2025

(NEP—2020)

(2nd 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)

Put a Tick (✓) mark against the correct answer in the brackets provided : 1×10=10

1. What is the place value of 5 in 3254710?

(a) 5 ( ) *(b)* 10000 ( )

(c) 50000 ( ) *(d)* 54710 ( )

2. Mr. Sawma purchased an air conditioner for ₹ 12,000 and sold it for ₹ 15,000. Then the profit percentage is

(a) 15 ( ) *(b)* 20 ( )

(c) 25 ( ) *(d)* 35 ( )

3. The total number of students in a school is 2140. If the number of girls in the school is 1200, then what is the ratio of the total number of boys to the total number of girls in the school?

(a) 18 : 13 ( )

(b) 26 : 25 ( )

(c) 47 : 60 ( )

(d) 31 : 79 ( )

4. Samaira, Mahiar and Kiara rented a set of DVDs at a rent of ₹ 578. If they used it for 8 hours, 12 hours and 14 hours respectively, what is Kiara's share of rent to be paid?

(a) ₹ 192 ( )

(b) ₹ 204 ( )

(c) ₹ 215 ( )

(d) ₹ 238 ( )

5. Two pipes *A* and *B* can fill a tank in 20 and 30 minutes respectively. If both the pipes are used together, how long will it take to fill the tank?

(a) 12 minutes ( )

(b) 15 minutes ( )

(c) 25 minutes ( )

(d) 50 minutes ( )

6. *A* can finish a work in 18 days and *B* can do the same work in half the time taken by *A*. Then, working together, what part of the same work they can finish in a day?

(a) $\frac{1}{6}$ ( )

(b) $\frac{1}{9}$ ( )

(c) $\frac{2}{5}$ ( )

(d) $\frac{2}{7}$ ( )

7. The speed of 30·60 km/hr is the same as

(a) 5·1 m/sec ( )

(b) 8·5 m/sec ( )

(c) 110·16 m/sec ( )

(d) 100 m/sec ( )

8. Whether classification is done first or tabulation?

(a) Classification follows tabulation ( )

(b) Classification precedes tabulation ( )

(c) Both are done simultaneously ( )

(d) No criterion ( )

9. The frequency distribution of two variables is known as

(a) univariate distribution ( )

(b) sub-multivariate distribution ( )

(c) bivariate distribution ( )

(d) multivariate distribution ( )

10. The most accurate mode of data presentation is

(a) diagrammatic method ( )

(b) tabulation ( )

(c) textual presentation ( )

(d) None of the above ( )

(SECTION : B—SHORT ANSWERS)

(*Marks* : 25)

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

UNIT—I

1. Solve $(0\ 064)\ (0\ 4)^7\ (0\ 4)^x\ (0\ 0256)^2$.

2. Saroj invests ₹ 72,318, which is 17% of her annual income, in mutual funds. What is her monthly income?

3. *A*, *B* and *C* started a business each investing ₹ 20,000. After 5 months *A* withdrew ₹ 5,000, *B* withdrew ₹ 4,000 and *C* invested ₹ 6,000 more. At the end of the year, a total profit of ₹ 69,900 was recorded. Find the share of each.

UNIT—II

4. *A* can do a work in 4 days, *B* in 5 days and *C* in 10 days. Find the time taken by *A*, *B* and *C* to do the work together.

5. One-third of a certain journey was covered at the speed of 20 km/hr, one-fourth at 30 km/hr and the rest at the speed of 50 km/hr. Find the average speed per hour for the whole journey.

6. The speed of a boat when travelling downstream is 32 km/hr, whereas when travelling upstream it is 28 km/hr. What is the speed of the boat in still water and the speed of the stream?

UNIT—III

7. Draw a bar graph for the following data. The annual expenditure (in thousands of ₹) of an establishment, in the year 1989–90, is given below :

Account head	*Expenditure* (in thousands of ₹)
Pay and allowances	630
Increase in DA	270
Life insurance premium	85
Provident fund	65
Contingent expenses	22

8. The time taken, in seconds, to solve a problem by each of 25 pupils is as follows :

16, 20, 26, 27, 28, 30, 33, 37, 38, 40, 42, 43, 46,
46, 48, 49, 50, 53, 58, 59, 60, 64, 52, 20, 30

Construct a frequency distribution for this data, using a class interval of 10 seconds.

