

Sample Paper – 1 – Part 1

Maharashtra Board Class IX Mathematics – Part 1 Sample Paper – 1

Total Marks: 40

Notes:

- i. All questions are compulsory.
- ii. Use of calculator is not allowed.
- iii. The numbers to the right of the questions indicate full marks.
- iv. In case of MCQ's [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
- v. For every MCQ, the correct alternative (A), (B), (C) or (D) with sub question number is to be written as an answer.

Q. 1.

Time: 2 Hours.

(A) Four alternative answers are given for every sub question. Choose the correct alternative and write its alphabet with sub question number. [4]

- i. If 3x + 5y = 9 and 5x + 3y = 7 then, what is the value of x + y?
 - (A) 2
 - (B) 16
 - (C) 9
 - (D) 7
- ii. For different types of investments what is the maximum permissible amount under section 80C of income tax?
 - (A) 1,50,000 rupees
 - (B) 2,50,000 rupees
 - (C) 1,00,000 rupees
 - (D) 2,00,000 rupees
- iii. Which of the following data is not primary?
 - (A) By visiting a certain class, gathering information about attendance of students.
 - (B) By actual visit to homes, to find number of family members.
 - (C) To get information regarding plantation of soyabean done by each farmer from the village Talathi.
 - (D) Review the cleanliness status of canals by actually visiting them.
- iv. Which of the following is not the solution of the equation x + y = 7.
 - (A) (3, 4)
 - (B) (0,7)
 - (C) (1, 6)
 - (D) (2, 4)



Sample Paper – 1 – Part 1

Q.1. (B) Solve the following sub questions:

- i. A person has earned his income during the financial year 2017-18. Then his assessment year is.
- ii. What is the upper-class limit for the class 25 35?
- iii. 'When 5 is subtracted from length and breadth of the rectangle, the perimeter becomes 26.' What is the mathematical form of the statement?
- iv. Super senior citizens (age above 80 years) are exempt from paying income tax for an income up to?

Q. 2.

i. Complete the following activities and rewrite it (any two):i. Complete the following cumulative frequency table :

Class	Frequency	Less than	
(Height in cm)	(No. of students)	type frequency	
150 - 153	05	05	
153 - 156	07	05 + =	
156 - 159	15	+ 15 =	
159 - 162	10	+ = 37	
162 - 165	05	37 + 5 = 42	
165 - 168	03	+ = 45	
	Total N = 45		

ii.Complete the following activity to solve the following simultaneous equations.

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[4]

[4]



Sample Paper – 1 – Part 1

ii. Observe the table given below. Check and decide, whether the individuals have to pay income tax.

S No.	Individuals	Age	Taxable Income (Rs)	Will have to pay income tax or not
(i)	Miss Nikita	27	Rs 2,34,000	
(ii)	Mr. Kulkarni	36	Rs 3,27,000	
(iii)	Miss Mehta	44	Rs 5,82,000	
(iv)	Mr. Bajaj	64	Rs 8,40,000	

Q.2.

(B) Solve the following sub questions (any four):

- i. The mean of nine numbers is 77. If one more number is added to it, then the mean increases by 5. Find the number added in the data.
- ii. Ajay is younger than Vijay by 5 years. Sum of their ages is 25 years. What is Ajay's age?
- iii. At the start of a year there were Rs. 24,000 in a savings account. After adding Rs. 56,000 to this the entire amount was invested in the bank at 7.5% compound interest. What will be the total amount after 3 years?
- iv. There are 10 observations arranged in ascending order as given below.
 45, 47, 50, 52, x, x+2, 60, 62, 63, 74. The median of these observations is 53.
 Find the value of x.
- v. The sum of a two-digit number and the number obtained by interchanging its digits is 99. Find the number.

Q.3.

(A) Complete the following activity and rewrite it (any one):

i. Sumit borrowed a capital of Rs. 50,000 to start his food products business. In the first year he suffered a loss of 20%. He invested the remaining capital in a new sweets business and made a profit of 5%. How much was his profit or loss computed on his original capital?

Original capital borrowed by Sumit = Rs. 50000

Sumit suffered a loss of 20% in his food products business in the first year.

 \therefore Loss suffered in the first year = 20% of 50000



[8]

[3]



Sample Paper – 1 – Part 1

Sumit invested the remaining capital i.e. Rs. 40,000 in a new sweets business and he made a profit of 5%.

 \therefore Profit made in sweets business = 5% of



New capital with Sumit after the profit in new sweets business



Since, the new capital is less than the original capital, we can conclude that Sumit suffered a loss.

