Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
Internal Examination (2021-22)
Notice

Date: 21/12/2021

All the students of B.Sc. – I, II & III are hereby informed that, the internal examination of semester- I, III &V will be held as per following time table.

B.Sc I

Sr. No.	Class	Date	Time	Title of the Paper
01	B.Sc I	27/12/2021	2:00 pm to 2:45 pm	Descriptive Statistics - I
		28/12/2021	1:00 pm to 1:45 pm	Elementary Probability Theory

Nature of Question paper: Total 20 Marks
Q.1 Attempt any 4 out of 5(5 marks each)

B.Sc II

Sr. No.	Class	Date	Time	Title of the Paper
2	B.Sc II	28/12/2021	4:15 pm to 5:00 pm	Probability Distributions
		31/12/2021	2:45 pm to 3.30 pm	Statistical Methods-I

Nature of Question paper: Total 20 Marks
Q.1. 4 MCQ's for 1 mark each
Q. 2 Attempt any one out of 2(8 Marks)
Q. 3 Attempt any 2 out of 4 (8 marks)

B.Sc III

Sr. No.	Class	Date	Time	Title of the Paper
01	B.Sc III˙	28/12/2021	11.30 am to 12.30 pm	Probability Distributions and Probability Theory
		31/12/2021	11.30 am to 12.30 pm	Sampling Theory and Operations Research

For each section, attempt any two Questions out of 3 (2 X 5 = 10)
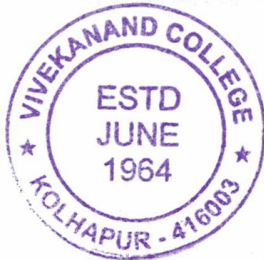
(Ms. V. V. Pawar)
HEAD
DEPARTMENT OF STATISTICS
VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
B.Sc. I SEM I Internal Exam 2021-22
Subject: Elementary Probability Theory

Total Marks 20   **Date: 28/12/2021**

Q1) Attempt any 4 of the Following (4X 5= 20)

a) Define the following terms with suitable example.
      i) Disjoint event   **ii)** Sample Space

b) Define Power set. Write down the power set of sample space S= {a, b, c}.

c) Define the following terms,
    i) Classical definition of probability   ii) Axiomatic definition of probability

d) State and prove addition law for two events A and B.

e) With usual notation prove that, **i)** $P\emptyset$)=0 where $\emptyset$ *is null event*
      ii) $P(A') = 1 - P(A)$ where A' is complement of event A.

f) Let S= {a, b, c} be the sample space associated with certain experiment.
If $P(a)= k$, $P(b) = 2k^2$ and $P(c)= k^2 +k$ then find the value of k

Vivekanand College, Kolhapur(Autonomous)
Department of Statistics
B. Sc. II SEM III Continuous Internal Evaluation (CIE) 2021 – 2022
Subject: Probability Distribution and Statistical Methods I
Section I: Probability Distribution Subject: Probability Distributions
Date: 28/12/2021   Time: 4.15pm – 5.15 pm   Total Marks: 20

Q.1 Choose the correct alternative (04)

a) If F(x) is distribution function of a continuous random variable X then $F(-\infty)$ is ……..
i) 1   ii) 0   iii) -1   iv) None of these.

b) If $M_X(t)$ is m.g.f. of X then $M_{X-m}(t)$ = …………..

i) $e^{-mt}M_X(t)$ ii) $M_X(t) - e^{-mt}$ iii) $e^{mt}M_X(t)$ iv) $M_X(t) - e^{mt}$

c) The joint pdf of (X, Y) is $f(x,y) = \begin{cases} x+y & 0 \le x \le 1, 0 \le y \le 1 \\ 0 & otherwise \end{cases}$

