IN-SEMESTER EXAMINATION-II

S.E. (Semester-IV)

SUBJECT – Mathematics-IV

Branch: Information Technology/Comp/CSE
Div.: ALL
Duration: 60 Minutes
Instructions –

1. All questions are compulsory.
2. Assume suitable data wherever necessary and state the assumptions made.
3. Diagrams / sketches should be given wherever necessary.
4. Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5. Figures to the right indicate full marks.

Date:15/04/2025
Timing: 12:00 TO 01:00 PM
Maximum Marks: 20

Q. 1		Answer any 5 of the following questions	Marks	Course Outcomes	Learning Levels
Pattern Same ESE 2024	a.	Solve by t-Test Statistic: Given that $\overline{X}=106.75, \mu=109.75, s=\sqrt{52.74}, n=18.$ [Tabulated value at 5% level of significance is 2.830]	2	4	A
	b.	Explain and Write formula for t- test.	2	4	U
	c.	Compute correlation coefficient from the following data X 18 20 34 52 12 Y 39 23 35 18 46	2	5	R
	d.	Explain the types of Correlation.	2	5	U
	e.	Define Slack Variable and Surplus Variable.	2	6	R
	f.	Define Dual of Linear Programming Problem.	2	6	R
	g.	Define optimal solution and feasible solution of LP.P (ISE, ESE 2024)	2	6	U
Q. 2	a.	How the Five dice were thrown 192 times and the number of times 4, 5 or 6 were obtained are as follows. Calculate χ^2	5	4	R
		OR			
Pattern Same ESE 2024	b.	Show that A company supplies tooth-paste in a packing of 100 gm. A sample of 9 packing gave the following. Does the sample support the claim of the company that the packing weights 100 gms? [Tabulated value at 5% level of significance is 2.251]	5	4	R

No. of dice showing 4 ,5 ,6 :	5	4	3	2	1	0
Frequency	6	46	70	48	20	2

weights in gms.

100.5	100.3	100.1	99.8	99.7	100.3	100.4	99.2	99.3

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END SEMESTER EXAMINATION, MAY 2025
S.E. SEMESTER IV (CBCGS-HME 2023)

Branch:	**COMP, CSE, IT**	**Q.P. Code:**	**E455RM251A-2**
Subject:	**Mathematics-IV**	**Duration:**	**2 hours**
Subject Code:	**BSC-CS401 , BSC-CYS401**	**Max. Marks:**	**60**

Instructions:
1. **All sections are compulsory**
2. **Figures to the right indicate full marks.**
3. **Assume suitable data if necessary and state the assumptions clearly.**

Section-I	**Short Answer Questions (Answer any 05 questions out of 06) (Fundamental, Core Types)**				**(10 Marks)**
Q. No.		**Marks**	**CO**	**RBT Level**	**PI**
1	Two dice are tossed what is the probability of getting sum 6?	2	1	U	1.3.1
ISE-I 2	Select the five numbers. Suppose the mean of the first four numbers is 14. If the fifth number is 24, what is the mean of all five numbers.	2	2	R	1.1.1
Pattern same ISE 2024 3	Find Z-Test Statistic: Given that [Tabulated value at 5% level of significance is 1.96] $\overline{X} = 4.45, \mu = 5, \sigma = 2, n = 400.$	2	3	R	1.1.1
ISE-II 4	Solve by t-Test Statistic: Given that $\overline{X} = 106.75, \mu = 109.75, s = \sqrt{52.74}, n = 18.$ [Tabulated value at 5% level of significance is 2.830]	2	4	A	2.1.3
5	Define Equation of Line of regression of X on Y and of Y on X .	2	5	U	1.3.1
ISE-II 2024 6	**Solve the Linear Programming Problem using Duality:** Max $Z = 3x_1 + 5x_2$ Subject to , $2x_1 + 3x_2 \le 8$, $x_1 + 2x_2 \le 5$, $x_1, x_2 \ge 0$	2	6	R	1.1.1
Section-II	**Descriptive Answer Questions (Answer any 04 out of 06) (Descriptive, Comprehension Types)**				**(20 Marks)**
ISE-I 2024 1	Build In a factory an article is produced on three machines. Their respective productions are 300 units by A, 250 units by B and 450 units by C. It is found that the percentages of defective articles for A, B and C are 1, 1.2 and 2 respectively. An article is randomly selected from a days production(which are mixed), then find the probability that the selected article is defective.	5	1	A	2.1.3
2	Show A car hire firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as Poisson variate with mean 1.5. Calculate the proportion of days on which (i) neither car is used (ii) some demand is refused.	5	2	U	1.3.1

