Objective
Paper Code
8185

Intermediate Part Second
STATISTICS (Objective)
Time: 20 Minutes   Marks: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	Any hypothesis which is tested for rejection under assumption that it is true is called:	Null hypothesis	Alternative hypothesis	Statistical hypothesis	None of these
2	The point estimator of "μ" is:	$\overline{X}$	X	$\hat{X}$	$\tilde{X}$
3	If $E(\hat{\theta}) = \theta$ then $\hat{\theta}$ is:	Biased	Unbiased	Positively biased	None of these
4	If $\sigma^2 = 5$ and $n = 2$ then $\sigma^2_{\overline{x}}$ is:	2	2.5	3	5
5	A sample is regarded as a subset of:	Data	Set	Distribution	Population
6	Any value calculated from the sample is called:	Parameter	Statistic	Proportion	Mean
7	If $y = 5x + 10$ and $X \sim N(10, 25)$ then mean of y is:	50	60	70	135
8	The mean of the standard normal distribution:	1	μ	0	2
9	The parameters of normal distribution are:	μ and $\frac{\sigma}{n}$	μ and σ^2	np and nq	n and p
10	One byte equals:	8 bits	4 bits	6 bits	12 bits
11	Increase in demand of ice is an example of:	Secular trend	Seasonal variation	Cyclical variation	Random variation
12	Methods of secular trend are:	2	3	4	5
13	If the class frequency (AB) = 0 then value of Q is equal to:	0	1	-1	-1 to $+1$
14	In testing independence in 2×3 contingency table, the number of degree of freedom in χ^2 is:	1	2	3	4
15	Correlation is said to be positively perfect if:	$r_{xy} = r_{yx}$	$r = 0.98$	$r = +1$	$r = 0$
16	The two regression coefficients have always:	Opposite sign	No sign	Same sign	Difficult to tell
17	If $y = 2 + 0.6x$ then the slope of line is:	2	2.6	0.6	Zero

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STATISTICS (Subjective)

Time: 02:40 Hours   Marks: 68

SECTION – I

Write short answers to any EIGHT parts.   16

(i) How much area of the normal distribution lies between $\mu - 2\sigma$ and $\mu + 2\sigma$?

(ii) Write the equation of normal distribution $N(\mu, \sigma^2)$.

(iii) If $X \sim N(25, 25)$, find mean deviation.

(iv) Find Q_1 of a normal distribution whose mean (μ) is 100 and variance (σ^2) is 25.

(v) What is the relation between mean, median and mode of a normal distribution?

(vi) Interpret the statement: A 90% confidence interval for μ is (48.4 , 56.6)

(vii) Describe point estimation.

(viii) Formulate the null and alternative hypothesis for the statement: "No more than 30% people pay Zakat".

(ix) Define composite hypothesis.

(x) Give an example of type-II error.

(xi) What is computer hardware?

(xii) Define input devices in computer.

3. **Write short answers to any EIGHT parts.**   16

(i) Define complete enumeration.

(ii) Express the concept of "sampling distribution" of any statistic.

(iii) If $n = 36$ and $S.E(\overline{X}) = 2$. Find $S.E(\overline{X})$ if sample size is increased to 144.

(iv) A population consists of two values as 4 and 6. Draw all possible samples of size $n = 3$ with replacement.

(v) Write any two properties of sampling distribution of sample proportions (P).

(vi) What is the basic aim of sampling?

(vii) Write at least 2 properties of least square regression equation $\hat{y} = a + bx$.

(viii) Define the term residual in regression.

(ix) If $\sum xy = 300300$, $\sum x = 5000$, $\sum y = 6000$ and $n = 100$. Find covariance S_{xy}.

(x) Define no correlation.

(xi) What is meant by product moment coefficient of correlation?

(xii) Given $\hat{Y} = 11.8 + 2x$ and $\hat{X} = 5.5 + 0.5y$ find Karl Pearson's coefficient of correlation.

4. **Write short answers to any SIX parts.**   12

(i) What is meant by independence of attributes?

(ii) If $n = 600$, $(A) = 240$, $(B) = 270$, what would be the value of (AB), if A and B are independent.

