2024

(NEP–2020)

(1st Semester)

MATHEMATICS

(Multi-disciplinary Course)

(Quantitative Aptitude)

(Revised)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A—OBJECTIVE)

(*Marks* : 10)

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

1. The next term of the series 9, 11, 15, 23, 39, ... is

(a) 71 ☐

(b) 64 ☐

(c) 42 ☐

(d) 56 ☐

2. The remainder when 2^{31} is divided by 5 is

(a) 0 ☐

(b) 4 ☐

(c) 3 ☐

(d) 8 ☐

3. If $a : b$ 5 : 4, then the value of $4a$ $7b : 16a$ $9b$ is

(a) 12 : 13 ☐

(b) 12 : 11 ☐

(c) 11 : 12 ☐

(d) 10 : 11 ☐

4. If 10% of A equals 20% of B, then $A : B$ is

(a) 1 : 2 ☐

(b) 3 : 1 ☐

(c) 1 : 3 ☐

(d) 2 : 1 ☐

5. A train travels 82·6 km/hr. How many meters will it travel in 15 minutes?

(a) 20650 ☐

(b) 20600 ☐

(c) 20·65 ☐

(d) 20655 ☐

6. In 1 minute, 3/7 of a bucket is filled. The rest of the bucket can be filled in

(a) 7/3 minutes ☐

(b) 7/4 minutes ☐

(c) 4/3 minutes ☐

(d) None of the above ☐

7. A collection of observations gathered initially is called

(a) primary data ☐

(b) data ☐

(c) range ☐

(d) raw data ☐

8. The portion of the population that is selected for analysis is called

(a) a sample ☐

(b) a frame ☐

(c) a parameter ☐

(d) a statistic ☐

9. The number of times a particular observation occurs in a given data is called its

(a) frequency ☐

(b) raw data ☐

(c) grouping ☐

(d) None of the above ☐

10. A graphical representation of data, quantities or numbers using bars or strips is called a

(a) bar graph ☐

(b) line graph ☐

(c) pie chart ☐

(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. *A*, *B* and *C* enter into partnership. *A* invests 3 times as much as *B* invests and *B* invests two-thirds of what *C* invests. At the end of the year, the profit earned is ₹ 6,600. Find each of their shares.

2. A sum invested at 5% simple interest per annum grows to ₹ 504 in 4 years. How much would it amount in 2½ years for the same amount at 10% simple interest?

3. How many numbers between 11 and 6777 are divisible by 7?

UNIT—II

4. Pipe *A* can fill a tank in 15 hours and pipe *B* in 30 hours. If both the pipes are opened in an empty tank, how much time will they take to fill it?

5. 12 men can do a piece of work in 24 days. How many days will it take for 8 men to do the same work?

6. A man takes 3 hours 45 minutes to row a boat 15 km downstream of a river and 2 hours 30 minutes to cover a distance of 5 km upstream. Find the speed of the river current in km/hr.

UNIT—III

7. Construct a table representing the following :

A small company conducted a survey among its 50 employees about their work preferences. Among 10 employees from sales, 6 prefer the morning shift, 4 prefer the evening shift, 7 prefer to work from home, and 3 have more than 5 years of experience. Among 15 employees from marketing, 10 prefer the morning shift, 5 prefer the evening shift, 8 prefer to work from home, and 5 have more than 5 years of experience. Again, among 20 employees from IT, 14 prefer the morning shift, 6 prefer the evening shift, 12 prefer to work from home, and 10 have more than 5 years of experience. Lastly, among 5 employees from HR, all of them prefer the morning shift, none prefer to work from home, and 2 have more than 5 years of experience.

8. Draw a pie chart from the following table :

Items	*Price* (INR)
A	100
B	250
C	150
D	90
E	50
F	200

9. Given below is the distribution of marks of 100 students. Compute the cumulative frequency :

Marks	35–40	40–45	45–50	50–55	55–60	60–65	65–70
Frequency	8	11	26	31	18	4	2

(SECTION : C—DESCRIPTIVE)

(*Marks* : 40)

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

UNIT—I

1. *(a)* A number consists of two digits. The sum of the digits is 9. If 63 is subtracted from the number, its digits are interchanged. Find the number. 5

(b) The sum of two numbers is 154. If one-third of the one exceeds one-seventh of the other by 8, find the bigger number. 5

2. *(a)* If $2x^2 \quad 7xy \quad 3y^2 \quad 0$, then find the value of $x : y$. 5

(b) A shopkeeper purchased 70 kg of potatoes for 420 INR and sold the whole lot at the rate of 6·50 INR per kg. What will be his gain percent? 5

3. *(a)* A sum of 800 INR amounts to 920 INR in 3 years at simple interest. If the interest rate is increased by 3%, how much would it amount to? 5

(b) *A*, *B* and *C* start a business each investing 20,000 INR. After 5 months *A* withdrew 5,000 INR, *B* withdrew 4,000 INR and *C* invests 6,000 INR more. At the end of the year, a total profit of 69,900 INR was recorded. Find the share of each. 5

UNIT—II

4. *(a)* A water tank can be filled by pipes *A* and *B* in 8 hours and 6 hours respectively. When full, the cistern can be emptied by pipe *C* in 5 hours. If all the pipes were turned on at the same time, in how much time will the cistern be filled? 4

(b) *A* can complete a work in 10 days, *B* in 12 days and *C* in 15 days. All of them began the work together, but *A* had to leave the work after 3 days of the start and *B*, 4 days before the completion of the work. How long did the work last? 6

5. *(a)* How many minutes does John take to cover a distance of 700 m, if he runs at a speed of 18 km/hr? 4

(b) An aeroplane started 30 minutes later than the scheduled time from a place 1500 km away from its destination. To reach the destination at the scheduled time the pilot had to increase the speed by 250 km/hr. What was the speed of the aeroplane per hour during the journey? 6

6. *(a)* A man can row 6 km/hr in still water. It takes him twice as long to row up as to row down the river. Find the rate of stream. 5

(b) A fast train takes 5 hours less than a slow train for a journey of 1000 km. If the speed of the slow train is 20 km/hr less than that of the fast train, then find the speeds of the two trains. 5

UNIT—III

7. Study the following table and answer the questions that follow :

Department	*Total number of employees*	*Percentage of females*	*Percentage of males*
IT	840	45	55
Accounts	220	35	65
Production	900	23	77
Marketing	450	44	56

(a) What is the respective ratio of the number of females in Production Department to the number of females in the Marketing Department? 5

(b) The total number of employees in the Accounts Department forms approximately what percent of the total number of employees in the IT Department? 3

(c) What is the total number of males in Marketing and Accounts Department together? 2

8. Given below is the distribution of IQ of 80 students :

IQ	5–9	10–14	15–19	20–24	25–29	30–34	35–39
Frequency	2	12	27	10	20	5	4

Compute the cumulative frequency and draw the cumulative frequency distribution of both less than and more than types. 10

9. The data on the mode of transport used by 720 students are given below :

Mode of transport	Bus	Cycle	Train	Car	Scooter
Number of students	120	180	240	80	100

Represent the above data by a bar graph and a pie chart. 10

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