National College of Computer Studies
(NCCS-College of IT & Management)
Final Examination (2023)

Full Marks: 50
Time: 2hr 40 min

Set A

BCA/Third Semester/ CACS 202: Probability and Statistics

Candidates are required to answer the questions in their own words as far as practicable.

Group B

Attempt any six questions. [6×5=30]

2. Describe the scope and limitation of statistics.

3. Calculate the median annual income of a group of employees from the data given below:

Annual income in Rs.	Under 2000	2000-2999	3000-3999	4000-4999	5000-5999	6000-6999	7000-7999	8000-8999
No. of employees	15	32	65	79	90	57	36	14

4. A company manufactures different types of electrical appliances. It has been using radio for advertising its products. The following table shows amounts of radio time (X in minutes) and the number of electrical appliances sold (Y) over the last six days.

X	25	18	32	21	35	29
Y	16	11	20	15	26	28

5. A panel of two judges P and Q graded seven dramatic performances by independently awarding marks as follows:

Performance	1	2	3	4	5	6	7
Marks by P	46	42	44	40	43	41	45
Marks by Q	40	38	36	35	39	37	41

The eight performance which judge Q could not attend was awarded 37 marks by judge P. If judge Q had also been present how many marks could be expected to have been awarded by him to the eight performances.

6. There are 3 economists, 4 engineers, 2 statisticians and 1 doctor. A committee of 4 from among them is to be formed. Find the probability that the committee
   a. Consists one of each kind
   b. Has at least one economist
   c. Has the doctor as a member and three others.

7. Fit the binomial distribution for the fitting data and find the expected frequencies:

Number of heads	0	1	2	3	4	Total
Frequency	28	62	46	20	4	160

8. Determine 3rd quartile (Q_3), 9th decile (D_9) and 80th Percentile (P_{80}) from the following data

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	40	50	45	30	15

Group C

Attempt any two questions.   **[2×10=20]**

9. The polythene bags are taken randomly from two manufacturing Company's A and B and are tested by a prospective buyer for bursting pressure. The results are as follows:

Bursting Pressure (in lb.)	5-10	10-15	15-20	20-25	25-30	30-35
Company A	2	9	29	44	11	5
Company B	9	11	18	32	17	13

It is generally assumed that the bags having more uniform pressure will have long lifetime. If the prices are same, which manufacturing companies would be prefer by the buyer and why?

10. In Dubai, 10 service stations have been providing services in computer maintenance and the quality of their services were rated by 5 professional raters (namely A, B, C, D, E). To analyze the data whether there is any significant difference between ratings and service stations, two-way ANOVA table was prepared as follows: (a) find the missing values in ANOVA table (b) test whether there is significant difference (i) between raters   (ii) between service station

Source of variation	Sum of squares (ss)	Degree of freedom (d.f)	Mean sum of squares (MSS)	Variance ratio (F)
Between raters	400	?	?	For between raters:
Between service providing station	6810	?	?	For between service proving service station:
Errors	?	?	?	
Total	9948	?		

11. A statistical analysis of 100 long distance telephone calls made from the headquarters of the bricks and clicks. Computer corporation indicates that the length of these calls is normally distributed with $\mu = 240 \ seconds \ and \ \sigma = 40 \ seconds$.

   a. What percentage of these calls lasted less than 180 seconds?
   b. What is the probability that a particular call lasted between 180 and 300 seconds?
   c. How many calls lasted less than 180 seconds or more than 300 seconds?
   d. What is the length of a particular call if only 1% of all calls are shorter?

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Set B

BCA/Third Semester/ CACS 202: Probability and Statistics

Candidates are required to answer the questions in their own words as far as practicable.

Group B

Attempt any six questions. [6×5=30]

2. Discuss the role of statistics computer science and information technology.

3. Calculate average income from the given income distribution of 1400 workers of a factory

Income in Rs.	Below 1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000 or above
No. of workers	200	225	275	250	180	150	120

4. Following are the marks in statistics and Accountancy of six students. Calculate correlation coefficient between them.

Marks in Statistics (Y)	26	24	24	27	25	23
Marks in Accountancy (X)	13	12	14	16	15	11

5. A panel of judge A and B graded seven debaters and independently awarded the following marks.

Debaters	1	2	3	4	5	6	7
Marks by A	40	34	28	30	44	38	31
Marks by B	32	39	26	30	38	34	28

An eight debater was awarded 36 marks by judge A and judge B was not present. If the judge B were also present, how many marks would you expect him to award to the eighth debaters if the same degree of relationships exists in their judgement.

6. A bag contains 8 red, 4 white and 5 black colored balls. Three balls are drawn randomly from a bag. Find the probability that (i) all are red (ii) 2 are red and 1 white (iii) 2 are red and other

7. Fit a Poisson distribution to the following frequency distribution.

x	0	1	2	3	4	5
f	142	156	69	27	5	1

8. Determine 1st Quartile (Q_1), 5th decile (D_5) and 85th percentile (P_{85}) from the following data

Age in year	0-20	20-40	40-60	60-80	80-100
No. of people	21	62	40	20	25

Attempt any two questions. [2×10=20]

9. Two brands of tyres are tested for their life and following results were found:

Life(000 km)	20-24	24-28	28-32	32-36	36-40
Brand X	8	15	12	8	7
Brand Y	6	20	14	5	5

Both the brands are offering same price and advertising in favor of their brands saying that the brand has consistent life. If you are requiring deciding to purchase tyre of one of these two brands, which one do you prefer and why?

10. Complete the following ANOVA table for two-way analysis. Also test whether there is significant difference between (i) rows and between (ii) columns at 1% level of significance.

Source of variation	Sum of squares (SS)	Degrees of freedom (d. f)	Mean sum of squares (MSS)	Variance ratio (F)
Between rows	18.04	3	?	?
Between columns	?	4	?	?
Error	0.96	?	?	
Total	25.69	19		

11. A set of final examination grades in an introductory statistics course was found to be normally distributed with a mean of 73 and standard deviation of 8.
    a. What is the percentage of students scored between 65 and 89?
    b. What is the probability of getting a grade no higher than 91 on this exam?
    c. Only 5% of the students taking the test scored higher than what grade?

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