## UNIVERSITY OF MYSORE Postgraduate Entrance Examination October - 2022



MAXIMUM MARKS : 50
MAXIMUM TIME : 75 MINUTES
(Including time for filling O.M.R. Answer sheet)

## INSTRUCTIONS TO THE CANDIDATES

1. The sealed question paper booklet containing 50 questions enclosed with O.M.R. Answer Sheet is given to you.
2. Verify whether the given question booklet is of the same subject which you have opted for examination.
3. Open the question paper seal carefully and take out the enclosed O.M.R. Answer Sheet outside the question booklet and fill up the general information in the O.M.R. Answer sheet. If you fail to fill up the details in the form as instructed, you will be personally responsible for consequences arising during evaluating your Answer Sheet.
4. During the examination:
a) Read each question carefully.
b) Determine the Most appropriate/correct answer from the four available choices given under each question.
c) Completely darken the relevant circle against the Question in the O.M.R. Answer Sheet. For example, in the question paper if "C" is correct answer for Question No.8, then darken against SI. No. 8 of O.M.R. Answer Sheet using Blue/Black Ball Point Pen as follows:

Question No. 8. (A) (B) (D) (Only example) (Use Ball Pen only)
5. Rough work should be done only on the blank space provided in the Question Booklet. Rough work should not be done on the O.M.R. Answer Sheet.
6. If more than one circle is darkened for a given question, such answer is treated as wrong and no mark will be given. See the example in the O.M.R. Sheet.
7. The candidate and the Room Supervisor should sign in the O.M.R. Sheet at the specified place.
8. Candidate should return the original O.M.R. Answer Sheet and the university copy to the Room Supervisor after the examination.
9. Candidate can carry the question booklet and the candidate copy of the O.M.R. Sheet.
10. The calculator, pager and mobile phone are not allowed inside the examination hall.
11. If a candidate is found committing malpractice, such a candidate shall not be considered for admission to the course and action against such candidate will be taken as per rules.
12. Candidates have to get qualified in the respective entrance examination by securing a minimum of 8 marks in case of SC/ST/Cat-I Candidates, 9 marks in case of OBC Candidates and 10 marks in case of other Candidates out of 50 marks.

## INSTRUCTIONS TO FILL UP THE O.M.R. SHEET

1. There is only one most appropriate/correct answer for each question.
2. For each question, only one circle must be darkened with BLUE or BLACK ball point pen only. Do not try to alter it.
3. Circle should be darkened completely so that the alphabet inside it is not visible.
4. Do not make any unnecessary marks on O.M.R. Sheet.
5. Mention the number of questions answered in the appropriate space provided in the O.M.R. sheet otherwise O.M.R. sheet will not be subjected for evaluation.

