

Total No. of Questions – [6]

Total No. of Printed Pages: 2

G.R. No.

--

DECEMBER 2021-ENDSEM EXAM
S. Y. B. TECH. (Civil) (SEMESTER - I)
COURSE NAME: Statistics and Probability
COURSE CODE: ES21201CV
(PATTERN 2020)

Time: [1Hr]

[Max.Marks: 30]

(*) Instructions to candidates:

- 1) Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed
- 4) Use suitable data where ever required

Q.1a A sample of 400 male students is found to have a mean height 171.38 cm. Can it be reasonably regarded as a sample from a large population with mean height 171.17 cm and standard deviation 3.30 cm? Test at 5% level of significance (for 5% two-sided significance $Z=1.96$ from table) 4 Marks

Q.1b The sales data of an item in six shops before and after a special promotional campaign are: 6 Marks

Shops	A	B	C	D	E	F
Before the campaign	53	28	31	48	50	42
Afrer the compaign	58	29	30	55	56	45

Can the campaign be judged to be a success? Test at 5 per cent level of significance. Use paired t-test. As per t tablet < -2.015 .

OR

Q2a A certain process produces 10 per cent defective articles. A supplier of new raw material claims that the use of his material would reduce the proportion of defectives. A random sample of 400 units using this new material was taken out of which 34 were defective units. Can the supplier's claim be accepted? Test at 1 per cent level of significance (for 1% one sided significance $Z=-2.32$ from table) 4 Marks

Q2b In an anti-corona compain in a certain area vaccine was administered to 1624 persons out of total population of 6496. The number of corona cases is shown below: 6 Marks
Discuss the usefulness of vaccine in checking corona. (for $v=1$, $\chi^2_{0.05} = 3.84$)

Treatment	Corona	No corona	Total
Vaccine	40	1584	1624
No vaccine	440	4432	4872
Total	480	6016	6496

OR

Q.3a Two massons are asked to rank 10 different types of tiles. The ranks given ny them are as follows:. 4 Marks
Caclulate Spearman's rank correlation coefficient

Mason	A	B	C	D	E	F	G	H	I	J
Ramesh	1	2	3	4	5	6	7	8	9	10
Chandar	3	1	4	2	6	9	8	10	5	7

Q.3b Fit a regression of expenditure (Y) on Income (X) by method of least squares

Income (₹)	41	65	50	57	96	94	110	30	79	65
Expenditur (₹ '000)	44	60	39	51	80	68	84	34	55	48

OR

Q.4a Given the following data obtain the yield when the rainfall is 75 cm. The coefficient of correlation between yield and rainfall is 0.8.

	Rainfall (cm)	Yield per acre
Mean	67.5	90
S.D.	7.5	15

Q.4b Calculate the Karl Pearson's coefficient of correlation for the following data

Expenditure on food (%)	Family Income (₹)				
	20000-30000	30000-40000	40000-50000	50000-60000	60000-70000
10-15	-	-	-	3	7
15-20	-	4	9	4	3
20-25	7	6	12	5	-
25-30	3	10	19	8	-

OR

Q.5a In a sample of 8 observations the sum of squared deviations of item from the mean was 84.4. In another sample of 10 observations the value was found to be 102.6. Test whether the difference is significant at 5% level. ($F=3.29$ at 5% level of significance $v_1=7$ and $v_2=9$, $F=3.07$ at 5% level of significance $v_1=8$ and $v_2=10$).

Q.5b Two random samples are drawn from two normal populations and their values are:

Sample 1	66	67	75	76	82	84	88	90	92		
Sample 2	64	66	74	78	82	85	87	92	93	95	97

Test whether the populations have the same variance at the 5% level of significance. ($F=3.36$ at 5% level of significance $v_1=10$ and $v_2=8$)

OR

Q.6a In a sample of 8 observations the sum of squared deviations of item from the mean was 94.4. In another sample of 10 observations the value was found to be 101.7. Test whether the difference is significant at 5% level. ($F=3.29$ at 5% level of significance $v_1=3$ and $v_2=9$, $F=3.07$ at 5% level of significance $v_1=8$ and $v_2=10$)

Q.6b The following table gives the yield on 15 sample plots under three varieties of seeds. Find if the average yield of land under different varieties of seeds show significant difference. ($F_{0.05}=3.88$, for $v_1=2$, $v_2=12$)

A	B	C
20	18	25
21	20	28
23	17	22
16	15	28
20	25	32