Total loss on original capital = Original capital – New capital



ii. The monthly salaries in rupees of 30 workers in a factory are given below.
5000, 7000, 3000, 4000, 4000, 3000, 3000, 3000, 8000, 4000, 4000, 4000, 9000, 3000, 5000, 5000, 4000, 3000, 5000, 5000, 5000, 6000, 5000, 6000, 6000, 6000, 4000
From the above data find the mean of monthly salary.

Monthly salary (x _i)	No. of workers (fi)	$f_i \times x_i$
3000	8	
4000	7	
5000	5	
6000	4	
7000	3	
8000	2	
9000	1	
	$\sum f_i = 30$	$\sum f_i X_i =$



 \therefore The mean of monthly salary is Rs.



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Q.3.

(B) Solve the following sub questions (any two):

- i. In an envelope there are some 5 rupee notes and some 10 rupee notes. Total amount of these notes together is 350 rupees. Number of 5 rupee notes is less by 10 than twice the number of 10 rupee notes. Then find the number of 5 rupee and 10 rupee notes.
- ii. Alka spends 90% of the money that she receives every month, and saves Rs. 120. How much money does she get monthly?
- iii. The data is given for 62 students in a certain class regarding their mathematics marks out of 100.

55, 60, 81, 90, 45, 65, 45, 52, 30, 85, 20, 10, 75, 95, 09, 20, 25, 39, 45, 50, 78, 70, 46, 64, 42, 58, 31, 82, 27, 11, 78, 97, 07, 22, 27, 36, 35, 40, 75, 80, 47, 69, 48, 59, 32, 83, 23, 17, 77, 45, 05, 23, 37, 38, 35, 25, 46, 57, 68, 45, 47, 49.

Take the classes 0-10, 10-20... and using the data above, prepare less than type cumulative frequency table and answer the following questions.

- (i) How many students obtained less than 40 marks?
- (ii) How many students obtained less than 10 marks?
- (iii) How many students obtained less than 60 marks?
- iv. The sum of ages of Priyanka and Deepika is 34 years. Priyanka is elder to Deepika by 6 years. Then find their today's ages.

Q.4. Solve the following sub questions (any two):

- i. Mr. Sayyad kept Rs. 40,000 in a bank at 8% compound interest for 2 years. Mr. Fernandes invested Rs. 1,20,000 in a mutual fund for 2 years. After 2 years, Mr. Fernandes got Rs. 1,92,000. Whose investment turned out to be more profitable?
- ii. The mean of the following data is 21.6. Find the value of p.

			-			-
Xi	6	12	18	24	30	36
fi	5	4	р	6	4	6

iii. First person says, "Give me a hundred, friend! I shall have twice as money as you". The other replies, "If you give me ten, I shall have six times as money as you". Now find their respective amounts?

[6]

[8]



Sample Paper – 1 – Part 1

Q.5. Solve the following sub questions (any one):

i. Nikhil spent 5% of his monthly income on his children's education, invested 14% in shares, deposited 3% in a bank and used 40% for his daily expenses. He was left with a balance of Rs. 19,000. What was his income that month?

ii. Find the mean salary of 60 workers of a factory from the following table:

Salary (in Rs)	Number of workers
3000	16
4000	12
5000	10
6000	8
7000	6
8000	4
9000	3
10000	1
Total	60

[3]



Sample Paper – 1 – Part 1 - Solution

Maharashtra Board Class IX Mathematics – Part 1 Sample Paper Solution - 1

Q. 1. (A)

i. Correct option: (A) $3x + 5y = 9 \dots (I)$ $5x + 3y = 7 \dots (II)$ Adding equations (I) and (II) 3x + 5y = 9 5x + 3y = 7 $\frac{+ + +}{8x + 8y = 16}$ Dividing both sides of the above equation by 8, we get

 $\mathbf{x} + \mathbf{y} = 2$

ii. Correct option: (A)

For different types of investments, the maximum permissible amount under section 80C of income tax Rs. 1,50,000.

iii. Correct option: (C)

To get information regarding plantation of soyabean done by each farmer from the village Talathi is not primary.

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iv. Correct option: (D)
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Given: x + y = 7 3 + 4 = 7 0 + 7 = 7 1 + 6 = 7 2 + 4 = 6Thus, the solution

Thus, the solutions are (3, 4), (0, 7), (1, 6). And (2, 4) is not a solution.

Q.1. (B)

- i. i.A person has earned his income during the financial year 2017-18. Then his assessment year is 2018-19.
- ii. The upper-class limit for the class 25 35 is 35.
- iii. Let x and y be the length and breadth of the rectangle respectively.