6. Which of the following is true for a series of real numbers $\sum_{n=0}^{\infty} a_{n}$ that converges?
(A) $\lim _{n \rightarrow \infty} a_{n}=0$
(B) $\lim _{n \rightarrow \infty} a_{n} \neq 0$
(C) $\lim _{n \rightarrow \infty} a_{n}=1$
(D) $\lim _{n \rightarrow \infty} a_{n}$ need not exist
7. Which of the following is true for the series $1+1 / 2+1 / 3+\cdots$ ?
(A) It converges to 0
(B) It converges to 1
(C) It converges to e
(D) It diverges to $\infty$
8. What is the radius of convergence of the power series $\sum_{n=0}^{\infty} \frac{x^{n}}{n!}$ ?
(A) 1
(B) $\infty$
(C) e
(D) 0
9. Which of the following is true for a real valued function of a real variable which is continuous at a point?
(A) It is differentiable at that point
(B) It need not be differentiable at that point
(C) It must be differentiable at that point
(D) It cannot be differentiable at that point
10. What is $\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} e^{-\left(\frac{x^{2}+y^{2}}{2}\right)} d x d y$ equal to?
(A) $2 \pi$
(B) $\frac{\pi}{2}$
(C) $\pi$
(D) $4 \pi$
11. Which of the following is need not be true in a vector space?
(A) It is closed under vector addition
(B) It is closed under scalar multiplication
(C) It is closed under vector multiplication
(D) It is closed under linear combinations of vectors
12. If $S$ is a any subspace of a vector space $V$, which of the following must be true?
(A) $S$ is a subset of $V$
(B) $S$ is not a subset of $V$
(C) $V$ is a subset of $S$ always
(D) $S$ and $V$ do not have any common elements
13. What are the characteristic roots of identity matrix of order 2 ?
(A) 0 and 1
(B) 0 and 0
(C) 1 and 1
(D) -1 and 1
14. Which of the following is not equal to the rank of a matrix?
(A) Row rank
(B) Column rank
(C) Number of linearly independent columns
(D) Number of linearly dependent rows
15. If $A$ and $B$ are any two symmetric matrices of the same order, which of the following need not be a symmetric matrix?
(A) $A+B$
(B) $A-B$
(C) $A B$
(D) $A^{T}+B^{T}$, where $A^{T}$ denotes transpose of $A$
16. Which of the following graphical representation enables reconstruction of data from it?
(A) Histogram
(B) Box-plot
(C) Stem-and-leaf-plot
(D) Frequency polygon
17. Which of the following helps in identifying correlation between two variables?
(A) Box-plot
(B) Scatter plot
(C) Stem-and-leaf plot
(D) Textile plot
18. Which of the following is not a measure of central tendency?
(A) Arithmetic mean
(B) Median
(C) Mode
(D) Mean deviation about mean
19. Which of the following is not an absolute measure of dispersion?
(A) Standard deviation
(B) Mean deviation about mean
(C) Mean deviation about median
(D) Coefficient of variation
20. If the unit of measurement of the mean is cm., the unit of measurement of variance is squared cm ., then what is the unit of measurement of the coefficient of variation?
(A) cm
(B) Squared cm
(C) No unit of measurement
(D) cm . per squared cm
21. If $X$ has Poisson distribution with mean 1 , then what is $E\left(X^{2}\right)$
(A) 0
(B) 1
(C) 2
(D) $\sqrt{2}$
22. If $X$ and $Y$ are independent random variables with distribution function $F$, then what is the distribution function of $\max \{X, Y\}$ ?
(A) $F(x)(1-F(x)), x \in R$
(B) $(1-\mathrm{F}(x))^{2}, x \in R$
(C) $F^{2}(x), x \in R$
(D) $F(x)(3-F(x)), x \in R$
23. If $X$ and $Y$ are independent standard normal random variables, then what is the variance of $X-Y$ ?
(A) 0
(B) 1
(C) 2
(D) $\sqrt{2}$
24. Given that an event $A$ has probability 0 , which of the following is true?
(A) $A$ is independent of any other event
(B) A cannot be independent of any other event
(C) A and every other event are dependent events
(D) The only events that are independent are $A$ and the null event
25. If random variable $X$ has geometric distribution with mean 1 , what is the probability that X takes the value 0 ?
(A) $1 / 2$
(B) $1 / 4$
(C) $1 / 3$
(D) 1
26. What is the range for Karl Pearson's correlation coefficient?
(A) $(-1,+1)$
(B) $[-1,+1]$
(C) $(0,1)$
(D) $[0,1]$
27. Which of the following is equal to the product of the regression coefficients of simple linear regression of a variable x on y and that of y on x ?
(A) Square of the correlation coefficient between the two variables
(B) The correlation coefficient between the two variables
(C) The ratio of standard deviation of $x$ and that of $y$
(D) The ratio of variance of $x$ and variance of $y$
28. What is the range of the multiple correlation coefficient?
(A) $(-1,+1)$
(B) $[-1,+1]$
(C) $(0,1)$
(D) $[0,1]$
29. Which of the following statement is not true for a bivariate normal distribution?
(A) Its marginals are normally distributed
(B) Sum of its marginal random variables has normal distribution if the correlation coefficient between the marginal variables is equal to 0
(C) Conditional distribution of one marginal given the other is normal
(D) Sum of its marginal random variables has chi-square distribution even if the correlation coefficient between the marginal variables is not equal to 0
30. Given that the correlation coefficient between the variables $X$ and $Y$ is equal to 0 and that $(\mathrm{X}, \mathrm{Y})$ has a bivariate normal distribution, which of the following is not true?
(A) X and Y are independent random variables
(B) X and Y are not independent random variables
