

FOURTH SEMESTER END TERM EXAMINATION: APRIL, 2014

**B. SC. (HONS.) MATHEMATICS**

BCM406

STATISTICS - II

Time: 3 Hrs

Max Marks: 70

Note: Attempt questions from all sections as directed.

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

Q1. If  $\theta$  is the acute angle between the two regression line in the case of two variables  $x$  and  $y$ , show that  $\tan\theta = \frac{1-r^2}{r} \cdot \frac{\sigma_y}{\sigma_x + \sigma_y^2}$  where  $r, \sigma_x, \sigma_y$  have their usual meanings. Explain the significance of the formula when  $r=0$  and  $r=\pm 1$ .

Q2. The following data regarding the weights ( $x$ ) and heights ( $y$ ) of 100 college students are given:  
 $\sum x = 15000, \sum y = 6800, \sum x^2 = 2272500, \sum y^2 = 463025$  and  $\sum xy = 1022250$   
 Find the equation of regression line of height on weight.

Q3. The mean life of sample of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the bulbs produced by it is 1600 hours. Using the level of significance of 0.05, is the claim acceptable?

Q4. Write short notes on:

(a) ANOVA

(b) One way classification

Q5. Fit a trend line to the following data by free hand graphical method:

Years :	1980	1981	1982	1983	1984	1985	1986
Sales :	35	60	45	70	65	62	80

Q6. Calculate the weighted arithmetic mean index number and the weighted geometric mean index number from the following data:

Item	Price in Rs./Unit		Weight
	Base Year ( $p_0$ )	Current Year ( $p_1$ )	
A	2	3	10
B	4	5	4
C	10	10	5
D	12	9	1

Q8. To test the effectiveness of inoculation against cholera, the following table was obtained:

	Attached	Not attached	Total
Inoculated	30	160	190
Not inoculated	140	460	600
Total	170	620	790

Use  $\chi^2$ -test to defend or refute the statement. The inoculation prevents attack from cholera.

Q9. The number of defects in 500 blades is given below:

Days	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
No. of defects	1	1	2	3	1	2	1

Are these data under taken out from a controlled process?

Section - C : *Compulsory question* -

[20 Marks]

Q10. (a) Set up two-way ANOVA table for the following per hectare yield for 4 varieties of wheat on 3 plots:

Plot of Land	Yield			
	A	B	C	D
I	3	4	6	6
II	6	4	5	3