

Enrol. No. 11953212007

THIRD SEMESTER END TERM EXAMINATION: NOVEMBER, 2013

**B. SC. (H) MATHEMATICS**

BCM304

STATISTICS - I

Max. Marks: 70

Time: 3 Hrs

Note: Attempt questions from all sections as directed.

Section - A : Attempt any five questions out of six. Each question carries 06 marks. [30 Marks]

Q3. Goals scored by two teams A and B in a football season were as shown in the adjoining table. Find out which team is more consistent?

No. of goals scored in a match	No. of matches	
	Team A	Team B
0	27	17
1	9	9
2	8	6
3	5	5
4	4	3

Q4. An MBA applies for a job in two firms X and Y. The probability of his being selected in firm X is 0.7 and being rejected in firm Y is 0.5. The probability of at least one of his applications being rejected is 0.6. What is probability that he will be selected in one of the firms?

Q5. Obtain moment generating function of a Binomial distribution. Also derive mean and variance of Binomial distribution.

Q4. Explain the terms (i) Standard error and (ii) Sampling distribution. Show that in series of  $n$  independent trials with constant probability  $p$  of success, the standard error of the proportion of successes is  $\sqrt{pq/n}$ , where  $q=1-p$ .

Q. The geometric mean of 10 observations on a certain variable was calculated as 16.2. It was later discovered that one of the observations was wrongly recorded as 12.9; in fact it was 21.9. Apply appropriate correction and calculate the correct geometric mean.

Q. For a distribution, the mean is 10, variance is 25 and  $\mu_3 = 10$ . Comment upon the nature of distribution.

**Section - B :** Attempt any two questions out of three. Each question carries 10 marks.

[20 Marks]

The personnel department of a company has records which show the following analysis of its 200 companies

Age	Bachelor's degree only	Master's degree	Total
Under 30	90	10	100
30 to 40	20	30	50
Over 40	40	10	50
Total	150	50	200

If one engineer is selected at random from the company, find

- The probability he has only a bachelor's degree.
- The probability he has a Master's degree given that he is over 40.
- The probability he is under 30, given that he has only a bachelor's degree.

Find the second, third and fourth central moments of the frequency distribution given below. Hence find the measure of skewness ( $\gamma_1$ ) and measure of kurtosis ( $\gamma_2$ ).

Class Limits	110.0-114.9	115.0-119.9	120.0-124.9	125.0-129.9	130.0-134.9	135.0-139.9	140.0-144.9
Frequency	5	15	20	35	10	10	5

The mean yield for one-acre plot is 662 kilos with standard deviation 32 kilos. Assuming normal distribution, how many one-acre plots in a batch of 1000 plots would you expect to have yield (i) over 700 kilos (ii) below 650 kilos and (iii) what is the lowest yield of the best 100 plots?

**III - C :** Compulsory question

[20 Marks]

Calculate (i) Quartile deviation and (ii) Mean Deviation from mean for the following data:

Age	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of students	6	5	8	15	7	6	3

There are three urns having the following compositions of black and white balls:

Urn I: 7 white, 3 black balls; Urn II: 4 white, 6 black balls; Urn III: 2 white, 8 black balls. One of the urns is chosen at random with probabilities 0.2, 0.6 and 0.2, respectively. From the chosen urn two balls are drawn at random without replacement. Calculate the probability that both these balls are white.

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