

No. of Pages. 20

Code No.

**Y – 3038**

Register Number :

Time : 2 Hours

Name :

Max.Marks : 100

**Entrance Examination for Admission to the P.G. Courses in the  
Teaching Departments, 2026**

**CSS**

**ACTUARIAL SCIENCE**

**GENERAL INSTRUCTIONS**

1. The Question Paper is having 100 Objective Questions, each carrying one mark.
2. The answers are to be marked **only** in the “**OMR Sheet**” provided.
3. **Negative marking : 0.25 marks** will be deducted for each wrong answer .

**INSTRUCTIONS FOR FILLING THE OMR SHEET**

- The OMR sheet should not be folded or crushed.
- Use only blue/black ball point pen to fill the circles.
- Use of pencil is strictly prohibited.
- Circles should be darkened completely and properly.
- Cutting and erasing on this sheet is not allowed.
- Do not leave any stray marks on the sheet.
- Do not use marker or white fluid to hide the mark.

• **WRONG METHODS**



**CORRECT METHOD**



DO NOT WRITE HERE

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Choose appropriate answer from the options in the questions.

**(100 × 1 = 100 marks)**

1. If  $f(x) = \ln(\sqrt{x^2 + 9})$ , then the minimum value of  $f(x)$  is :
- A. 0
  - B.  $\ln 3$
  - C.  $\ln 9$
  - D. None of the above

2. If vectors  $v_1, v_2, v_3$  in  $R^3$  are linearly dependent, then :
- A. All are zero
  - B. One is linear combination of others
  - C. They are orthogonal
  - D. They form a basis
3. If  $\det(A) = 5$  then  $\det(3A)$  for  $3 \times 3$  matrix :
- A. 15
  - B. 45
  - C. 135
  - D. 5
4. Eigenvalues satisfy :
- A.  $AX = 0$
  - B.  $A^2 X = X$
  - C.  $AX = I$
  - D.  $AX = \lambda x$
5. For what values of  $p$  does the series converge  $\sum_{n=1}^{\infty} \frac{1}{n^p}$
- A.  $p \geq 0$
  - B.  $p > 1$
  - C.  $p < 1$
  - D. Always
6. If  $z = x + iy$ , then  $|z|^2 =$
- A.  $x^2 - y^2$
  - B.  $x^2 + y^2$
  - C.  $x + y$
  - D.  $xy$
7. If polynomial has odd degree, it must have :
- A. Real root
  - B. Complex root only
  - C. No roots
  - D. Infinite roots
8. The function  $f(x) = x^3 - 3x^2 + 2$  is strictly increasing in :
- A.  $(-\infty, 1)$
  - B.  $(2, \infty)$
  - C.  $(-\infty, 0) \cup (2, \infty)$
  - D.  $(0, 2)$



15. " $p \wedge (p \rightarrow q)$ " is equivalent to :
- |                 |         |
|-----------------|---------|
| A. $P$          | B. $q$  |
| C. $p \wedge q$ | D. None |
16. Limit of  $\sin x / x$  as  $x \rightarrow 0$
- |             |       |
|-------------|-------|
| A. 0        | B. 1  |
| C. $\infty$ | D. -1 |
17. Number of solutions to  $x^2 \equiv 1 \pmod{p}$ ,  $p$  prime ( $> 2$ ) :
- |      |      |
|------|------|
| A. 1 | B. 2 |
| C. 3 | D. 4 |
18. Continuity at a point requires :
- |                                |                     |
|--------------------------------|---------------------|
| A. Limit exists                | B. Function defined |
| C. Limit equals function value | D. All of these     |
19.  $\int_0^1 x^n dx$  equals :
- |          |              |
|----------|--------------|
| A. $1/n$ | B. $1/(n+1)$ |
| C. $n$   | D. $n+1$     |
20.  $dy/dx = ky$  is :
- |           |              |
|-----------|--------------|
| A. Linear | B. Separable |
| C. Both   | D. None      |
21. Continuous function on closed interval is :
- |                  |             |
|------------------|-------------|
| A. Unbounded     | B. Bounded  |
| C. Discontinuous | D. Infinite |







