{x_{1}, x_{2}, \ldots \ldots, x_{n} \mid x_{i} \in \mathbb{C}\right\}$ over $\mathbb{C}$ under the norm $\|x\|=\sum_{i=1}^{n}\left|x_{i}\right|^{2}$
86. NSS 79 th round is earmarked for :
(A) Collection of data on 'Domestic Tourism Expenditure' and 'Multiple Indicators'
(B) Collection of data for compilation of a number of SDG indicators through a "Comprehensive Annual Modular Survey (CAMS)" along with a survey AYUSH
(C) Collection of data on 'Land and Livestock Holdings of Households and Situation Assessment of Agricultural Households' and 'Debt and investment'
(D) All the above
87. The headquarters of Survey Design and Research Division (SDRD) of NSSO located at :
(A) Kolkata
(B) New Delhi
(C) Faridabad
(D) Bangalore
88. The General Crop Estimation Survey (GCES) under EARAS Scheme, Department of Economics and Statistics, Kerala is conducting crop cutting experiments of $\qquad$ crops for the estimation of production and yield rate of crops.
(A) 10
(B) 19
(C) 9
(D) 14
89. The list of all sampling units in the population is
(A) Sampling design
(B) Sampling frame
(C) Population
(D) Sample
90. The design generally adopted for carrying out General Crop Estimation Surveys (GCES) :
(A) Cluster sampling
(B) Simple random sampling
(C) Multiphase sampling
(D) Stratified multi-stage random sampling design
91. If a statistic $t$ follows student's $t$-distribution with $n d . f$. , then $t^{2}$ follows :
(A) $\quad \chi^{2}$ distribution with $n d . f$.
(B) T distribution with $n^{2}$ d.f.
(C) Standard normal distribution
(D) F distribution with $(l, n)$ d. $f$
92. Level of significance refers to :
(A) Probability of non sampling error
(B) Probability of Type II error
(C) Probability of Type I error
(D) None of these
93. Mann-Whitney $U$ test is used to test:
(A) The quality of means of two independent population
(B) Equality of variances of two independent populations
(C) Equality of medians of two independent populations
(D) To test the randomness
94. Consider the following statements :
(i) Principal components analysis is a data reduction technique
(ii) Principal components are Un correlated
(iii) Variances of principal components are equal to eigen values of variance covariance matrix
(iv) Principal components are unobservable

Then
(A) Only (i) is true
(B) Only (i), (ii) and (iii) are true
(C) Only (i) and (ii) are true
(D) All are true
95. $\chi^{2}$ test is used:
(i) To test the hypothetical value single of population variance
(ii) To test goodness of fit
(iii) To test equality of more than two means
(iv) To test the equality of three or more population variances

Then
(A) Only (i), (ii), (iv) is correct
(B) Only (i), (ii), (iii) is correct
(C) Only (i), (iii), (iv) is correct
(D) All are correct
96. Consider the following statements :
(i) R is a free and open source software
(ii) R is a programming language for statistical computing and data visualization
(iii) Key feature of $R$ was that its syntax is very similar to $S$
(iv) R is licensed by the GNU Project and available under the GNU General Public License
(v) R runs only on Windows computing platform and operating system

Then
(A) Only (v) is correct
(B) Only (i) and (iv) are correct
(C) Only (i), (ii) and (iv) are correct
(D) Only (i), (ii), (iii) and (iv) are correct
97. The following commands are entered in R :
data <- data.frame $(x=1: 3, \mathrm{y}=2: 4, \mathrm{z}=8: 10)$
data $[,-\mathrm{c}(1,3)$ ]
Then the output will be
(A) [1] 234
(B) $\quad$ [1] 8910
(C) [1] 123
(D) None of these
98. The R command $t$.test $\left(y_{1}, y_{2}\right)$, where $y_{1}$ and $y_{2}$ are numeric vectors is used for :
(A) Paired t test between $y_{1}$ and $y_{2}$
(B) Independent sample test between $y_{1}$ and $y_{2}$
(C) Single sample $t$ test for $y_{1}$ and $y_{2}$
(D) None of these
99. Which of the following is not a valid function in MS Excel?
(A) AVERAGE()
(B) PRODUCT()
(C) COUNTA()
(D) MEAN ()
100. In MS Excel to add numerical values in column A, from rows A10 to A20, the formulae that should be used is :
(A) $\operatorname{SUM}(A 10, A 20)$
(B) TOTAL $(A 10, A 20)$
(C) $\operatorname{SUM}(A 10: A 20)$
(D) TOTAL $(A 10: A 20)$

SPACE FOR ROUGH WORK

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