(iii) If A's are 60% and B's are 40%. Find percentage of AB's if A and B are independent.

(iv) What is the cell frequency?

(v) Define consistency of data.

(vi) What is the principle of method of least squares?

(vii) Give the two examples of secular trend.

(viii) Describe any two disadvantages of moving average method.

(ix) Given $\overline{x} = 1$, $\overline{y} = 8$. Find the value of "a" if $b_{yx} = 2$.

SECTION – II	Attempt any THREE questions. Each question carries 08 marks.

5. (a) If $X \sim N(36, 25)$ find median, mode, D_9 and P_{67} 04

   (b) If $Q_1 = 3$, $Q_3 = 10$, find μ and σ of the normal distribution.   04

6. (a) Take all possible samples of size two with replacement of the population 2 , 2 , 8. Show that the population mean is equal to the mean of means of all samples and population variance is twice the variance of samples means. 04

   (b) A population consists of four values 4 , 10 , 15 , 20. Take all possible samples of size two without replacement from this population. Find the proportion of even number and verify that:

   $$\text{S.E}(\hat{p}) = \sqrt{\frac{Pq}{n}\left(\frac{N-n}{N-1}\right)}$$ 04

7. (a) A restaurant wishes to estimate the average amount of money a customer spends for lunch. A random sample of size n = 36 is selected and the sample mean $\bar{x}$ = Rs. 12.40. Assuming σ = Rs. 2.4. Find 95% confidence interval for μ 04

   (b) For the given set of data, test $H_0 : \mu \geq 73$ against $H_1 : \mu < 73$, n = 15, $\bar{x}$ = 70, s^2 = 9. Use $\alpha = 0.01$ 04

8. (a) Find regression equation of X on Y for the following data: 04

X	15	14	12	10
Y	11	18	17	16

   (b) Compute correlation co-efficient between X and Y: 04

X	4	6	1	2
Y	8	9	5	7

9. (a) Compute rank correlation coefficient from the following data: 04

X	4.2	2.7	6.1	2.4	4.7
Y	8.5	5.2	6.3	4.8	8.6

   (b) Compute 4 months centered moving average for the following data: 04

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Values	23	26	78	30	31	35	37	32

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Objective	Intermediate Part Second (New Scheme)
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8181	Time: 20 Minutes Marks: 17

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S.#	Questions	A	B	C	D
1	The parameters of normal distribution are:	π and σ	π and p	μ and σ^2	π and μ
2	In a normal distribution $\beta_2 =$:	0	3	1	.6745
3	In a normal distribution $\mu \pm 2\sigma$ has area:	.6827	.9545	.9973	.6745
4	Numerical value calculated from population is called:	Parameter	Statistic	Sampling unit	Sampling design
5	The complete list of all the sampling units is called:	Sampling frame	Sample design	Target population	Sampled population
6	Another name of probability sampling is:	Non-random sampling	Judgement sampling	Purposive sampling	Random sampling
7	By decreasing the level of confidence, the precision of confidence interval is:	Decreased	Increased	Equal	Unchanged
8	Which is a simple hypothesis?	$\mu < 15$	$\mu > 15$	$\mu = 15$	$\mu \neq 15$
9	Accepting H_0 if H_0 is false is:	No error	Type-1 error	Type-II error	α
10	In regression dependent variable is assumed to be:	Fixed	Random	Constant	Zero
11	If r > 0 and $b_{yx} > 0$ then b_{xy} is:	< 0	> 0	0	≤ 0
12	In correlation both variables are:	Random	Non-random	Constant	Fixed
13	If $AB < \dfrac{(A)(B)}{n}$ the association between A and B is:	Negative	Positive	Zero	Symmetrical
14	The coefficient of association lies between:	−1 and +1	0 and 1	−1 and 0	$-\alpha$ and $+\alpha$
15	Depression in business is:	Secular trend	Cyclical	Seasonal	Random
16	The graph of time series is called:	Histogram	Ogive	Historigram	Scatter diagram
17	Compact disk is an example of:	Primary storage	Secondary storage	Main storage	All of these

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Intermediate Part Second (New Scheme)

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STATISTICS (Subjective)