Now, perimeter of the rectangle = 2(length + breadth)

$$=2(x+y)$$

By the condition given in the question, we have

2[(x-5) + (y-5)] = 26

 $\therefore 2(x-5) + 2(y-5) = 26$

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Sample Paper – 1 – Part 1 - Solution

 $\begin{array}{l} \therefore 2x - 10 + 2y - 10 = 26\\ \therefore 2x + 2y = 26 + 10 + 10\\ \therefore 2x + 2y = 46\\ \\ \text{Dividing both the sides of the above equation by 2}\\ \therefore x + y = 23 \end{array}$

iv. Super senior citizens (age above 80 years) with income up to Rs.5,00,000 are exempt from paying income tax.

I)

i.

ClassFrequencyLess than(Height in cm)(No. of students)type frequency $150 - 153$ 0505 $153 - 156$ 07 $05 + 07 = 12$ $156 - 159$ 15 $12 + 15 = 27$ $159 - 162$ 10 $27 + 10 = 37$ $162 - 165$ 05 $37 + 5 = 42$ $165 - 168$ 03 $42 + 03 = 45$ Total N = 45			
(Height in cm)(No. of students)type frequency $150 - 153$ 05 05 $153 - 156$ 07 $05 + 07 = 12$ $156 - 159$ 15 $12 + 15 = 27$ $159 - 162$ 10 $27 + 10 = 37$ $162 - 165$ 05 $37 + 5 = 42$ $165 - 168$ 03 $42 + 03 = 45$ Total N = 45	Class	Frequency	Less than
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153 - 156 07 $05 + 07 = 12$ $156 - 159$ 15 $12 + 15 = 27$ $159 - 162$ 10 $27 + 10 = 37$ $162 - 165$ 05 $37 + 5 = 42$ $165 - 168$ 03 $42 + 03 = 45$ Total N = 45	150 – 153	05	05
156 - 159 15 $12 + 15 = 27$ $159 - 162$ 10 $27 + 10 = 37$ $162 - 165$ 05 $37 + 5 = 42$ $165 - 168$ 03 $42 + 03 = 45$ Total N = 45	153 - 156	07	05 + 07 = 12
159 - 162 10 $27 + 10 = 37$ $162 - 165$ 05 $37 + 5 = 42$ $165 - 168$ 03 $42 + 03 = 45$ Total N = 45	156 - 159	15	12 + 15 = 27
162 - 165 05 $37 + 5 = 42$ $165 - 168$ 03 $42 + 03 = 45$ Total N = 45	159 – 162	10	27 + 10 = 37
165 - 168 03 $42 + 03 = 45$ Total N = 45	162 - 165	05	37 + 5 = 42
Total N = 45	165 - 168	03	42 + 03 = 45
		Total $N = 45$	

ii.
$$2x + y = 5 \dots (I)$$

iii.

S No.	Individuals	Age	Taxable Income (Rs)	Will have to pay income tax or not
(i)	Miss Nikita	27	Rs 2,34,000	No
(ii)	Mr. Kulkarni	36	Rs 3,27,000	Yes
(iii)	Miss Mehta	44	Rs 5,82,000	Yes
(iv)	Mr. Bajaj	64	Rs 8,40,000	Yes



Sample Paper – 1 – Part 1 - Solution

Q.2. (B)

i.

- $\therefore Mean = \frac{Sum of all the observations}{Total number of observations}$
- \therefore The sum of all observations = Mean \times Total number of observations
- \therefore sum of 9 numbers = 77 \times 9 = 693 ... (I)
- If one more number is added, then mean increases by 5
- \therefore Mean of 10 numbers = 77 + 5 = 82
- \therefore sum of the 10 numbers = $82 \times 10 = 820$... (II)
- : Number added = sum of the 10 numbers sum of the 9 numbers = 820 - 693 ... [From (I) and (II)] = 127
- \therefore The number added in the data is 127.
- ii. Let Ajay's age be 'x' years and Vijay's age be 'y' years.

By the first condition, we have $y = x + 5 \dots (I)$ By the second condition, we have $x + y = 25 \dots (II)$ Substituting the value of y from (I) in (II) $\therefore x + x + 5 = 25$ $\therefore 2x = 25 - 5$ $\therefore 2x = 20$ $\therefore x = 10$ Substituting this value of x in (I), we get y = 15Hence, Ajay's age is 10 years and Vijay's age is 15 years.

iii. Here, P = 24000 + 56000 = Rs. 80000, R = 7.5%, n = 3 years Total amount after 3 years

$$= P \left(1 + \frac{R}{100} \right)^{n}$$

= 80000 × $\left(1 + \frac{7.5}{100} \right)^{3}$
= 80000 (1 + 0.075)³
= 80000 (1.075)³
= 80000 × 1.242297
= 99383.75

- ∴ The total amount after 3 years is Rs. 99383.75.
- iv. 45, 47, 50, 52, x, x+2, 60, 62, 63, 74.
 - \therefore Number of observations (n) = 10, which is even
 - : Median will be the average of middle two observations.
 - Here, the 5th and 6th numbers are in the middle position.