(C) Covariance between X and Y is equal to 0
(D) X and Y have normal distribution
31. If $\left\{X_{n}, n \geq 1\right\}$ is a sequence of random variables with $P\left(X_{n}=1\right)=\frac{1}{n}=1-P\left(X_{n}=0\right)$, then which one of the following is not true?
(A) The sequence converges in probability
(B) The sequence converges in distribution
(C) The sequence converges in distribution but not in probability
(D) The sequence converges in second mean
32. If $\left\{X_{n}, n \geq 1\right\}$ is a sequence of independent standard normal random variables, what is the distribution of $X_{1}^{2}+\ldots+X_{10}^{2}$ ?
(A) Chi-square distribution with 10 degrees of freedom
(B) Standard normal distribution
(C) Chi-square distribution with 100 degrees of freedom
(D) Normal distribution with mean 10 and variance 100
33. Which of the following is the limiting distribution in central limit theorem?
(A) Poisson
(B) Normal
(C) Cauchy
(D) Chi-square
34. If $X_{1}, X_{2}, \ldots$, is a sequence of independent and identically distributed Bernoulli random variables with success probability $1 / 2$, what does $\frac{X_{1}+\ldots+X_{n}}{n}$ converge to in probability?
(A) $1 / 2$
(B) 1
(C) 0
(D) 2
35. In a one sample test based on a sample of size 10 for testing that mean is equal to a specified value, what is the distribution of the test statistic?
(A) Normal
(B) t
(C) Chi-square
(D) Exponential
36. Which of the following is not a property of an estimator?
(A) Unbiasedness
(B) Consistency
(C) Efficiency
(D) Sufficiency
37. Which of the following is the type-I error in statistical hypothesis testing?
(A) Probability of accepting the null hypothesis under the null hypothesis
(B) Probability of rejecting the null hypothesis under the null hypothesis
(C) Probability of accepting the null hypothesis under the alternate hypothesis
(D) Probability of rejecting the null hypothesis under the alternate hypothesis
38. Which of the following is a non-parametric test?
(A) $t$ test
(B) Z test
(C) Sign test
(D) F test
39. Which of the following is the sampling distribution of the likelihood ratio test statistic for mean of a normal distribution when the sample size is large?
(A) Normal
(B) Chi-square
(C) F
(D) t
40. Abbreviation MLR stands for what?
(A) Maximum Likelihood Ratio
(B) Monotone Likelihood Ratio
(C) Monotone Likelihood Regression
(D) Maximum Likelihood Regression
41. Which of the following is not a method of sampling?
(A) Simple random sampling
(B) Stratified sampling
(C) Curvilinear sampling
(D) Systematic sampling
42. Which of the following is not an allocation scheme?
(A) Neyman
(B) Fisher
(C) Proportional
(D) Optimal
43. The divisor in the unbiased estimator of the population variance is which one of the following?
(A) $n$
(B) $n-1$
(C) $n-2$
(D) $\sqrt{n}$
44. Which of the following is not a method of systematic sampling?
(A) Linear
(B) Circular
(C) Curved
(D) Both (A) and (B)
45. The number of possible SRSWOR samples of size 10 from a population of size 100 is which one?
(A) 1000
(B) $10^{100}$
(C) $100^{10}$
(D) $\binom{100}{10}$
46. The estimator of the parametric function given by the Gauss-Markov theorem does not satisfy one of the following properties. Which one?
(A) Linearity
(B) Unbiasedness
(C) Minimum Variance
(D) Minimum entropy
47. Which of the following is not a basis for design of experiments?
(A) Randomization
(B) Minimization
(C) Local control
(D) Replication
48. Which of the following properties is not satisfied by a RBD?
(A) Every treatment is replicated the same number of times in the design
(B) Every block has the same number of plots
(C) The number of plots in a block is equal to the number of treatments
(D) Every treatment need not appear in every block
49. Yates' algorithm is used to compute one of the following. Which one?
(A) Factorial effect totals
(B) Variance of factorial effects
(C) Mean of factorial effects
(D) Standard errors of factorial effects
50. ANOVA refers to which one of the following?
(A) Analysis of Variation
(B) Analysis of Variance
(C) Analysis of Variance Components
(D) Analysing Naturally Occurring Variation
51. Census operations in India are done by which of the following agencies?
(A) Census India
(B) Registrar General for Census in India
(C) Central Statistical Organization
(D) National Academy of Statistical Administration
52. Which of the following is not a component of a general time series?
(A) Seasonal
(B) Trend
(C) Stationarity
(D) Random error
53. Among the following, who is considered as father of Indian Statistical system?
(A) Prof. Calyampudi Radhakrishna Rao
(B) Prof. Prasanta Chandra Mahalanobis
(C) Prof. P.V.Sukhatme
(D) Prof. B.K.Kale
54. Which of the following is not an Index number?
(A) GDP
(B) GNP
(C) INA
(D) CPI
55. Which of the following is useful in studying poverty levels?
(A) Gini Index
(B) Fish-bone diagram
(C) Simplex method
(D) Lagrange's multipliers

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## Rough Work

## అభ్యథిรగษిగి శ్జอఒసేగఆు



 ఎంబదన్ను யరిరిలలిసిరి.



 జదాబ్దారరంగిరుత్తిర.


 లుత్తరహస్ను నిధణరిి.


 కుంబిర:




 ळలళెయల్లిన లుదాळరణ నైలణి.
 యృడ్బొలు.
 పిల్టలిద్యానిలయుద
 ஹృఁగబळుదు.




 అంచగఆన్ను யֹడియత్ర్ప్దు.

## ఓ.ఎం.ఆరా. ळలఆయన్ను కుంబలు ష్యృజసెగళు









Note : English version of the instructions is printed on the front cover of this booklet.