9. The following is the distribution of total household expenditure (in ₹) of manual workers in a city :

Expenditure (in ₹)	*Number of manual workers*
100–150	25
150–200	40
200–250	33
250–300	28
300–350	30
350–400	22
400–450	16
450–500	8
Total	202

Draw a histogram and a frequency polygon representing the above data.

(SECTION : C—DESCRIPTIVE)

(*Marks* : 40)

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

UNIT—I

1. *(a)* Find the sum of money which will amount to ₹26,010 in 6 months at the rate of 8% per annum when the interest is compounded quarterly. 5

(b) At what rate of simple interest, a certain sum will be doubled in 15 years? 5

2. *(a)* The price of a TV set inclusive of sales tax of 9% is ₹ 13,407. Find its marked price. 5

(b) A man buys a house for ₹ 5 lakh and rents it. He puts $12\frac{1}{2}$% of each month's rent aside for repairs, pays ₹ 1,660 as annual taxes and realizes 10% on his investment thereafter. Find the monthly rent of the house. 5

3. *(a)* If $(2x \quad 3y) : (3x \quad 5y) \quad 18 : 29$, what is the value of $x : y$? 5

(b) The ratio of incomes of *A* and *B* is 3 : 4. The ratio of their expenditures is 4 : 5. Find the ratio of their savings if the savings of *A* is one-fourth of his income. 5

UNIT—II

4. *(a)* A tap can fill a tank in 10 minutes and another can empty it in 6 minutes. If the tank is already two-fifths full and both the taps are opened together, will the tank be filled or emptied? How long will it take before the tank is either filled completely or emptied completely, as the case may be? 5

(b) *A* and *B* can do a piece of work in 9 days, *B* and *C* can do it in 12 days, *A* and *C* can do it in 18 days. In how many days will *A*, *B* and *C* finish it, working together and separately? 5

5. *(a)* A fast train takes 3 hours less than a slow train for a journey of 600 km. If the speed of the slow train is 10 km/hr less than that of the fast train, then find the speeds of the two trains. 5

(b) A person reaches his destination 40 minutes late if his speed is 3 km/hr, and reaches 30 minutes before time if his speed is 4 km/hr. Find the distance of his destination from his starting point. 5

6. *(a)* The speed of a motorboat is that of the current of water as 36 : 5. The boat goes along with the current in 5 hours 10 minutes. How much time will it take to come back? 5

(b) A boat goes 8 km upstream and then returns. Total time taken is 4 hrs 16 minutes. If the velocity of current is 1 km/hr, then find the actual velocity of the boat. 5

UNIT—III

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

City	*A*	*B*	*C*	*D*	*E*	*F*
Number of candidates	125	314	1089	227	185	273

Ratio of candidates passing and failing within the city :

City	*Ratio of passing and failing*
A	7 : 3
B	5 : 3
C	4 : 5
D	1 : 3
E	3 : 2
F	7 : 5

(a) The number of candidates appearing for the exam from city *C* is what percent of the number of candidates appearing for the exam from city *B* ? 5

(b) What is the number of candidates passing together the exam from cities *E* and *F* ? 5

8. Study the table given below and answer the questions that follow :

Total number of employees in different departments of an organization and percentage of females and males

Department	*Total number of employees*	*Percentage of females*	*Percentage of males*
IT	840	45	55
Accounts	220	35	65
Production	900	23	77
HR	360	65	35
Marketing	450	44	56
Customer service	540	40	60

(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) What is the total number of males in the IT and customer service departments together? 5

9. A man with a monthly salary of ₹ 10,800 plans his budget for a month as given below :

Item	*Food*	*Rent*	*Education*	*Savings*	*Miscellaneous*
Amount (₹)	3,150	2,100	1,950	2,400	1,200

Represent the above data by a pie chart. 10

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