Sample Paper – 1 – Part 1 - Solution

$$\therefore \text{ Median} = \frac{x + (x + 2)}{2}$$
$$\therefore 53 = \frac{2x + 2}{2}$$
$$\therefore 106 = 2x + 2$$
$$\therefore 106 - 2 = 2x$$
$$\therefore 104 = 2x$$
$$\therefore x = 52$$

v. Let the digit at ones place be 'x' and digit at tens place be 'y'. So, the number will be 10y + x.

The number obtained after interchanging the digits is 10x + y.

By the condition given in the question, we have

10y + x + 10x + y = 99

 $\therefore 11x + 11y = 99$

Dividing both sides by 99, we get

x + y = 9 ... (I)

If y = 1, then x = 8

If y = 2, then x = 7

If y = 3, then x = 6 and so on.

∴ The number can be 18, 27, 36, ... etc.

Q. 3. (A)

Original capital borrowed by Sumit = Rs. 50000
 Sumit suffered a loss of 20% in his food products business in the first year.

 \therefore Loss suffered in the first year = 20% of 5000

$$=\frac{20}{100}\times50000$$
$$= \text{Rs.} \ \boxed{10000}$$

Remaining capital = Original capital - loss suffered

Sumit invested the remaining capital i.e. Rs. 40,000 in a new sweets business and he made a profit of 5%.

 \therefore Profit made in sweets business = 5% of 40000

$$=\frac{5}{100} \times \boxed{40000}$$
$$= \text{Rs.} \boxed{2000}$$

New capital with Sumit after the profit in new sweets business

= 40000 + 2000

= Rs. 42000

Since, the new capital is less than the original capital, we can conclude that Sumit suffered a loss.

Total loss on original capital = Original capital – New capital



Sample Paper – 1 – Part 1 - Solution

= 500	000 -	-	42000
= Rs.	8000)	

ii.

Monthly salary (x _i)	No. of workers (f _i)	$f_i \times x_i$
3000	8	24000
4000	7	28000
5000	5	25000
6000	4	24000
7000	3	21000
8000	2	16000
9000	1	9000
	$\sum f_i = 30$	$\sum f_i x_i = \boxed{147000}$

$$Mean(\bar{x}) = \frac{\sum f_i x_i}{\sum f_i}$$
$$= \frac{147000}{30}$$
$$= Rs. 4900$$

 \therefore The mean of monthly salary is Rs. 4900

Q.3. (B)

i. Let the number of 5 rupee notes be x, number of 10 rupee notes be y. By first condition, we have 5x + 10y = 350

Dividing both sides of the above equation by 5

 $\therefore x + 2y = 70 \dots (I)$

By the second condition, we have

 $x = 2y - 10 \dots (II)$

Substituting this value of x in equation (I)

 $\therefore 2y - 10 + 2y = 70$

 $\therefore 4y = 70 + 10$

 $\therefore 4y = 8$

 \therefore y = 20

Substituting y 20 in equation (II)

 $\therefore x = 2 \times 20 - 10$

 $\therefore x = 40 - 10$

$$\therefore x = 30$$

Thus, the number of 5 rupee notes is 30 and number of 10 rupee notes is 20.



Sample Paper – 1 – Part 1 - Solution

ii. Let Alka's monthly income be Rs. x. Since, Alka spends 90% of the money that she receives every month. \therefore Amount spent by Alka = 90% of x $= \frac{90}{100} \times x$ = 0.9xNow, Savings = Income - Expenditure $\therefore 120 = x - 0.9x$ $\therefore 120 = 0.1 x$ $\therefore x = \frac{120}{0.1}$ $\therefore x = \frac{120 \times 10}{0.1 \times 10}$ $\therefore x = 1200$ Thus, Alka gets Rs. 1200 monthly.

iii.

Class	Frequency (f) No. of students	More than or equal to type cumulative frequency
0 - 10	3	3
10 - 20	3	3 + 3 = 6
20 - 30	9	6 + 9 = 15
30 - 40	9	15 + 9 = 24
40 - 50	13	24 + 13 = 37
50 - 60	6	37 + 6 = 43
60 - 70	5	43 + 5 = 48
70 - 80	6	48 + 6 = 54
80 - 90	5	54 + 5 = 59
90 - 100	3	59 + 3 = 62
	Total $N = 62$	

(i) 24 students obtained less than 40 marks.

