No. of Printed Pages : 7

BCS-040

BACHELOR OF COMPUTER APPLICATIONS (BCA) (Revised)

06542

Term-End Examination

June, 2017

BCS-040 : STATISTICAL TECHNIQUES

Time : 2 hours *Maximum Marks : 50*

Note :

(i) Attempt both sections, i.e., Section A and Section B.

*(ii) Attempt any **four** questions from Section A.*

*(iii) Attempt any **three** questions from Section B.*

(iv) Use of non-scientific calculator is allowed.

SECTION A

1. Data of rainfall were collected to study the rainfall patterns in 50 different areas of a state and are given in the following table :

166	154	168	217	199	168	205	201	173
192	157	224	160	209	203	182	182	151
191	188	226	176	228	182	228	186	229
219	220	189	188	179	199	150	190	215
207	211	228	204	195	221	206	215	218
168	183	213	180	208				

Construct the continuous frequency distribution by considering intervals 150 – 160, 160 – 170, 170 – 180, etc. Also draw a Histogram. 5

2. The chances of catching cold by workers working in an ice factory during winter are 25%. What is the probability that out of 5 workers, 4 or more will catch cold ? 5

3. A quality controller selected 50 laptops from the production line, each day over a period of 10 days to monitor the manufacturing process. Fifty laptops were inspected for defectives and the number of defective laptops found each day was recorded and given in the following table :

Day	1	2	3	4	5	6	7	8	9	10
No. of defective laptops	3	4	4	10	4	2	4	5	4	6

Construct a suitable control chart and interpret the results. 5

4. (a) Differentiate between estimator and estimate with examples. 2

(b) A manager of a bulb manufacturing company tests a random sample of 100 bulbs and determined the average life to be 300 hours and standard deviation 50 hours. Obtain 99% confidence interval for the average life of the bulbs. (Given that $Z_{0.005} = 2.58$) 3

5. (a) Distinguish between random sampling and non-random sampling. 2

(b) The monthly income (in thousands) of five workers in a small company is as follows :

25, 20, 30, 15, 10

How many samples of size 2 are possible, if we select the samples without replacement ? Write all of them. 3

6. A computer chip manufacturer claims that at most 2% of the chips it produces are defective. To check the claim of the manufacturer, a researcher selects a sample of 250 of these chips. If there are eight defective chips among these 250, test the null hypothesis that more than 2% of the chips are defective at 5% level of significance. Does this disprove the manufacturer's claim. (Given that $Z_{0.05} = 1{\cdot}645$) 5

SECTION B

7. (a) What is time series ? Explain briefly the components of the time series with examples. *4*

(b) In a company, cases of CPU are manufactured and the production for ten years is given below :

Year	Production (in 1000 tonnes)
2001	26
2002	27
2003	28
2004	30
2005	29
2006	27
2007	30
2008	31
2009	32
2010	31

Determine the (i) 3-yearly, and (ii) 4-yearly centred moving averages. *6*

8. A researcher wants to compare the waiting time of three hospitals (A, B and C). The time measured from the instant the patient arrives in the emergency room until the patient is attended to by a doctor is recorded in the following table :

Waiting time (in minutes)

Hospital A	Hospital B	Hospital C
8	2	10
4	4	2
3	3	9
6	5	5
	3	7
	6	

(Given that $F_{0\cdot05,\,2,\,12} = 3\cdot89$)

Is there enough evidence that the average waiting times for a patient to meet a doctor in these hospitals are equal at 5% level of significance ? *10*

9. A company manufactures pipes of small diameter. Four observations of diameters of the pipes were taken periodically. The following table gives the values of four observations, taken 10 times during a working day :

Sample No.	Observations			
	I	II	III	IV
1	4·1	4·3	4·2	4·2
2	4·3	4·1	4·3	4·5
3	4·2	4·3	4·4	4·3
4	4·1	4·2	4·4	4·1
5	4·3	4·1	4·2	4·2
6	4	4·2	4·1	4·1
7	4	4·5	4·2	4·1
8	4·2	4·3	4·1	4·2
9	4·4	4·2	4·1	4·5
10	4·4	4·2	4·3	4·3

Calculate the control limits for mean and range. (Given that $A_2 = 0{\cdot}729$, $D_3 = 0$, $D_4 = 2{\cdot}282$) *10*

10. The table given below shows the relation between the performances of students in Statistics and Computer Sciences. Test the hypothesis that the performance in Statistics is independent of the performance in Computer Sciences using 5% level of significance. (Given that $\chi^2_{0\cdot05,\,4} = 9\cdot49$) *10*

		Computer Sciences		
		High Grade	Medium Grade	Low Grade
Statistics	High Grade	36	72	42
	Medium Grade	34	122	44
	Low Grade	50	56	44