F.Y.CS ATKT Exam Oct-17
Sem-II
SMTS

11/10/17
FYCS

15

Q.P. Code :05599

[Time: $2\frac{1}{2}$ Hours] [Marks:75]

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory.
2. Figures to the right indicate marks.
3. Illustrations, in-depth answers and diagrams will be appreciated.
4. Mixing of sub-questions is not allowed.
5. Log book to be provided by college.
6. Use of calculator is allowed.

Q. 1 Attempt all **(each of 5 marks)** 15

a. Choose the best choice for the following questions : 05

i) Which of the following is not the property of binomial distribution
a. n is fixed b. has two outcomes c. trials are independent
d. probability of success varies from trail to trial

ii) In a normal curve, the ordinate is highest at :
a. Mean b. Variance c. Standard deviation d. None

ii) Now suppose a hypothesis test is performed at a significance level of 0.05, but someone else wants to test with a stricter significance level of 0.01. what is needed?
a. Confidence interval b. Critical value c. p value d. Z value

iii) The Kruskal-Wallis test, also called the _____ test
a. H b. Ho c. H1 d. Hz

iv) Once-way analysis of variance is an extension of :
a. Two independent samples t-test b. both c. two dependent samples t-test d. None

b. Fill in the blanks for the following questions: 05

i) Each trail in Binomial distribution has _____ outcome.
ii) If in a binomial distribution n=1 then E(X) is _____.
iii) Sum of squares is abbreviated by SS then SS (W) is _____.
iv) In the Sign test if the data value is above the conjectured median, it assigned a _____ sign.
v) Three groups of data is given, so df = _____,

c. Answer the following questions: 05

i) What is One tailed Test?
ii) What does Critical region means.
iii) What is Power of a test?
iv) What is Analysis of Variance?
v) What are parameters of the normal distribution?

Q. 2 Attempt the following **(any THREE)** 15

A Define Normal Distribution & solve : Given a normal distribution with m = 50 and s = 8,find the probability that x assumes a value between 42 and 64. (note: P(0<z<1) = 0.3413 & P (0< z < 1.75) = 0.4599 directly from the table)

B An urn contains 6 red and 4 white balls. Three balls are drawn at random. Obtain the probability distribution of the number of white balls drawn.

[P.T.O]

(16)

C Ten coins are tossed simultaneously. Fine the probability of getting
- i) Atleast seven heads
- ii) Exactly seven heads.
- iii) Atmost seven head

D Explain the following terms
- i) Discrete Random Variable
- ii) Continuous random Variable
- iii) Expectation
- iv) Variance

E 256 visual artists were surveyed to find out their zodiac sign. The results were: Aries (29), Taurus (24), Gemini (22), Cancer (19), Leo(21), Virgo (18), Libra (19), Scorpio (20), Sagittarius (23), Capricorn (18), Aquarius (20), Pisces (23). Test the hypothesis that zodiac signs are evenly distributed across visual artists. So calculate the value of chi-square test statistics for the following data.

F The Acme Chain Company claims that their chains have a average breaking strength of 20,000 pounds, with a standard deviation of 1750 pounds. Suppose a customer tests 14 randomly-selected chains. What is the probability that the average breaking strength in the test will be no more than19,800 pounds?

Q. 3 Attempt the following **(any THREE)** 15

A State the properties of hypothesis testing.

B A company is testing new drug to see if it reduce the time to recover from fever. They decided to test it on three different race & both gender. The data is provided below

	Male	Female
Caucasian	54,49,59,39,55	25,29,47,26,28
African American	53,72,43,56,52	46,51,33,47,41
Hispanic	33,30,26,25,26	18,21,34,40,24

Find the mean , standard deviation & complete the two way ANOVA table

Source	SS	df	MS	F
Row (race)	2328.2			
Column (gender)	907.5			
Interaction (race×gender)	452.6			
Error	1589.2			
total	5277.5			

C A batch of 100 resistors have an average resistance of 102 Ohms. Assuming a population standard deviation of 8 Ohms, test whether the population mean is 100 Ohms at a significance level $\alpha=0.05$.

D Explain One-way & Two-way ANOVA?

E A random sample of the students in each row was taken.
Front: 82, 83, 97, 93, 55, 67, 53

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Middle: 83, 78, 68, 61, 77, 54, 69, 51, 63
Back: 38, 59, 55, 66, 45, 52, 52, 61
The score for those students on the second exam was recorded

Row	Front	Middle	Back
Sample size	7	9	8
Mean	75.71	67.11	53.50
St. Dev	17.63	10.95	8.96
Variance	310.90	119.86	80.29

Prepare the proper one-way ANOVA table for the same

F What is hypothesis testing? Explain the type of Errors.

Q. 4 Attempt the following **(Any THREE)** 15

A State the Advantages of Nonparametric Methods.

B Explain Post hoc analysis.

C The data shows an hours of relief provided by two drug in 12 patients suffering from a sickness. Is there any evidence that one drug provides longer relief than the other?

Case	Drug A	Drug B	Case	Drug A	Drug B
1	2.0	3.5	7	14.9	16.7
2	3.6	5.7	8	6.6	6.0
3	2.6	2.9	9	2.3	3.8
4	2.6	2.4	10	2.0	4.0
5	7.3	9.9	11	6.8	9.1
6	3.4	3.3	12	8.5	20.9

Perform Wilcoxon rank sum test for the same. Do proper step by step procedure.

D Explain Run test with an example.

E A shoe company has three groups of workers with different salaries:
Women: 23K, 41K, 54K, 66K, 78K.
Men: 45K, 55K, 60K, 70K, 72K
Minorities: 18K, 30K, 34K, 40K, 44K
Formulate it using Kruskal-Wallis Test

F Explain the Duncan's Chi-square test.

Q. 5 Attempt the following **(Any THREE)** 15

A Let x be a discrete random variable with the following probability distribution

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X	-3	6	9
P(X= x)	1/6	1/2	1/3

Find the mean and variance

B When to use non-parametric methods?

C A soap manufacturing company was distributing a particular brand of soap through a large number of retail shops. Before a heavy advertisement campaign, the mean sales per week per shop was 140 dozens. After the campaign, a sample of 26 shops was taken and the mean sales was found to be 147 dozens with standard deviation 16. Can you consider the advertisement effective? Use t-test.

D What is the procedure of Ranking the Data in the Non-parametric test

E Two random samples drawn from two normal populations are :
Sample I: 20 16 26 27 22 23 18 24 19 25
Sample II: 27 33 42 35 32 34 38 28 41 43 30 37
Obtain the estimates of the variance of the population and test at 5% level of significance whether the two populations have the same variance. Formulate using F- distribution

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