(ii) 3 students obtained less than 10 marks.

(iii) 43 students obtained less than 60 marks.

iv. Let Priyanka's age be 'x' years and Deepika's age be 'y' years.

By the first condition, we have

 $x + y = 34 \dots (I)$

By the second condition, we have

 $\mathbf{x} = \mathbf{y} + \mathbf{6}$

 $\therefore x - y = 6 \dots (II)$

Adding equations (I) and (II)



Sample Paper – 1 – Part 1 - Solution

$$x + y = 34$$

$$x - y = 6$$

$$\frac{+ + +}{2x = 40}$$

$$\therefore x = \frac{40}{2}$$

$$\therefore x = 20$$

Substituting x = 20 in equation (I), we get

$$20 + y = 34$$

$$\therefore y = 34 - 20$$

$$\therefore y = 14$$

Hence, Priyanka's present age is 20 years and Deepika's present age is 14 years.

Q.4.

i. For Mr. Sayyad: P = Rs. 40000, R = 8%, n = 2 yearsCompound interest (I) = Amount (A) – Principal (P)

$$= P\left(1 + \frac{R}{100}\right)^n - P$$

$$= P\left[\left(1 + \frac{R}{100}\right)^n - 1\right]$$

$$= 40000\left[\left(1 + \frac{8}{100}\right)^2 - 1\right]$$

$$= 40000\left[\left(1 + 0.08\right)^2 - 1\right]$$

$$= 40000\left[\left(1.08\right)^2 - 1\right]$$

$$= 40000\left[1.1664 - 1\right]$$

$$= 40000\left(0.1664\right)$$

$$= Rs. 6656$$

$$\therefore Mr. Sayyad's percentage of profit Interest$$

$$= \frac{Interest}{Amount invested} \times 100$$

$$= \frac{6656}{40000} \times 100$$

$$= 16.64\%$$
For Mr. Fernandes
Amount invested in mutual fund = Rs. 120000
Amount received after 2 years = Rs. 192000
$$\therefore Profit earned by Mr. Fernandes$$

$$= Amount invested - Amount invested$$

= 192000- 120000



Sample Paper – 1 – Part 1 - Solution

= Rs. 72000

 \div Mr. Fernandes percentage of profit Profit earned

 $= \frac{\text{Profit earned}}{\text{Amount invested}} \times 100$ $= \frac{72000}{120000} \times 100$ = 60%

: Investment of Mr. Fernandes turned out to be more profitable.

ii.

Xi	fi	$f_i x_i$
6	5	30
12	4	48
18	р	18p
24	6	144
30	4	120
36	6	216
	$\sum f_i = 25 + p$	$\sum f_i x_i = 558 + 18p$

Mean = 21.6

- -

$$\therefore \frac{\sum f_i x_i}{\sum f_i} = 21.6$$

$$\therefore \frac{558 + 18p}{25 + p} = 21.6$$

$$\therefore 558 + 18p = 21.6(25 + p)$$

$$\therefore 558 + 18p = 540 + 21.6p$$

$$\therefore 558 - 540 = 21.6p - 18p$$

$$\therefore 3.6p = 18$$

$$\therefore p = 5$$

iii. Let the money with the first person and second person be Rs x and Rs y respectively. According to the first person

$$x + 100 = 2(y - 100)$$

$$x + 100 = 2y - 200$$

$$x - 2y = -300 \qquad \dots (1)$$
Now, According to the second person
$$6(x - 10) = (y + 10)$$

$$6x - 60 = y + 10$$

$$6x - y = 70 \qquad \dots (2)$$
Multiplying equation (2) by 2, we obtain:
$$12x - 2y = 140 \qquad \dots (3)$$
Subtracting equation (1) from equation (3), we obtain:
$$11x = 140 + 300$$

$$11x = 440$$

$$x = 40$$
Putting the value of x in equation (1), we obtain:



Sample Paper – 1 – Part 1 - Solution

40 - 2y = -30040 + 300 = 2y2y = 340y = 170Thus, the two friends had Rs 40 and Rs 170 with them.

Q.5.

i. Let the monthly income of Nikhil be Rs x. Since, Nikhil invested 14% in shares and deposited 3% in a bank. \therefore Total investment = (14% + 3%) of x = 17% of x

$$=\frac{17}{100} \times x$$
$$= 0.17x$$

Nikhil spent 5% on his children's education and used 40% for his daily expenses.