Then E(Y) is………
i) $\frac{1}{4}$ ii) $\frac{2}{3}$ iii) $\frac{7}{12}$ iv) $\frac{1}{2}$

d) If f(x, y) is joint pdf of (X, Y), $f_1(x)$ and $f_2(y)$ are the marginal pdf of X and Y respectively, then conditional pdf of X given Y = y is………
i) $\frac{f(x,y)}{f_1(x)}$ ii) $\frac{f_2(y)}{f(x,y)}$ iii) $\frac{f_1(x)}{f(x,y)}$ iv) $\frac{f(x,y)}{f_2(y)}$

Q.2 Attempt any One (08)

1. If X is a r.v. with pdf f(x) = k ; 0<x<1 then find i) k   ii) First four raw moments   iii) First four central moment iv) γ_1 & γ_2

2. The joint pdf of bivariate r.v. (X,Y) is f(x,y) = 8xy; 0<x<y<1 Find i) Marginal pdf of X and Y   ii) Mean of X and Mean of Y iii) Conditional distribution of X given Y = y.

Q.3 Attempt any Two (08)

1. If X is an r.v. with pdf f(x) = $9x^2$; 0<x<1 then find the pdf of $Y = \frac{X}{1-X}$.

2. Define a) Arithmetic Mean   b) Harmonic Mean

3. Prove that E(E(X/y)) = E(X).

4. The joint pdf of bivariate r.v. (X,Y) is f(x,y) = 4xy; 0<x<1 ,0<y<1 . Find marginal pdf of X and E(X).

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
B.Sc. II Internal Examination SEM III
Subject: Probability Distribution and Statistical Methods I
Section II: Statistical Methods II

Total Marks 20   Time: 2:45 pm to 3.30 pm   Date: 31/12/2021

Q1) Choose most correct option from the following

1) The price index number is 140% then the interpretation is……..
   A) price of each commodity is increased by Rs.40/-
   B) price of each commodity is increased by.40%
   C) average rise in prices is by Rs.40/-
   D) average rise in prices is by 40%.

2) Combined changes in prices and quantities are measured by …
   A) Price index number   B) Value index number
   C) Quantity index number   D) None of these

3) If the new series is connected with the old series of index numbers, it is known as…
   A) Base shifting   B) Forward splicing
   C) Backward splicing   D) None of these`

4) Chebyshev's inequality gives ……..bounds for given probabilities.
   A) Lower bound   B) Upper bound
   C) Both lower and upper bound   D) gives exact values

5) Which of the following statement is correct for bound of Chebyshev's inequality?
   A) $P[|X-E(X)| \ge k\sigma] \ge \frac{1}{k^2}$ B) $P[|X-E(X)| \ge k\sigma] < \frac{1}{k^2}$
   C) $P[|X-E(X)| \le k\sigma] \ge \frac{1}{k^2}$ D) $P[|X-E(X)| \le k\sigma] > \frac{1}{k^2}$

Q2) Attempt any three of the following (3X5 = 15)

a) Define Index number. Explain different types of Index number.

b) Define Cost of living index number. What are the different methods of construction of it? Explain any one method.

c) State and prove Chebychev's inequality for continuous random variable.

d) A random variable X such that E(X) = 3 and $E(X^2)$ =13 find lower bound for P [-2 < X< 8].

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
B.Sc. III SEM V Internal Exam 2021-22
Subject: Probability Distributions and Probability Theory
Total Marks 20 Time: 11:30 am to 12:30 pm   Date: 28/12/2021

Q1) Attempt any two Questions of the following (2 X 5 = 10)

  a) Derive an expression for raw moments in case of lognormal Distribution and hence find mean and variance.

  b) If $X \sim C(\mu, \lambda)$ then find the distribution of Y^2 where $Y = \frac{x-\mu}{\lambda}$ and identify the distribution.

  c) IF $(X, Y) \sim BN(\mu 1, \mu 2, \sigma 1^2, \sigma 2^2, \rho)$ then find the distribution of aX +bY +C where a, b and c are constants.