42. Stratified sampling reduces :
- A. Bias  
B. Mean  
C. Sample size  
D. Variance
43. The least square regression line of  $y$  on  $x$  is  $x + 5y + 3 = 0$ . The least square regression line of  $w = 2y + 3$  on  $z = x + 2$  is :
- A.  $-2z + 5w + 13 = 0$   
B.  $2z + 5w - 13 = 0$   
C.  $10z + w - 17 = 0$   
D.  $10z + w + 17 = 0$
44. In ANOVA, null hypothesis is :
- A. Means differ  
B. Means equal  
C. Variances equal  
D. Medians equal
45. Suppose  $X \sim N(\mu, \sigma^2)$ , with  $\mu = 2, \sigma^2 = 3$ , is independent of  $Y \sim U(2, 4)$ . Then  $\text{Var}(XY)$  equals :
- A.  $88/3$   
B.  $30$   
C.  $32$   
D.  $80/3$
46. If  $r = 0.9$ , relationship is :
- A. Weak  
B. Moderate  
C. Strong positive  
D. Negative
47. An unbiased estimator satisfies :
- A.  $E(\theta) = \theta$   
B.  $E(\theta) = 0$   
C.  $E(\theta) = 1$   
D. None
48. If  $p\text{-value} < \alpha$ , we :
- A. Accept  $H_0$   
B. Reject  $H_0$   
C. Ignore test  
D. Increase  $\alpha$
49. In linear programming, optimal solution occurs at :
- A. Interior point  
B. Midpoint  
C. Any point  
D. Corner point

50. Feasible solution means :
- A. Any solution
  - B. Valid solution satisfying constraints
  - C. No solution
  - D. Infinite solution
51. A continuous random variable  $X$  has a probability density function symmetric about its mean. In such a case, which of the following statements is necessarily true?
- A. Mean = Median = Mode
  - B. Variance = 0
  - C. Skewness is positive
  - D. Distribution is uniform
52. If two random variables have zero covariance, it implies that :
- A. They are independent
  - B. They are uncorrelated but may not be independent
  - C. They are identical
  - D. Their variances are equal
53. Present value of ₹ 1000 due in 1 year at 10% :
- A. 900
  - B. 950
  - C. 1000
  - D. 909.09
54. The present value of a perpetuity depends on the interest rate such that if the interest rate decreases :
- A. Present value decreases
  - B. Present value increases
  - C. Present value remains constant
  - D. Present value becomes zero

55. An annuity due differs from an ordinary annuity because payments are made :
- At the end of each period
  - At the beginning of each period
  - Randomly
  - Only once
56. Depreciation is charged on fixed assets to :
- Increase profit
  - Show market value
  - Reduce liabilities
  - Allocate cost over useful life
57. Elastic demand means :
- $|E| < 1$
  - $|E| = 1$
  - $|E| > 1$
  - $E = 0$
58. The law of diminishing marginal utility states that as consumption of a good increase :
- Total utility decreases
  - Price increases
  - Marginal utility decreases
  - Demand increases
59. In a perfectly competitive market, firms are price takers because :
- They control prices
  - Many buyers and sellers
  - Government fixes prices
  - Demand is zero
60. A country experiences a sustained increase in the general price level due to rising input costs such as wages and raw materials, even though aggregate demand has remained relatively stable overtime. This situation is best described as :
- Demand-pull inflation
  - Cost-push inflation
  - Structural inflation
  - Anticipated inflation
61. Opportunity cost is :
- Accounting cost
  - Explicit cost
  - Foregone alternative
  - Fixed cost

62. A project with a positive Net Present Value (NPV) is considered acceptable because it :
- A. Reduces cost
  - B. Increases shareholder wealth
  - C. Has zero risk
  - D. Requires no investment
63. The time value of money concept implies that :
- A. Money loses value over time
  - B. Future money is more valuable
  - C. Money today is worth more than in the future
  - D. Inflation is zero
64. Net premium excludes :
- A. Risk cost
  - B. Expenses
  - C. Mortality
  - D. Interest
65. If independent lives :  $P(A \cap B) =$
- A.  $P(A) + P(B)$
  - B.  $P(A)P(B)$
  - C. 0
  - D. 1
66. Central Limit Theorem applies when sample size :
- A.  $n = 5$
  - B.  $n = 10$
  - C.  $n \geq 30$
  - D.  $n \geq 2$
67. Confidence interval width depends on :
- A. Mean only
  - B. Only variance
  - C. Only size
  - D. Sample size & variance
68. Which is not a risk management strategy?
- A. Risk transfer
  - B. Risk Mitigation
  - C. Risk avoidance
  - D. All of the above

69. Diversification works best when assets are :
- A. Perfectly correlated
  - B. Negatively correlated
  - C. Independent with high correlation
  - D. Risk-free
70. What does gross premium include?
- A. Mortality only
  - B. Interest only
  - C. Expenses + profit + risk
  - D. Profit only
71. What is the effect of higher mortality on insurance premiums?
- A. Lower premium
  - B. Higher premium
  - C. No change
  - D. Lower reserves
72. Last survivor policy pays when :
- A. First dies
  - B. Both die
  - C. Last dies
  - D. Maturity
73. Crop insurance schemes aim to protect farmers against losses arising from uncertainties such as weather conditions because :
- A. Prices are fixed
  - B. Agriculture is risk-prone
  - C. Demand is constant
  - D. Supply is fixed
74. Which of the following is included in the current account?
- A. Capital flows
  - B. Trade in goods/services
  - C. Loans
  - D. Investments

