Time : 1 ½ hours.   Max.Marks : 40

Note :   1) All questions are compulsory
         2) Attempt any two sub questions from each question.
         3) Calculators are allowed .
         4) Figures to the right indicate marks.

Q.1

a) Draw network diagram for the following set of activities. Also find the critical path & the project
    completion time.   **(5)**

Activity	1-2	1-3	2-4	3-5	4-6	5-6
Time(days)	4	5	3	2	2	4

b) A project schedule has the following characteristics.:-   (5)

Activity	Time in (weeks)
1-2	4
1-3	1
2-4	1
3-4	1
3-5	6
4-9	5
5-6	4
5-7	8
6-8	1
7-8	2
8-10	5
9-10	7

    i) Construct the network diagram.
    ii) Compute Earliest start time and Latest finish time.

c) A project manager has made following 3 point time estimates for various activities   (5)
    of a project. :-

Events	Time	Estimates	in Weeks
	Optimistic	Most likely	Pessimistic
1-2	1	3	5
1-3	2	4	6
2-5	3	5	7
2-4	5	6	7
5-6	5	7	9
4-6	6	8	10
3-6	7	9	11
6-7	2	3	4

    Draw the network diagram.
    Find the expected duration time and variance for each activity.

                                                                                        P.T.O

Q.2

  a) Consider a population of four units with values 3,4,5 and 6. Write down all   (5)
possible samples of size 2 (with replacement) from the given population units
and verify whether the sample mean is an unbiassed estimator of the population
mean.

  b) For the small population containing 6 units 2,5,7,11,16 and 19, write down all   (5)
possible simple random sampling of size 2 without replacement from this population.
Show that $E(\bar{y}) = \bar{Y}$.

  c) From the given list of random numbers draw a random Sample of size 7 from the   (5)
population having 30 units numbered from 1 to 30 using simple random sampling
without replacement.
$$20 ., 53, 86 , 58 , 44 , 50 , 74 , 70 , 26 , 13 , 81.$$
Hence find the sample mean.

Q.3

  a) Calculate trend values using 3 yearly moving averages from the following data.:-   (5)

Year :	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Sales in (thousand units)	50	70	90	120	110	100	80	120	105	115

  b) Use the method of least squares to obtain the straight line trend . Also estimate trend value for the Year 2005.

Year	1998	1999	2000	2001	2002	2003	2004
Cotton Production. (in Kgs.)	52	53	42	60	65	67	70

  C) Compute the seasonal index for the following data by the method of simple averages. The price in Rupees per quintal of a certain commodity during 2002 to 2005 were as follows :-

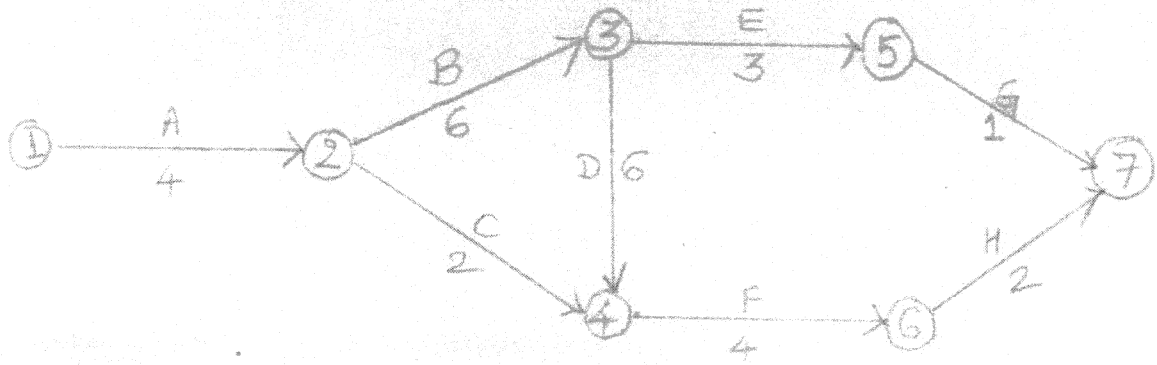| Year	I	II	III	IV
2005	81	78	89	82
2006	86	79	92	84
2007	84	76	80	90
2008	88	83	94	93

P.T.O

Q.4
a) For the following network diagram find Total Float :-

(5)

b) A population contains six units with values 4 , 7 , 9 and 10 , 12 , 14 . Write all possible samples of size 3 assuming simple random sampling without replacement. (5)

C) Following time series data relate to Profit of a company . Find the trend of profits using 4 yearly centered moving averages. (5)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Profit (in lakhs of Rupees)	51	53	56	58	62	67	61	63	70

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