

12TH STANDARD STATISTICS PRACTICAL PROBLEMS

1. Test of significance-Basic Concepts and Large Sample Tests:

1. A company producing LED bulbs finds that mean life span of the population of its bulbs is 2000 hours with a standard derivation of 150 hours. A sample of 100 bulbs randomly chosen is found to have the mean life span of 1950 hours. Test, at 5% level of significance whether the mean life span of the bulbs is significantly different from 2000 hours. **(Eg:1.7, Page-13)**
2. A Model Examination was conducted to XII Standard students in the subject of Statistics. A District Educational Officer wanted to analyze the Gender wise performance of the students using the marks secured by randomly selected boys and girls. Sample measures were calculated and the details are presented below:

Gender	Sample size	Sample Mean	Sample Standard deviation
Boys	100	50	4
Girls	150	51	5

Test, at 5% level of significance, whether performance of the students differ significantly with respect to their gender.**(Eg:1.11, Page-22)**

3. A study was conducted to investigate the interest of people living in cities towards self-employment. Among randomly selected 500 persons from City-I, 400 persons were found to be self-employed. From City-2, 800 persons were selected randomly and among them 600 persons are self-employed. Do the data indicate that the two cities are significantly different with respect to prevalence of self-employment among the persons? Choose the level of significance as $\alpha = 0.5$ **(Eg:1.13, Page-26)**

2. Tests Based on Sampling Distributions - I

4. The average monthly sales based on past experience of a particular brand of tooth paste in departmental stores is Rs.200. An advertisement campaign was made by the company and then a sample of 26 departmental stores was taken at random and found that the average sales of the particular brand of tooth paste is Rs.216 with a standard deviation of Rs.8. Does the campaign have helped in promoting the sales of a particular brand of tooth paste? **(Eg.2.1, Page-41)**
5. A company gave an intensive training to its salesmen to increase the sales. A random sample of 10 salesmen was selected and the value (in lakhs of Rupees) of their sales per month, made before and after the training is recorded in the following table. Test whether there is any increase in mean sales at 5% level of significance. **(Eg.2.5, Page-50)**

Salesman	1	2	3	4	5	6	7	8	9	10
Before	15	22	6	17	12	20	18	14	10	16
After	17	23	16	20	14	21	18	20	10	11

6. The following table gives the performance of 500 students classified according to age in a computer test. Test whether the attributes age and performance are independent at 5% of significance.

(Eg:2.9, Page-58)

Performance	Below	21-30	Above 30	Total
Average	138	83	64	285
Good	64	67	84	215
Total	202	150	148	500

3. Tests Based on Sampling Distributions - II

7. Two samples of sizes 9 and 8 give the sum of squares of deviations from their respective means as 160 inches square and 91 inches square respectively. Test the hypothesis that the variances of the two populations from which the samples are drawn are equal at 10% level of significance. (Eg:3.1, Page-80)
8. Three different techniques namely medication, exercises and special diet are randomly assigned to (individuals diagnosed with high blood pressure) lower the blood pressure. After four weeks the reduction in each person's blood pressure is recorded. Test at 5% level, whether there is significant difference in mean reduction of blood pressure among the three techniques. (Eg:3.4, Page-86)

Medication	10	12	9	15	13
Exercise	6	8	3	0	2
Diet	5	9	12	8	4

9. A test was given to five students taken at random from XII class of three schools of a town. The individual scores are

School I	9	7	6	5	8
School II	7	4	5	4	5
School III	6	5	6	7	6

Carry out the one-way ANOVA. (Ex:43, Page-103)

4. Correlation Analysis

10. The following are the marks scored by 7 students in two tests in a subject. Calculate coefficient of correlation from the following data and interpret. (Eg:4.2, Page-114)

Marks in test-1 (x)	12	9	8	10	11	13	7
Marks in test-2 (y)	14	8	6	9	11	12	3

11. A random sample of 5 college students is selected and their marks in Tamil and English are found to be: (Ex:49, Page-126)

Tamil	85	60	73	40	90
English	93	75	65	50	80

Calculate Spearman's rank correlation coefficient.

12. Out of 1800 candidates appeared for a competitive examination 625 were successful; 300 had attended a coaching class and of these 180 came out successful. Test for the association of attributes attending the coaching class and success in the examination. **(Eg:4.7, Page-121)**

5. Regression Analysis

13. Using the method of least square, calculate the regression equation of X on Y and Y on X from the following data and estimate X where Y = 16.

X	10	12	13	17	18
Y	5	6	7	9	13

Also determine the value of correlation coefficient. **(Ex:42, Page-151)**

6. Index Numbers

14. Construct weighted aggregate index numbers of price from the following data by applying (i) Laspeyre's method (ii) Paasche's method (iii) Dorbish and Bowley's method (iv) Fisher's ideal method (v) Marshall-Edgeworth method. **(Eg:6.6, Page-162)**

Commodity	2016		2017	
	Price	Quantity	Price	Quantity
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

15. Calculate the consumer price index number for 2015 on the basis of 2000 from the following data by using (i) the Aggregate expenditure method (ii) the family budget (or) weighted relatives method.

(Eg:6.15, Page-175)

Commodity	Quantity	Price	
		2000	2015
Wheat	20	15	20
Rice	8	20	24
Ghee	2	160	200
Sugar	4	40	40

7. Time Series and Forecasting

16. Calculate the trend values using semi-averages methods for the income from the forest department. Find the yearly increase.. **(Eg:7.2, Page-186)**

Year	2008	2009	2010	2011	2012	2013
Income (in crores)	46.17	51.65	63.81	70.99	84.91	91.64

17. Compute the trends by the method of moving averages, assuming that 4 year cycle is present in the following series. (Eg:7.6, Page-190)

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Annual value	154.0	140.5	147.0	148.5	142.9	142.1	136.6	142.7	145.7	145.1	137.8

18. The following table gives quarterly expenditure over a number of years. Obtain seasonal correction for the data. (Ex:49, Page-205)

Year Season	2000	2001	2002	2003
I	78	84	92	100
II	62	64	70	81
III	56	61	63	72
IV	71	82	83	96

8. Vital Statistics and Official Statistics

19. The following are the information about the number of persons who are affected by Diabetes and Lung Cancer and the number of persons died due to each cause of death during a calendar year in two different districts:

Cause of Death	District A		District B	
	No. of persons Affected	No. of persons Died	No. of persons Affected	No. of persons Died
Diabetes	20,000	325	22,000	400
Lung Cancer	19,500	300	21,225	380

Find the illness specific death rates for the two districts. Also compare health conditions of both the districts with reference to these two causes of death. Assume that a person affected by Diabetes is not affected by Lung Cancer and vice-versa. (Eg: 8.4, Page-215)

20. A life Table was constructed for a cohort. The following is a section of the table, wherein some of the entries are not available. Find the estimates of missing values and complete the Life Table.

(Eg: 8.6, Page-218)

Age (in years)	$l(x)$	$d(x)$	$p(x)$	$q(x)$	$L(x)$	$T(x)$	$e^0(x)$
40	10,645	-	-	-	-	1,93,820	-
41	10,543	169	-	-	-	-	-
