Student's Copy

2025

(NEP—2020)

(1st Semester)

MATHEMATICS

(Multi-disciplinary Course)

(Quantitative Aptitude)

(Regular & Repeater)

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 ☑ the correct answer in the boxes provided : 1×10=10

1. Find the missing term (x) in the series 4, 12, 36, x, 324, 972.

(a) 48 ☐ *(b)* 96 ☐

(c) 108 ☐ *(d)* 205 ☐

2. Which one of the following is not a surd?

(a) $\sqrt{7}$ ☐ *(b)* $3\sqrt{5}$ ☐

(c) $\sqrt{4}$ ☐ *(d)* $\sqrt[4]{19}$ ☐

3. 75 kg is what percent of 300 kg?

(a) 50% ☐ (b) 35% ☐

(c) 55% ☐ (d) 25% ☐

4. Ruthi covers 10·5 km in 3 hrs. The distance covered by him in 8 hrs is

(a) 26 km ☐ (b) 28 km ☐

(c) 30 km ☐ (d) 32 km ☐

5. *A* can do a piece of work by working alone in 10 days, while *B* can finish it by working alone in 15 days. If both of them work together, they can finish the work in

(a) 6 days ☐ (b) 8 days ☐

(c) 10 days ☐ (d) 5 days ☐

6. A tap *A* can fill a cistern in 8 hrs and another tap *B* can empty the full cistern in 12 hrs. If both the taps are opened together when the cistern is empty, the required time to fill the cistern is

(a) 26 hrs ☐ (b) 22 hrs ☐

(c) 20 hrs ☐ (d) 24 hrs ☐

7. A man can row with a speed of 4 km/hr in still water. If the speed of the stream is 2 km/hr, then his speed with the stream is

(a) 5 km/hr ☐ (b) 6 km/hr ☐

(c) 7 km/hr ☐ (d) 8 km/hr ☐

8. The difference of the highest and the lowest values in the data is called its

(a) range ☐ (b) frequency ☐

(c) class mark ☐ (d) None of the above ☐

9. The frequency distribution represents the data in which form?

(a) Algebraic form ☐ (b) Arithmetic form ☐

(c) Summarised form ☐ (d) None of the above ☐

10. The empirical relationship among mean, median and mode for symmetrical distribution is

(a) mode = 3median – 2mean ☐

(b) mode = median = mean ☐

(c) mode = 3median = 2mean ☐

(d) None of the above ☐

(SECTION : B—SHORT ANSWERS)

(*Marks* : 25)

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

UNIT—I

1. Simplify :

$$\frac{3\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$$

2. By selling a watch for ₹ 1,440, a man losses 10%. At what price should he sell it to gain 10%?

3. Two numbers are in the ratio 3 : 5. If 9 is subtracted from each, the ratio becomes 12 : 23. Find the greater number.

UNIT—II

4. A train is moving with 82·65 km/hr. How many meters will it travel in 15 minutes?

5. Pipes *A* and *B* can fill an empty tank in 6 hrs and 12 hrs respectively. If both are opened together, how much time will they take to fill an empty tank completely?

6. Liana and Mawia together can do a piece of work in 12 days and Liana alone can do it in 18 days. In how many days will Mawia alone can finish the same work?

UNIT—III

7. Draw a pie chart showing the following information. The table shows mode of transportation used by students of school *ABC* :

Mode of Transport	*Bus*	*Taxi*	*Car*	*Bike*	*Scooty*
Number of Students	240	80	100	180	120

8. The expenditure of a family on different heads in a month is given below. Draw a bar graph for the data :

Head	*Food*	*Education*	*Clothing*	*House Rent*	*Others*	*Savings*
Expenditure (in ₹)	4,000	2,500	1,000	3,500	2,500	1,500

9. The following table shows a frequency distribution table for the speed of cars passing through a particular spot on a highway. Draw a histogram for it :

Class Interval (km/hr)	30–40	40–50	50–60	60–70	70–80	80–90	90–100
Frequency	3	6	25	65	50	28	14

(SECTION : C—DESCRIPTIVE)

(*Marks* : 40)

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

UNIT—I

1. *(a)* *A* and *B* invested ₹ 24,000 and ₹ 8,000 respectively for a period of 2 years. After 2 years, they earned ₹ 48,000. What will be the shares of *A* and *B* out of this earning? 5

   (b) Find the compound interest on ₹ 8,000 at 4% per annum for 2 years, compounded annually. 5

2. *(a)* *A* starts a business investing ₹ 25,000. After 3 months, *B* joined him with a capital of ₹ 30,000. At the end of the year, they made a profit of ₹ 38,000. Find their shares. 5

(b) In an election contested by two candidates, one candidate got 30% of the total votes and still lost by 500 votes. Then find the total number of votes casted. 5

3. *(a)* Find the compound interest on ₹ 5,000 in 2 years at 4% per annum, if the interest being compounded half-yearly. 5

(b) The difference between 78% of a number and 59% of the same number is 323. What is 62% of that number? 5

UNIT—II

4. *(a)* A policeman sees a thief at a distance of 50 m. He starts chasing the thief with a speed of 4 m/s, while the thief's speed is 2 m/s. Find the distance covered by the thief when he is caught by the policeman. 5

(b) Peter can cover a certain distance in 1 hr 24 minutes by covering two-thirds of the total distance at 4 km/hr and the rest at 5 km/hr. Find the total distance. 5

5. *(a)* Awma and Biaka can finish a piece of work in 18 days. Biaka and Chama in 24 days while Chama and Awma finished in 36 days. In how many days will Awma, Biaka and Chama finished it, working together? In how many days will each of them finished it, working alone? 5

(b) Pipes *A* and *B* can fill an empty tank in 5 and 6 hrs respectively. Pipe *C* can empty a full tank in 12 hrs. If all the three pipes are opened together when the tank is empty, then how much time is needed for the tank to be filled? 5

6. *(a)* Liana can row a certain distance downstream in 12 hrs and can return the same distance in 18 hrs. If the stream flows at the rate of 6 km/hr, then what is the speed of Liana? 5

(b) Tetei and Sangsangi can do a piece of work in 40 days and 50 days respectively. Both begin to work together, but after sometime, Tetei left. Sangsangi finishes the remaining work in 20 days. After how many days did Tetei leave? 5

UNIT—III

7. Given below are the marks (out of 100) of 45 students in Mathematics :

65	74	55	47	39	64	97	77	46	62	66	52	51	73	37
41	42	8	34	57	41	33	55	76	3	44	20	70	97	98
88	10	14	41	2	44	74	60	37	61	25	10	11	33	71

(a) Construct a frequency distribution with class intervals of 10 marks (starts from 0–9). 7

(b) How many students are there who scored more than 60 marks? 3

8. In Pune, the weekly observations made in a study on the cost of living index are given below :

Cost of Living Index	140–150	150–160	160–170	170–180	180–190	190–200
Number of Weeks	6	10	20	12	8	3

Construct a frequency polygon and a histogram. 10

9. *(a)* To complete one of the government schemes, the government made a team composed of 1 director, 1 secretary and 5 labourers. Their salaries are ₹ 30,000, ₹ 25,000 and ₹ 15,000 respectively. Calculate the mean, median and mode of the salaries of this team. 6

(b) The following observations are arranged in ascending order :

$26, 29, 42, 53, x, x+2, 70, 75, 82, 93$

If the median is 65, find the value of $x+2$. 4

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