

**DELHI SCHOOL OF BUSINESS**  
By Vivekananda Institute of Professional Studies - TC

Delhi School of Business  
PGDM (G) & PGDM (FINTECH) Program  
**END-TERM EXAMINATION, November 2023**  
**TERM – I (Batch: 2023-25)**

Course Name	Business Mathematics (QT-1)	Course Code	QT1
Duration	2.5 Hours	Max. Marks	60

**Instructions:**

1. You can use Scientific Calculators. Borrowing of Calculators is not allowed.
2. There are marks for steps. Show steps and calculations clearly. There are marks for Neatness.

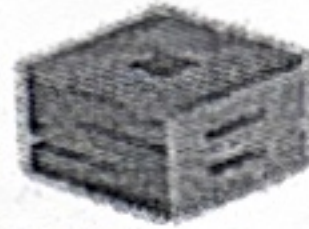
Q1. The Wall Street Journal reported some interesting statistics on the job market. One statistic is that 40% of all workers say they would change jobs "for slightly higher pay". 88% of companies say that there is a shortage of qualified job candidates.

- a) Suppose 16 workers are randomly selected and asked if they would change jobs for "slightly higher pay". What is the probability that 3 or more say yes?
- b) If 13 companies are contacted, what is the probability that 11 or more say that there is a shortage of job candidates?
- c) If 13 companies are contacted, what is the expected number of companies that would say there is no shortage of qualified job candidates? (4+4+2 marks) CO3

OR

Q1. There are a few breakfast cereals given along with their Calories and Sugar content. Calculate the Covariance and Coefficient of Correlation between the two. (10 marks) CO1

Product Name	Calories	Sugar
A	80	6
B	100	2
C	100	4
D	110	4
E	130	5
F	190	11



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G	200	10
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Q2. A Lottery game had total winnings of Rs. 50 crore. The cost of the lottery ticket is Rs. 100. Prizes ranged from Rs. 100 to Rs. 10,000. The probability of winning prizes is given below.

Prize Amount	10000	8000	5000	1000	500	200	100	0
Probability	0.001	0.002	0.004	0.019	0.034	0.04	0.2	0.7

110  
347000  
589.067

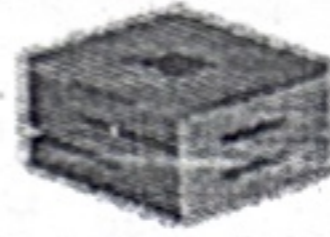
Consider the Prize money as a Random Variable and compute the expected value and the standard deviation of the game. (10 marks) CO3

Q3. Tool workers are subject to work-related injuries. One disorder caused by strain to the hands and wrists is called the carpal tunnel syndrome. The US Labor Dept. estimates that the average cost of this cost to employers and insurers is approximately \$30,000 per injured worker. Suppose these costs are normally distributed with a standard deviation (SD) of \$9000. What proportion of these costs are

- A) Between \$15,000 and \$45,000
- B) Greater than \$50,000?
- C) Suppose the SD is not known, but the mean is \$30,000 and 90.82% of the costs are more than \$7000. What would be the value of SD?
- D) Suppose the mean value is unknown and the SD is \$9000. How much would be the average cost if 79.95% of the costs were less than \$33,000? (10 marks) CO3

Q4. According to Nielsen Media Research, the average number of TV viewing hours by adults is 33 hours in the US. Suppose the standard deviation is 7.9 hours and a random sample of 49 adults is taken.

- a) What is the probability that the sample average is more than 36 hours?
- b) What is the probability that the sample average is less than 30 hours?
- c) Suppose the population SD is unknown. If 71.23% of all sample means are greater than 32 hours, what is the value of population SD? (3+3+4 marks) CO4



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Q5 a) Coal prices fluctuate over a period of time. For a particular company, the number of tonnes purchased and the Price/tonne is given. Find the average price per tonne at which coal was purchased over the 6-month period? (5 marks) CO1

Price/Tonne	4205	5125	5000	5200	4425	5400
Tonnes purchased	25	30	40	52	10	45

5032.30

b) Explain Stratified Random Sampling with an example.

(5 marks) CO4

Q6. The US Census Bureau reports on the total units of new privately owned housing started over a 12-year period. Use Exponential smoothing with a smoothing constant of 0.7 to forecast the values for each time period. Also find the Mean Absolute Deviation of the forecasts.

(10 marks) CO2

Period	Total Units (in '000s)
1	512
2	675
3	640
4	625
5	570
6	580
7	615
8	655
9	636
10	580
11	595
12	615

38.076