MATH110 (MDC)

Student's Copy

2023

(NEP-2020)

(1st Semester)

MATHEMATICS

(Multi-disciplinary Course)

(Quantitative Aptitude)

Full Marks: 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

Use of Simple Calculator is allowed

(SECTION: A-OBJECTIVE)

(Marks: 10)

Tick \square the correct answer in the boxes provided :

 $1 \times 10 = 10$

1. 3, 7, 16, 32, 57, <u>?</u>

	(a)	93		(b)	36	
	(c)	21		(d)	89	
2.	2%	of 2 = _	?			
	(a)	0.004		(b)	0.4	
	(c)	0.02		(d)	0.04	

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- **3.** $\frac{1}{2}^{\frac{1}{2}}$ is equal to (a) $\frac{1}{\sqrt{2}}$ \Box (b) $2\sqrt{2}$ \Box (c) $\sqrt{2}$ \Box (d) $\sqrt{2}$ \Box
- 4. What percent of a day is 3 hours?



- **5.** If 2/3 of A 75% of B, then A:B is
 - (a) 1:1
 - (b) 9 : 8 □
 - (c) 8 : 9 □
 - (d) 10 : 11
- **6.** A person crosses a 600 meters long street in 5 minutes. What is his speed in km/hr?
 - (a) 3·6
 - (b) 7·2
 - *(c)* 8·4 □
 - (d) 10 🗌

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- **7.** A boat goes 8 km in one hour along the stream and 2 km in one hour against the stream. The speed in km/hr of the stream is
 - (a) 2 \Box
 - (b) 4
 - (c) 3
 - (d) 5

8. The data that is obtained directly from the first-hand source is called

- (a) direct data \Box
- (b) primary data
- (c) secondary data \Box
- (d) None of the above \Box
- **9.** The extreme left part of a table, which describes the nature of the rows is called
 - (a) the title \Box
 - (b) the caption \Box
 - (c) the stub \Box
 - (d) the footnotes \Box
- **10.** The frequency curve whose curve has a single maximum nearabout the middle of the range and the frequency-density decreases towards the ends of the range is called
 - (a) multimodal distribution \Box
 - (b) U-shaped distribution \Box
 - (c) J-shaped distribution \Box
 - (d) bell-shaped distribution \Box

(SECTION : B—SHORT ANSWERS)

(Marks: 25)

Answer *five* questions, taking at least *one* from each Unit : 5×5=25

Unit—I

- **1.** If $2^{x-1} = 2^{x-1} = 1280$, then find the value of *x*.
- **2.** The difference of two numbers is 1660. If 7.5% of one number is 12.5% of the other number, find the two numbers.
- **3.** A book was sold for ₹ 27.50 with a profit of 10%. If it was sold for ₹ 25.75, then what should be the percentage of profit or loss?

UNIT—II

- **4.** A train is moving with 82.65 km/hr. How many meters will it travel in 15 minutes?
- **5.** A can do a work in 4 days, *B* in 5 days, *C* in 10 days. Find the time taken by *A*, *B* and *C* to do the work together.
- **6.** Pipe *A* can fill a tank in 30 hours and pipe *B* in 45 hours. If both the pipes are opened in an empty tank, how much time will they take to fill it?

UNIT—III

7. Represent the information contained in the following passage in a suitable tabular form :

According to T & M Factory report, in 2009, out of a total of five thousand workers of the factory, four thousand and two hundred were members of the Trade Union. The number of female workers were twenty percent of the total workers out of which thirty percent were members of the Trade Union.

In 2010, the number of workers belonging to the Trade Union was increased by twenty percent as compared to 2009 of which four thousand

and two hundred were male. The number of workers not belonging to Trade Union was nine hundred and fifty of which four hundred and fifty were females.

