

PG DEGREE EXAMINATION MAY 2026

(Third Semester)

TRANS DISCIPLINARY COURSE

(Common to PG Programmes)

STATISTICAL TECHNIQUES

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	Before any procedure for----- are established, the purpose and scope of the study must be clearly specified. a) Data analysis b) Data tabulation c) Data collection d) Data Selection	K1	CO1
	2	How does increasing the sample size affect the sampling error? a) It increases the sampling error b) It reduces the sampling error c) It has no effect on the sampling error d) It depends on the type of sampling	K2	CO1
2	3	In a binomial probability distribution it is impossible to find a) $P(X < 0)$ b) $P(X = 0)$ c) $P(X > 0)$ d) $P(0 \leq X \leq n)$	K1	CO2
	4	In a Poisson distribution a) The mean and variance of the distribution are same b) The probability of Success is always greater than 5 c) The number of trails is always less than 5 d) it has only 2 possible outcomes	K2	CO2
3	5	The processes of making estimates about population parameter from a sample is called a) Statistical independence b) Statistical inference c) Statistical hypothesis d) Statistical decisions	K1	CO3
	6	Be decreasing the sample size, the confidence interval is a) Decreased b) Increased c) Constant d) Neither increase nor decrease	K2	CO3
4	7	A Statistic on the basis of which a decision is made about the hypothesis of interest is called a) Statement of hypothesis b) Critical region c) Significance level d) Test statistics	K1	CO4
	8	The degrees of freedom corresponding to a χ^2 -test for independence of attributes having 3 rows and 4 columns is a) 12 b) 7 c) 6 d) 5	K2	CO4
5	9	In the test concerning mean of a normal population t-test is used when a) σ is known and n is large b) σ is known and n is small c) σ is unknown and n is large d) σ is unknown and n is small	K1	CO5
	10	A two set of two dependent samples of size 15 was taken and hypothesis test was performed. A t value with 14 degrees of freedom was used. If the two sets of samples had been treated as independent. How many degrees of freedom would have been used? a) 14 b) 28 c) 29 d) 30	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.	Explain the different methods of collecting primary data with examples.	K3	CO1
		(OR)		
	11.b.	Differentiate between Simple Random Sampling and Systematic Random Sampling.		
2	12.a.	2 % of the items of a factory are defective. The items are packed in boxes. What is the probability that there will be (i) 2 defective items (ii) at least three defective items in a box of 100 items.	K4	CO2
		(OR)		
	12.b.	What are the main Characteristics of the Normal Distribution?		

Cont...

3	13.a.	Explain what is meant by point estimation and interval estimation with an example.	K3	CO3
	(OR)			
	13.b.	A manufacturer wants to produce plastic medical parts with a mean thickness of 15mm. a sample of 81 observations consists of sample statistics with mean 14.87mm and variance 0.25. Find 95% confidence interval.		
4	14.a.	Explain steps in testing hypothesis procedure?	K2	CO4
	(OR)			
	14.b.	Describe the chi-square test of significance and state various uses to which it can be out.		
5	15.a.	A company claims that the average weight of its chocolate bars is 100 grams. A quality control inspector is suspicious of this claim and takes a random sample of 9 chocolate bars, with the following weights (in grams): 98, 97, 99, 96, 95, 99, 97, 98, 96. The inspector wants to test if the true average weight is significantly less than 100 grams at a 5% significance level.	K4	CO5
	(OR)			
	15.b.	From a sample of 25 observations, the estimate of the standard deviations of the population was found to be 15. From another sample of 14 observations, the estimate was found to be 9.7. Can we accept the hypothesis that the two samples come from population with equal variances, or must we conclude that the variance of the second population is smaller? Use the 5% level of significance.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO																			
1	16	What are the major sources of collection of secondary data? Explain your answer in the light of the classifications of secondary data.	K2	CO1																			
2	17	A certain class of students is assessed for mathematical aptitude. The class average is 70% with a standard deviation of 5%. i) What is the probability of a student scoring 80%? ii) What is the probability of a student scoring 60%? iii) What is the probability of a student scoring between 70% and 85%?	K3	CO2																			
3	18	a) In a sample of 64 observations from a population, the sample mean is 52 and sample standard deviation is 8. Construct a 95% confidence interval for the population mean. b) A pilot study of 36 manufactured parts measured a standard deviation of 4. The manufacturer wants to estimate the mean dimension to within ± 1 unit at 99% confidence. What sample size should be used?	K4	CO3																			
4	19	The following contingency table presents the analysis of 300 persons according to hair colour and eye colour : <table border="1"> <thead> <tr> <th rowspan="2">Hair Colour</th><th colspan="3">Eye Colour</th></tr> <tr> <th>Blue</th><th>Grey</th><th>Brown</th></tr> </thead> <tbody> <tr> <td>Fair</td><td>30</td><td>10</td><td>40</td></tr> <tr> <td>Brown</td><td>40</td><td>20</td><td>40</td></tr> <tr> <td>Black</td><td>50</td><td>30</td><td>40</td></tr> </tbody> </table> Test the hypothesis that there is an association between hair colour and eye colour at 5% level of significance. (Given that $\chi^2_{0.05,4} = 9.49$)	Hair Colour	Eye Colour			Blue	Grey	Brown	Fair	30	10	40	Brown	40	20	40	Black	50	30	40	K5	CO4
Hair Colour	Eye Colour																						
	Blue	Grey	Brown																				
Fair	30	10	40																				
Brown	40	20	40																				
Black	50	30	40																				
5	20	A computer engineer identifies A, B and C as three methods to do a certain job. To determine how long the operator takes to do the job when each of these methods is used, the engineer asks four operators to do the job using the method A, another four operators to do the job using the method B, and so on. Each operator's time (in minutes) is shown below: A : 19 17 22 20 B : 18 16 15 14 C : 21 20 19 19 Construct the relevant analysis of variance table and test the hypothesis that the average times of all operators are equal at 5% level of significance. (Given that $F_{0.05, (2,9)} = 4.26$)	K5	CO5																			