75. What is the primary effect of inflation on an economy?
- A. Purchasing power
  - B. Income
  - C. GDP
  - D. Exports
76. What is the primary function of the Reserve Bank of India?
- A. Fiscal policy
  - B. Monetary policy
  - C. Trade policy
  - D. Taxation
77. The role of Reserve Bank of India in monetary policy includes controlling inflation and liquidity primarily through tools such as repo rate and reverse repo rate. This function aims to :
- A. Increase exports
  - B. Maintain price stability
  - C. Reduce population
  - D. Increase imports
78. A country experiencing persistent current account deficit is importing more goods and services than it exports. This situation typically leads to :
- A. Pressure on domestic currency
  - B. Increase in foreign exchange reserves
  - C. Decrease in imports
  - D. Reduction in inflation
79. The introduction of Goods and Services Tax (GST) in India aimed at creating a unified market by replacing multiple indirect taxes. One major advantage of GST is that it :
- A. Reduces cascading effect of taxes
  - B. Eliminates all taxes
  - C. Increases tax evasion
  - D. Reduces exports

80. The Constitution of India provides Fundamental Rights to ensure individual freedom and equality. These rights are enforceable by courts, meaning that :
- A. They are advisory in nature
  - B. They apply only to government
  - C. Citizens can approach courts if violated
  - D. They are optional
81. The Election Commission of India is responsible for conducting free and fair elections at national and state levels. Its status as a constitutional body implies that :
- A. It is created by Parliament
  - B. It derives authority directly from the Constitution
  - C. It can be removed easily
  - D. It is private
82. The role of Securities and Exchange Board of India is to regulate the securities market and protect investors. Which of the following best describes its function?
- A. Controlling inflation
  - B. Managing fiscal deficit
  - C. Regulating agriculture
  - D. Supervising stock exchanges
83. The Paris Agreement is a global effort under the United Nations Framework Convention on Climate Change to combat climate change. Its primary aim is to limit global temperature rise. What is the targeted limit?
- A. 1°C
  - B. 2°C above pre-industrial levels
  - C. 5°C
  - D. No limit

84. Deforestation contributes to climate change because trees act as carbon sinks. When forests are cleared, the stored carbon is released into the atmosphere, leading to :
- A. Reduced greenhouse gases
  - B. Lower temperature
  - C. Increased carbon dioxide levels
  - D. Improved soil fertility
85. Biodiversity hotspots are regions that are both rich in endemic species and under threat from human activities. Protecting these regions is important because they :
- A. Have low species diversity
  - B. Are uninhabited
  - C. Have no economic value
  - D. Support unique ecosystems
86. Renewable energy sources such as solar and wind energy are considered sustainable because they :
- A. Are always cheap
  - B. Do not get depleted quickly
  - C. Produce no energy
  - D. Replace all fuels instantly
87. Which layer of the atmosphere is primarily responsible for weather changes and is directly affected by climate change?
- A. Stratosphere
  - B. Troposphere
  - C. Mesosphere
  - D. Thermosphere
88. When is the World Environment Day celebrated every year?
- A. July 5
  - B. January 15
  - C. June 5
  - D. January 5
89. Which vitamin is produced when skin is exposed to sunlight?
- A. Vitamin A
  - B. Vitamin B12
  - C. Vitamin C
  - D. Vitamin D

90. Which of the following activities helps reduce Global Warming?
- A. Increase use of coal
  - B. Deforestation
  - C. Use of renewable energy
  - D. Burning of fossil fuel
91. Which global tech company is leading developments in AI with models like ChatGPT?
- A. Google
  - B. Microsoft
  - C. Open AI
  - D. Amazon
92. The human circulatory system relies on the heart to pump blood. The presence of four chambers ensures :
- A. Mixing of oxygenated and deoxygenated blood
  - B. Slower circulation
  - C. No circulation
  - D. Efficient separation of blood types
93. Electric current is defined as the rate of flow of charge. The unit of electric current in the SI system is :
- A. Volt
  - B. Ampere
  - C. Watt
  - D. Ohm
94. The International Monetary Fund provides financial assistance to countries facing balance of payments crises. Its main objective is to :
- A. Ensure global financial stability
  - B. Promote military alliances
  - C. Control trade tariffs
  - D. Conduct elections
95. The World Trade Organization plays a crucial role in facilitating international trade by establishing rules among member nations. Which of the following is its key function?
- A. Regulating climate policies
  - B. Providing healthcare
  - C. Managing currencies
  - D. Reducing trade barriers



## **ROUGH WORK**

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