8. Draw a pie diagram to represent the following data relating to the trade deficit during different plans of India (taken from Economic Survey, 1989–90 and 1991–92) :

Plan Period	Trade Deficit		
	(₹ in crore)		
Second	2,340		
Third	2,380		
Fourth	1,560		
Fifth	3,180		
Sixth	28,100		
Seventh	54,200		

9. Construct the relative frequency distributions for the following frequency disribution of number of peas per pod for 198 pods :

Number of Peas	Frequency		
1	4		
2	33		
3	76		
4	50		
5	26		
6	8		
7	1		
Total	198		

(SECTION : C—DESCRIPTIVE)

(Marks: 40)

Answer *four* questions, taking at least *one* from each Unit : 10×4=40

UNIT—I

1. (a) If $\frac{3}{\sqrt{2}} \sqrt{2} = a + b\sqrt{2}$, find the values of a and b.

- (b) Due to the reduction of 6¹/₄% in the price of sugar, a man is able to buy 1 kg more for ₹ 120. Find the original and the reduced rate of sugar.
- (a) A book was sold for ₹27.50 with a profit of 10%. If it was sold for ₹25.75, then what should be the percentage of profit or loss?
 - (b) A sum of ₹ 1,290 is divided between A, B and C such that A's share is $1\frac{1}{2}$ times that of B and B's share is $1\frac{3}{4}$ times that of C. What is C's share?
- (a) A, B and C shared a business by investing ₹ 1,20,000; ₹ 1,35,000 and
 ₹ 1,50,000 respectively. Find the share of each out of an annual profit
 ₹ 56,700.
 - (b) A certain sum of money amount to ₹ 1,008 in 2 years and to ₹ 1,164 in $3\frac{1}{2}$ years. Find the sum and the rate of interest.

UNIT—II

- **4.** (*a*) Peter can cover a certain distance in 1 hour 24 minutes by covering two-third of the distance at 4 km/hr and the rest at 5 km/hr. Find the total distance.
 - (b) Three pipes A, B and C are attached to a tank. A and B can fill it in 20 and 30 minutes respectively while C can empty it in 15 minutes. If A, B and C are kept open successively for 1 minute each, how soon will the tank be filled?

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- **5.** (*a*) A man can row 6 km/hr in still water. It takes him twice as long as to row up and to row down the river. Find the rate of the stream.
 - (b) A can do a piece of work in 10 days and B in 20 days. They work together but 2 days before the completion of the work, A leaves. In how many days was the work completed?
- 5

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6. Describe the different methods of collection of data and state their merits and demerits.

UNIT—III

7. (a) Draw a multiple bar diagram for average per capita consumption of cereals per month in rural and urban India, 1989–90.

	Consumption (in kg) per month in India, 1989–90						
	Rice	Wheat Jowar		Bazra	Maize		
Rural	6.8	4.7	0.9	0.6	0.5		
Urban	Urban 5.6 4.8		0.4	0.2	0.3		

Source : Sarvekshana, 52nd issue, July-September, 1992

- (b) Discuss the different modes of graphical representation of frequency distributions of different types.
- **8.** Given below are the marks obtained in Mathematics by a batch of 48 students of a school at the Board Examination, 1996 :

43	34	43	32	87	35	71	65	12	52	19	48
17	24	52	65	40	54	62	45	2	13	18	49
57	21	64	71	45	81	52	40	35	78	43	45
44	55	79	37	19	14	8	66	15	24	56	22

- (a) Construct a frequency distribution with class intervals of 10 marks.
- (b) Draw the cumulative frequency distribution of both less than and greater than types.10

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9. Given below are the investment on different heads under the Eighth Five-Year Plan :

	Items	Proposed Outlay			
		(₹ in Crores at 1991–92			
		prices)			
1.	Agriculture and allied services	32,025			
2.	Rural development	33,386			
3.	Special area program	4,500			
4.	Irrigation and flood control	23,771			
5.	Energy	1,22,356			
6.	Industry and minerals	46,889			
7.	Transport and communications	80,798			
8.	Science, Technology and Environment	6,287			
9.	Services	84,088			
		4,34,100			

Construct a divided bar diagram and a pie chart showing proposed investment on different heads under the Eighth Five-Year Plan. 10

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