 \therefore Total expenditure = (5% + 40%) of x

$$= 45\% \text{ of } x$$
$$= \frac{45}{100} \times x$$
$$= 0.45x$$

Amount left with Nikhil = Income – (Total investment + Total expenditure) Since, amount left with Nikhil is 19,000

 $\therefore 19000 = x - (0.17x + 0.45x)$

 $\therefore 19000 = x - 0.62x$

 $\therefore 19000 = 0.38x$

 $\therefore x = \frac{19000}{1000}$

0.38

=<u>19000</u>×100

0.38×100 = 1900000

38

=50000

∴ The monthly income of Nikhil is Rs. 50000.



Sample Paper – 1 – Part 1 - Solution

ii. As

$$Mean = \frac{\sum f_i x_i}{\sum f_i}$$

Values of $\sum f_i x_i \,$ and $\sum f_i$ can be computed

Salary (in Rs) (<i>xi</i>)	Number of workers (f _i)	$f_i x_i$
3000	16	$3000 \times 16 = 48000$
4000	12	$4000 \times 12 = 48000$
5000	10	$5000 \times 10 = 50000$
6000	8	$6000 \times 8 = 48000$
7000	6	$7000 \times 6 = 42000$
8000	4	$8000 \times 4 = 32000$
9000	3	$9000 \times 3 = 27000$
10000	1	$10000 \times 1 = 10000$
Total	$\sum f_i = 60$	$\sum f_i x_i = 305000$

Mean salary = $\frac{305000}{60}$

=5083.33

So, mean salary of 60 workers is Rs 5083.33.



Sample Paper – 1 – Part 2

Maharashtra Board Class IX Mathematics – Part 2 Sample Paper – 1

Time: 2 hours

Total Marks: 40

[4]

Notes:

- i. All questions are compulsory.
- ii. Use of calculator is not allowed.
- iii. The numbers to the right of the questions indicate full marks.
- iv. In case of MCQ's [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
- v. For every MCQ, the correct alternative (A), (B), (C) or (D) with sub question number is to be written as an answer.
- vi. Draw proper figures for answers wherever necessary.
- vii. The marks of construction should be clear. Do not erase them.
- viii. Diagram is essential for writing the proof of the theorem.

Q. 1. (A) Four alternative answers are given for every sub question. Choose the correct alternative and write its alphabet with sub question number

- i. Diagonals of a parallelogram WXYZ intersect each other at point O. If \angle XYZ = 135° then the measure of \angle XWZ is
 - (A) 90°
 - (B) 180°
 - (C) 55°
 - (D) 135°
- ii. In the given figure, find the distance of the chord PQ from the centre of the circle.





Sample Paper – 1 – Part 2

- iii. The value of $(5 \sin 30^\circ + 3 \tan 45^\circ)$ is equal to
 - $(A)\frac{11}{2}$ (B) $\frac{1}{2}$ (C) $\frac{9}{2}$

 - $(D)\frac{1}{2}$

iv. What will be the approximate volume of a cube having length of edge 7.5 cm?

- (A) 345 cubic cm
- (B) 422 cubic cm
- (C) 500 cubic cm
- (D)512 cubic cm

Q.1. (B) Solve the following sub questions:

- The length of the longest chord of the circle with radius 2.9 cm is i.
- In a parallelogram ABCD, if $\angle A = (3x + 12)^\circ$, $\angle B = (2x 32)^\circ$ then find the value of x. ii.
- iii. Curved surface area of a cylinder is 1980 cm² and radius of its base is 15 cm. Find the height of the cylinder. $\pi = \frac{22}{7}$.

If
$$\cos\theta = \frac{15}{17}$$
 then find $\sin\theta$ iv.

Q. 2. (A) Complete the following activities and rewrite it (any two):

[4]

[4]

i. Prove that the chords of a circle equidistant from the centre of a circle are congruent. Complete the proof by filling in the boxes.

Given: In a circle with centre O, seg OP \perp chord AB, seg OQ \perp chord CD and OP = OQ **To prove:** chord $AB \cong$ chord CD



Construction: Draw seg OA and seg OD. Proof:

In right angled $\triangle OPA$ and right $\triangle OQD_{,}$ Hypotenuse $OA \cong$ hypotenuse $OD \dots$

seg $OP \cong$ seg $OQ \dots$ Given



Sample Paper – 1 – Part 2



```
AP = QD \dots From (I)

\therefore AB = CD

\therefore seg AB \cong seg CD
```

ii. In right angled triangle $\triangle PQR$, $\angle Q = 90^\circ$, $\angle R = \theta$ and if $\sin \theta = \frac{5}{13}$ then find $\cos \theta$ and $\tan \theta$ by completing the following activity.