Q2) Attempt any two Questions of the following (2 X 5 = 10)

  a) Define Order Statistics. Derive the expression for i^{th} order statistics.

  b) Let $X_1, X_2 \ldots \ldots X_n$ be a random sample of size n then find the probability distribution of Sample range.

  c) Using CLT for a sequence of i.i.d. Poisson variates with parameter 1 then show that $\sum_{x=0}^{n} \frac{e^{-n} n^x}{x!} \to 0.5 \ as \ n \to \infty.$

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
Internal Examination (2021-22)

Notice

Date: 16/05/2022

All the students of B.Sc. III are hereby informed that, the internal examination of semester VI will be held as per following time table:

Sr. No.	Class	Date	Time	Title of the Paper
01	B.Sc III	21/05/2022	11:30 a.m. - 11:45 a.m	Statistical Inference -I
		23/05/2022	11:30 a.m. - 11:45 a.m	Statistical Inference -II
		24/05/2022	11:30 a.m. - 11:45 a.m	Designs of Experiments
		25/05/2022	11:30 a.m. - 11:45 a.m	Quality Management and Data Mining

Nature of Question paper: Total 10 Marks

10 Multiple choice questions each carrying one mark

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SHRI SWAMI VIVEKANAND SHIKSHAN SANSTHA'S
VIVEKANAND COLLEGE, KOLHAPUR (Autonomous).
Department of Statistics
SEM: VI Statistical Inference -II   Roll No.:

Date: - 23/05/2022   Time: 11:30 a.m. - 11:45 a.m.   **Total Marks- 10**

Q. Choose the correct alternative   (10 marks)

1. If $(-1.96 < \mu < 1.96) = 0.95$ then which of the following statement is correct.
   a) Length of Confidence interval is 3.92 units.
   b) The confidence coefficient is 0.95.
   c) The probability that μ lies between $(-1.96, 1.96)$ is 0.95.
   d) All the above.

2. The quantities C1 & C2 within which the unknown value of the parameter is expected to lie such that $P(C1 < \theta < C2) = 1-\alpha$ are known as
   a) Confidence limits   b) C.I.
   c) Confidence coefficient   d) confidence levels

3. Interval estimate of parameter θ of exponential distribution can be obtained by use of:
   a) Chi-square Distribution   b) F-distribution
   c) Normal distribution   d) t-distribution.

4. A random variable T which is a function of r. s., a parameter θ & its distribution is independent of θ is known as
   a) a statistic   b) a pivot
   c) a likelihood function   d) None of them

5. The probability of rejecting the null hypothesis when it is true is called as ....
   a) P- value   b) Size of the test
   c) Power of the test   d) Type II error

6. If $X_1, X_2, \dots X_n$ is a r. s. of size n taken from $N(\theta, 100)$ population a UMP test exists for testing $H_0: \theta = \theta_0$ against
   a) $H_1: \theta \neq \theta_0$ b) $H_1: \theta > \theta_0$
   c) $H_1: \theta < \theta_0$ d) Either (b) or (c)

7. Which of the following is most appropriate for testing simple H_0 against simple H_1.
   a) UMP level α test exists   b) MP level α test exists
   c) UMP level $(1-\alpha)$ test exists   d) MP level $(1-\alpha)$

8. In a SPRT of strength (α, β)
   a) Sample size is fixed, α & β are minimized
   b) Sample size & α are fixed, β is minimized
   c) Sample size & β are fixed, α is minimized
   d) Sample size is random, α & β are fixed

9. The theory of SPRT was developed by
   a) Karl Pearson   b) A Wald
   c) Fisher   d) Neyman Pearson.

10. In SPRT of strength (0.5, 0.2) the stopping bounds denoted by A & B are given by.
    a) A=1.6, B=0.4   b) A=1.5, B=0.4
    c) A=1.6, B=0.5   d) A=0.5, B=0.8


Date 24/05/2022   Total marks 10

Choose the correct alternative.   (10)

1. The principle of controlling heterogeneity in design of experiment is....
   a) Replication   b) Randomization   c) Local control   d) None of these

2. If the treatments shows significant effect then to find out which pair(s) of treatments differ significantly ..... is used.
   a) t test   b) z test   c) Critical difference   d) paired-t test