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SECTION – I

2. **Write short answers to any EIGHT parts.**   16
   (i)   What is normal probability density function?
   (ii)   What is the value of mean deviation (MD) and quartile deviation (QD) for standard normal distribution?
   (iii)   What is the mean and variance of standard normal variable?
   (iv)   What is the range of normal distribution?
   (v)   In a normal distribution, what are the values of μ_2 and μ_3.
   (vi)   What is estimator?
   (vii)   If $x = 6$, $n = 50$, find P.
   (viii) What is null hypothesis?
   (ix)   What is composite hypothesis?
   (x)   Define critical region.
   (xi)   Describe any two output devices.
   (xii)   Define hardware.

3. **Write short answers to any EIGHT parts.**   16
   (i)   Define sample.
   (ii)   Define sampling frame.
   (iii)   Define sampling technique.
   (iv)   Describe simple random sampling without replacement.
   (v)   Define sample size.
   (vi)   Given $N = 400$, $n = 100$ and $\sigma_{\bar{x}}^2 = 20$, find σ^2 if sampling is done without replacement.
   (vii)   Define slope of regression line.
   (viii) Define the term residual.
   (ix)   Given $\sum (x - \bar{x})(y - \bar{y}) = 100$, $n = 10$, $S_x^2 = 10$, find b_{yx}.
   (x)   Define correlation.
   (xi)   Describe the range of correlation coefficient.
   (xii)   Describe properties of correlation coefficient (any two).

4. **Write short answers to any SIX parts.**   12
   (i)   Define association of attributes.
   (ii)   Differentiate between class and class frequency.
   (iii)   Given $(AB) = 95$, $(A\beta) = 55$, $(\alpha B) = 85$, $(\alpha\beta) = 45$, find the coefficient of association.
   (iv)   What is the relation between two attributes if $Q = +1$?
   (v)   Write the formula for Pearson's coefficient of mean square contingency.
   (vi)   Differentiate between signal and noise in a time series.
   (vii)   If $\hat{Y} = 10 - 2x$, find the trend values for $x = 0, 1, 2, 3, 4, 6$
   (viii) Suggest any three methods of obtaining secular trend.
   (ix)   What are different components of time series?

| SECTION – II   Attempt any THREE questions. Each question carries 08 marks. |

5. (a) If 'x' is N (100 , 64), find (i) P ($90 \leq x \leq 115$)   (ii) P ($x \geq 110$)   04
   (b) In a normal distribution, $\mu = 20$ and $\sigma = 5$. Find two points containing middle 95% area between them.   04

6. (a) A population consists of the elements 1, 3, 5, 7, 9. Draw all possible samples of size 2 without replacement and find the means of all possible samples.   04
   (b) Make sampling distribution of sample means of part (a) and find mean and variance of sampling distribution of means.   04

(Continued P/2)

7. (a) Given that $n = 8$, $\overline{X} = 100$ and $\sum(X - \overline{X})^2 = 4600$

Assume that above information is taken from normal population. Find 95% confidence interval for μ. 04

(b) Given $n_1 = 50$, $\overline{x}_1 = 87$, $s_1 = 6$

$n_2 = 50$, $\overline{x}_2 = 78$, $s_2 = 5$

Test the hypothesis $H_0 : \mu_1 - \mu_2 \geq 12$ against the alternative $H_1 : \mu_1 - \mu_2 < 12$ at $\alpha = 5\%$ (Level of significance). 04

8. (a) Compute the regression coefficients in each of the following cases: 04

$n = 7$, $\sum(x - \overline{x})(y - \overline{y}) = 148$, $S_x = 7.933$, $S_y = 16.627$

(b) For a given set of data, we have $r = 0.5$, $\sum(x - \overline{x})(y - \overline{y}) = 120$, $S_y = 8$, $\sum(x - \overline{x})^2 = 90$.

Find the number of pairs of values. 04

9. (a) Test the independence between gender and liking for fish use $\alpha = 0.05$ 04

	Males	Females
Like fish	80	80
Do not like fish	20	20

(b) Compute trend values by semi-average method for the following data: 04

Years	2001	2002	2003	2004	2005	2006	2007
Values	847	1024	1186	1405	1664	1958	2258

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