In right angled $\triangle PQR$, $\angle R = \theta$ 5

$$\sin\theta = \frac{1}{13}$$

$$\therefore \frac{PQ}{PR} =$$

 \therefore Let PQ = _____ and PR = _____

Let us find QR by using Pythagoras' theorem, $PQ^2 + QR^2 = PR^2$ $(5k)^2 + QR^2 = (13k)^2$ $\boxed{\qquad} = 169k^2$ $QR^2 = \boxed{\qquad}$ $QR^2 = \boxed{\qquad}$ $\therefore QR = 12k$ Now, in right angled $\triangle PQR$, PQ = 5k, PR = 13k and QR = 12k $\therefore \cos \theta = \frac{QR}{PR} = \frac{12k}{13k} = \frac{12}{13}$ and $\tan \theta = \frac{PQ}{QR} = \frac{5k}{12k} = \frac{5}{12}$



Sample Paper – 1 – Part 2

iii. The total surface area of a cone is 704 sq.cm and radius of its base is 7 cm, find the slant height of the cone by completing the following activity. $\left(\pi = \frac{22}{7}\right)$



Q.2. (B) Solve the following sub questions (any four):

[8]

- i. Using opposite angles test for parallelogram, prove that every rectangle is a parallelogram.
- ii. In the figure, centre of two circles is O. Chord AB of bigger circle intersects the smaller circle in points P and Q. Show that AP = BQ



iii. In the following table, a ratio is given. Find the remaining two ratios in the column and complete the table.



- iv. Side of a cube is 4.5 cm. Find the surface area of all vertical faces and total surface area of the cube.
- v. In \Box IJKL, side IJ || side KL, \angle I = 108°, \angle K = 53°, then find the measures of \angle J and \angle L.



Sample Paper – 1 – Part 2

Q. 3. (A Complete the following activity and rewrite it (any one):

i. Points D and E are the midpoints of side AB and side AC of \triangle ABC respectively. Point F is on ray ED such that ED = DF. Prove that \Box AFBE is a parallelogram. Write 'given' and 'to prove' and complete the proof given below by filling up the blanks.



ii. Surface area of a cone is 188.4 sq.cm and its slant height is 10cm. Complete the following activity and find its perpendicular height ($\pi = 3.14$). Given: Length (l) =10 cm, curved surface area of the cone = 188.4 sq.cm To find: Perpendicular height (h) of the cone



[3]



 \therefore h = _____ ... [Taking square root on both sides]

 \therefore The perpendicular height of the cone is _____.

Q.3. (B) Solve the following sub questions (any two):

[6]

[8]

- i. Radius of a circle is 34 cm and the distance of the chord from the centre is 30 cm, find the length of the chord.
- ii. In right angled Δ TSU, TS = 5, \angle S = 90°, SU = 12 then find sin T, cos T, tan T. Similarly find sin U, cos U, tan U.



- iii. Diagonals of a rhombus are 20 cm and 21cm respectively, then find the side of rhombus and its perimeter.
- iv. Volume of a cone is 1232 cm³ and its height is 24 cm. Find the surface area of the cone. $\pi = \frac{22}{7}$

Q.4. Solve the following sub questions (any two):

i. In right angled Δ LMN, if $\angle N = \theta$, $\angle M = 90^{\circ}$, $\cos \theta = \frac{24}{25}$, find $\sin \theta$ and $\tan \theta$ Similarly, find $(\sin^2 \theta)$ and $(\cos^2 \theta)$.



- ii. Radius of circle is 10 cm. There are two chords of length 16 cm each. What will be the distance of these chords from the centre of the circle?
- iii. If the ratio of radius of base and height of a cone is 5:12 and its volume is 314 cubic metre. Find its perpendicular height and slant height ($\pi = 3.14$).



Sample Paper – 1 – Part 2

Q.5. Solve the following sub questions (any one):

i. In figure 5.41, seg PD is a median of Δ PQR. Point T is the mid-point of seg PD. Produced

QT intersects PR at M. Show that $\frac{PM}{PR} = \frac{1}{3}$. [Hint: draw DN || QM.]



ii. Construct ΔXYZ such that XY = 6.7 cm, YZ = 5.8 cm, XZ = 6.9 cm. Construct its incircle.

[3]



Maharashtra Board Class IX Mathematics – Part 2 Sample Paper Solution - 1

Q.1. (A) i. Correct option: (D)

 $\angle XYZ = 135^{\circ}$ and WXYZ is a parallelogram. $\therefore \angle XWZ = \angle XYZ$... (Opposite angles of a parallelogram are equal) $\therefore \angle XWZ = 135^{\circ}$

ii.

Correct Option: (C)

We know that, perpendicular drawn from the centre of the circle to the chord bisects the chord.