3. In the efficiency of RBD over CRD, if E >1 then RBD is .... than CRD. a) less efficient   b) more efficient   c) equally efficient   d) None of these

4. To obtain the valid estimate of experimental error which of the following principle are used?
   a) Replication and Randomization
   b) Randomization and local control
   c) Replication and local control
   d) Replication, Randomization and local control

5. In LSD the least square estimate of μ is given by ....
   a) mean of any treatment   b) mean of first row
   c) mean of first column   d) overall mean

6. Let T. B and G be the total of known observations of ith treatment, jth block and all known observations with t treatments and r blocks then formula for estimating one missing observation in RBD is ......
   a) $\frac{rT - tB + G}{(t-1)(r-1)}$ b) $\frac{tT + rB - G}{(t-1)(r-1)}$ c) $\frac{rT - tB - G}{(t-1)(r-1)}$ d) $\frac{tT - rB - G}{(t-1)(r-1)}$

7. In analysis of variance (ANOVA) the distribution of test statistic is ....
   a) T distribution   b) Normal distribution
   c) F distribution   d) Chi Square distribution

8. Let MSE and SSE are mean sum of square and sum of square due to error in CRD with t treatments and n experimental units then unbiased estimate of error variance is - ....
   a) MSE   b) $\frac{SSE}{(n-1)}$ c) $\frac{SSE}{(n-t)}$ d) Both a amd c

9. Standard error of the difference between two treatment means in RBD with t treatments and r replications and mean error sum of square S^2_E will be ....
   a) $\sqrt{\frac{2S^2_E}{t}}$ b) $\sqrt{\frac{2S^2_E}{r}}$ c) $S^2_E\sqrt{\frac{2}{r}}$ d) $S^2_E\sqrt{\frac{2}{t}}$

10. In RBD with 4 blocks and 6 treatments if sum of square due to error is 80.45 then mean sum of square due to error is ......
    a) 6.82   b) 5.36   c) 10.25   d) none of these
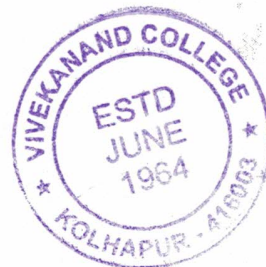
$\left(\dfrac{9}{10}\right)$

Roll. No. 7903

Date: 25/05/2022

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1. .... variability is unavoidable.
   - a. Chance causes
   - b. Assignable causes
   - c. Both a and b
   - d. None of a and b

2. Use of statistical technique to industrial products is helpful in
   - a. Judging conformance on non-conformance of the products
   - b. Improve quality standards
   - c. Maintaining quality standards
   - d. Maintaining & improving quality standards

3. Generally, in process control, cost of production is............ as compared to that in product control
   - a. High
   - b. low
   - c. almost same
   - d. exactly the same

4. Control chart is .... tool
   - a. On-line process control
   - b. Off-line Process control
   - c. Product control
   - d. Both process and product control

5. Which of the following chart is distribution free?
   - a. Cusum
   - b. EWMA
   - c. Shewhart charts
   - d. All of the above.

6. For drawing ATT curve, the values on X axis are the values of –
   - a. incoming lot quality
   - b. consumer s risk
   - c. outgoing lot quality
   - d. producer's risk

7. If the producer's risk is fixed as 0.01 then the Average Amount of Total inspection per lot of size 110 on the basis of sample of size 10 is
   - a. 100
   - b. 11
   - c. 9
   - d. 99

8. For double sampling plan $n_2 = 5$ and probability of accepting lot, on the basis of first Sample of Size 10 is 0.4. Then the value of ASN is
   - a. 11
   - b. 13
   - c. 4
   - d. 12

9. Who among the following conceived the PDCA Cycle?
   - a. W. E. Deming
   - b. W. A. Shewhart
   - c. Both a and b
   - d. None of these

10. In EWMA control Chart the starting value is
    - a. 0
    - b. process target
    - c. Z_i
    - d. None of these