C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),
MELVISHARAM - 632 509.
SEMESTER EXAMINATIONS, NOVEMBER - 2018

B.Sc., MATHEMATICS **SEMESTER V**

U15SMA501 / U14SMA501 – QUANTITATIVE TECHNIQUES
(SBS - III)

Time: Three Hours Maximum: 60 Marks

SECTION - A (10 X 1 = 10 Marks)

Answer **ALL** Questions.

1. Define Statistical Quality Control.
2. Write down the different types of control charts for variable.
3. List any two uses of Index Numbers.
4. Write down two types of weighted Index Number.
5. What is time Series?
6. Write down the merits of methods of moving averages.
7. Define Idle time on a Machine.
8. Define No Passing Rule.
9. Find $z\left[\frac{1}{3^n}\right]$.
10. Find $z^{-1}\left[\frac{z}{z+3}\right]$.

SECTION - B (5 X 4 = 20 Marks)

Answer **ALL** Questions.

11. a) Explain the limitations of Statistical Quality Control.

(Or)

b) The average number of defectives in 22 sample lots of 2,000 rubber belts was found to be 10%. Obtain the values for central line and control limits for p-charts.

12. a) Write down the characteristics of Index Numbers.

(Or)

b) Explain the limitations of Index Numbers.

13. a) Discuss the uses of Time Series Analysis.

(Or)

b) Draw a trend line by the method of semi-averages:

Year	2001	2002	2003	2004	2005	2006	2007
Sales ('000)	110	105	115	112	120	118	130

14. a) Determine the optimal sequence for the following sequencing problem.

Job	1	2	3	4	5
M_1	3	8	5	4	4
M_2	4	10	6	5	8

(Or)

b) Write down the algorithm of n jobs on 2 machines.

15. a) Find $z\left[\frac{1}{(n+1)(n+2)}\right]$.

(Or)

b) Find $z^{-1}\left[\frac{z}{z^2+7z+10}\right]$.

SECTION - C (3 X10 = 30 Marks)

Answer **ANY THREE** Questions.

16. The following data refer to visual defects found at inspection of the first 10 samples of size 100. Use them to obtain upper and lower control limits for percentages defective in samples of 100. Represent the first ten sample results in the chart you prepare to show the central line and control limits.

Sample No.	1	2	3	4	5	6	7	8	9	10	Total
No. of defectives	2	1	1	3	2	3	4	2	2	0	20

17. Calculate the index number by the application of Laspeyee's formula and Paasche's formula from the following data.

Commodity	Units consumed		Price per unit	
	2006	2007	2006	2007
A	20	16	1.2	2.0
B	35	38	2.1	2.4
C	10	09	3.0	4.1
D	45	50	0.8	1.2

And also calculate Fisher's Ideal Index.

18. Calculate trend value from the following data using the method of least square.

Year	2002	2003	2004	2005	2006	2007
Production	7	9	12	15	18	23

19. Find the sequence that minimises the total elapsed time required to complete the following tasks on the machines in the order 1-2-3. Find also the minimum total elapsed time (hours) and idle times on the machines.

Task	A	B	C	D	E	F	G
Time on Machine 1	3	8	7	4	9	8	7
Time on Machine 2	4	3	2	5	1	4	3
Time on Machine 3	6	7	5	11	5	6	12

20. Solve $y_{n+2} + 6y_{n+1} + 9y_n = 2^n$ given that $y_0 = y_1 = 0$.

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