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23ITU419N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(Fourth Semester)

Branch- **INFORMATION TECHNOLOGY**

STATISTICS FOR INFORMATION TECHNOLOGY – II

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	In Simple Random Sampling, every unit of the population has _____. a) Different chances of being selected b) Equal chance of being selected c) No chance of being selected d) Chance based on judgment	K1	CO1
	2	In Systematic Sampling, the first unit is selected _____. a) Randomly b) By judgment c) By convenience d) Using strata	K2	CO1
2	3	A Type I error occurs when we: a) Accept a true null hypothesis b) Reject a true null hypothesis c) Accept a false null hypothesis d) Reject a false null hypothesis	K1	CO2
	4	The level of significance (α) represents: a) The probability of Type II error b) The power of the test c) The probability of Type I error d) The size of the sample	K2	CO2
3	5	A t-test is generally used when the sample size is: a) Greater than 30 b) Less than 30 c) Equal to 100 d) Very large	K4	CO3
	6	The degrees of freedom for a single mean t-test is: a) n b) n – 1 c) n + 1 d) 2n	K4	CO3
4	7	ANOVA is mainly used to compare: a) Two means b) More than two means c) Two variances d) Two proportions	K1	CO4
	8	The Chi-square test is used to test: a) Equality of means b) Independence of attributes c) Equality of variances d) Normality of data	K2	CO4
5	9	Non-parametric tests are also called: a) Distribution-free tests b) Parametric tests c) Normality tests d) Large sample tests	K1	CO5
	10	The Run test is used to test the: a) Normality of data b) Randomness of a sequence c) Equality of two means d) Independence of attributes	K2	CO5

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Describe the systematic sampling method and discuss its merits and demerits.	K1	CO1
		(OR)		
	11.b.	Distinguish between probability and non-probability sampling methods with examples.		

Cont...

2	12.a.	Explain Type I and Type II errors with suitable examples.	K3	CO2
		(OR)		
	12.b.	Explain the steps involved in the general procedure of hypothesis testing.		
3	13.a.	Write short notes on independent samples t-test and its assumptions.	K2	CO3
		(OR)		
	13.b.	Explain the procedure for a t-test for a single mean.		
4	14.a.	Write short notes on Chi-square test for independence of attributes.	K3	CO4
		(OR)		
	14.b.	Explain the one-way classification ANOVA in detail with assumptions, procedure, and formula.		
5	15.a.	Describe the Mann–Whitney U test procedure.	K4	CO5
		(OR)		
	15.b.	Explain the difference between parametric and non-parametric tests.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks $(3 \times 10 = 30)$

<table>
<tr><th>Module No.</th><th>Question No.</th><th>Question</th><th>K Level</th><th>CO</th></tr>
<tr><td>1</td><td>16</td><td>Explain in detail the various probability sampling techniques with suitable examples.</td><td>K2</td><td>CO1</td></tr>
<tr><td>2</td><td>17</td><td>Explain in detail the procedure for testing the significance of two sample means.</td><td>K2</td><td>CO2</td></tr>
<tr><td>3</td><td>18</td><td>Before and after training, the productivity (in units) of 6 workers was recorded as follows:
<table>
<tr><th>Worker</th><th>Before</th><th>After</th></tr>
<tr><td>1</td><td>15</td><td>18</td></tr>
<tr><td>2</td><td>18</td><td>20</td></tr>
<tr><td>3</td><td>14</td><td>16</td></tr>
<tr><td>4</td><td>16</td><td>19</td></tr>
<tr><td>5</td><td>15</td><td>17</td></tr>
<tr><td>6</td><td>17</td><td>18</td></tr>
</table>
Use a paired t-test to determine whether the training program was effective at the 5% level of significance.</td><td>K3</td><td>CO3</td></tr>
<tr><td>4</td><td>19</td><td>A study of the relationship between gender and preference for a new product gave the following data:
<table>
<tr><th>Preference</th><th>Male</th><th>Female</th><th>Total</th></tr>
<tr><td>Like</td><td>50</td><td>30</td><td>80</td></tr>
<tr><td>Dislike</td><td>20</td><td>40</td><td>60</td></tr>
<tr><td>Total</td><td>70</td><td>70</td><td>140</td></tr>
</table>
Test whether gender and preference are independent using the Chi-square test at the 5% significance level.</td><td>K4</td><td>CO4</td></tr>
<tr><td>5</td><td>20</td><td>A random sample of 12 observations gave the following values:
15, 18, 14, 20, 19, 16, 17, 22, 21, 13, 18, 19
Test whether the median of the population is 17.5 using the Sign test at the 5% significance level.</td><td>K4</td><td>CO5</td></tr>
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Z-Z-Z END