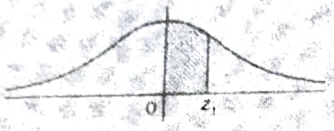
3	List of Random samples drawn from two countries gave the following data, related to the heights of adult males.Is the difference between the means significant? [Tabulated value at 5% level of significance is 1.96] **Mean height(in inches):** Country A: 67.42, Country B: 67.25 **Standard deviation(in inches):** Country A: 2.58, Country B: 2.50 **Number in samples:** Country A: 1000, Country B: 1200	5	3	R	1.1.1
4	Show that A certain injection administered to 12 patients resulted in the following changes of blood pressure. Can it be concluded that the injection will be in general accompanied by an increase in blood pressure? [Tabulated value at 5% level of significance is 2.201] 5 2 8 -1 3 0 6 -2 1 5 0 4	5	4	U	2.1.3
5	How to Compute Spearman's rank correlation coefficient from the following data. X: 18, 20, 34, 52, 12 Y: 39, 23, 35, 18, 46	5	5	R	1.1.1
6	**Solve the following L.P.P. by simplex method** **Max. $z = 3x_1+4x_2$** **subject to $x_1+x_2 \leq 450$** **$2x_1 + x_2 \leq 600$** **$x_1, x_2 \geq 0$**	5	6	U	1.3.1
Section-III	**Long Answer Question (Answer any 03 out of 05)** **(Application, Analytical, Evaluation, Design Type)**				**(30 Marks)**
1	Assuming that 20% of the population of the city are literate, so that the chance of an individual being literate is 1/5 and assuming that 100 investigators each take 10 individuals to see whether they are literate, how many investigators would you except to report, (i)Three or less (ii) atleast three (iii) exactly two (iv) two or more were literate?	10	2	A	2.1.3
2	Choose The mean life of a sample of 100 electric light bulbs was found to be 1456 hours with S.D. 400. A second sample of 225 bulbs chosen from a different batch showed a mean life of 1400 hours with standard deviation of 144 hours. Assuming that the two populations have same standard deviation find, if there any significant difference between the mean of two batches? [Tabulated value at 5% level of significance is 1.96]	10	3	R	1.1.1
3	Build the Ten school boyes were given a test in Statistics and their scores were recorded. They were given a months special coaching and a second test was given to him in the same subject at the end of the coaching period. Test if the marks given below give evidence to the fact that the students are benefitted by coaching.[Tabulated value at 5% level of significance is 2.26]	10	4	A	2.1.3

	Test-I	70	68	56	75	80	90	68	75	56	58
	Test II	68	70	52	73	75	78	80	92	54	55

4	Find the Equation of the lines of regression from the following data: X: 1, 2, 3, 4, 5, 6, 7 Y: 9, 8, 10, 12, 11, 13, 14	10	5	R	1.1.1
5	Solve *the L.P.P.* by Using Big–M Method Maximise $Z = 3x_1 - 2x_2 + 3x_3$ Subject to Constraints $2x_1 + 2x_2 - x_3 \geq 2$ $3x_1 - 4x_2 \leq 3$ $x_2 + 3x_3 \leq 5$	10	6	A	2.1.3

Pattern same
ESE 2024

Area Under Standard Normal Curve



The table gives the area under the standard normal curve from $z = 0$ to $z = z_1$ which is the probability that z will lie between $z = 0$ and $z = z_1$.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.09 10	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2703	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	4505	.4415	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4841	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4560	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	4986	4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990