 $\therefore PR = RQ = 40 \text{ units}$ In $\triangle OPR$, $OR^2 + PR^2 = OP^2$ $\therefore OR^2 + 40^2 = 41^2$ $\therefore OR^2 = 1681 - 1600$ $\therefore OR^2 = 81$ $\therefore OR = 9 \text{ units}$ Thus, the distance of the chord from the centre of the circle is 9 units.

```
iii.

Correct option: (A)

5 \sin 30^{\circ} + 3 \tan 45^{\circ}

= 5 \times \frac{1}{2} + 3 \times 1

= \frac{5}{2} + 3

= \frac{5}{2} + \frac{6}{2}

= \frac{11}{2}
```



Sample Paper – 1 – Part 2 - Solution

iv.

Correct option is (B) Given: Length of edge of cube (l) = 7.5 cm Volume of a cube = l^3 = (7.5)³ = 421.875 \approx 422 cubic cm \therefore The volume of the cube is 422 cubic cm.

Q.1. (B)

i. The longest chord of the circle is the diameter. Here, radius = 2.9 cm ... (Given) Since, diameter = $2 \times \text{radius}$ So, diameter = $2 \times 2.9 = 5.8 \text{ cm}$

ii.

ABCD is a parallelogram ... [Given] $\therefore \angle A + \angle B = 180^{\circ}$... [Adjacent angles of a parallelogram are supplementary], $\therefore (3x + 12)^{\circ} + (2x - 32)^{\circ} = 180^{\circ}$ $\therefore 3x + 12^{\circ} + 2x - 32^{\circ} = 180^{\circ}$ $\therefore 5x - 20^{\circ} = 180^{\circ}$ $\therefore 5x = 180^{\circ} + 20^{\circ}$ $\therefore 5x = 200^{\circ}$ $\therefore x = \frac{200}{5}$ $\therefore x = 40^{\circ}$

iii.

Given: Curved surface area of cylinder = 1980 sq.cm, radius (r) = 15 cm Curved surface area of cylinder = $2\pi rh$

$$\therefore 1980 = 2 \times \frac{22}{7} \times 15 \times h$$

$$\therefore h = \frac{1980 \times 7}{2 \times 22 \times 15} \text{ cm}$$

$$\therefore h = 21 \text{ cm}$$

$$\therefore \text{ The height of the cylinder is 21 cm.}$$

iv. $\sin^2\theta + \cos^2\theta = 1$ $\sin^2\theta + \left(\frac{15}{17}\right)^2 = 1$ $\sin^2\theta + \frac{225}{289} = 1$ $\sin^2\theta = 1 - \frac{225}{289}$



Sample Paper – 1 – Part 2 - Solution

$$\sin^2 \theta = \frac{289 - 255}{289} = \frac{64}{289}$$
$$\sin^2 \theta = \frac{8}{17}$$

Thus, the value of $\sin^2 \theta$ is $\frac{8}{17}$.

Q. 2. (A)

i.

Given: In a circle with centre O, seg OP \perp chord AB, seg OQ \perp chord CD and OP = OQ **To prove:** chord AB \cong chord CD



Construction: Draw seg OA and seg OD. **Proof:** In right angled \triangle OPA and right \triangle OQD,

Hypotenuse $OA \cong$ hypotenuse $OD \dots$ Radii of the same circle

 $seg OP \cong seg OQ \dots \dots Given$

 $\therefore \Delta OPA \cong \Delta OQD \dots By SAS Test$

- $\therefore \text{ seg AP} \cong \text{ seg QD} \dots \dots \square \overline{c. p. c. t}$
- $\therefore AP = QD \dots \dots (I)$

But $AP = \frac{1}{2} AB$ and $DQ = \frac{1}{2} CD \dots$ \bot drawn from the centre of a circle to a chord bisects it

 $AP = QD \dots From (I)$ $\therefore AB = CD$ $\therefore seg AB \cong seg CD$



Sample Paper – 1 – Part 2 - Solution



In right angled $\triangle PQR$, $\angle R = \theta$

$$\sin \theta = \frac{13}{13}$$

$$\therefore \frac{PQ}{PR} = \frac{5}{13}$$

 \therefore Let PQ = 5k and PR = 13k

Let us find QR by using Pythagoras' theorem, $PQ^2 + QR^2 = PR^2$ $(5k)^2 + QR^2 = (13k)^2$

$$25k^2 + QR^2 = 169k^2$$

$$QR^2 = 169k^2 - 25k^2$$

 $QR^2 = 144k^2$

 $\therefore QR = 12k$ Now, in right angled $\triangle PQR$, PQ = 5k, PR = 13k and QR = 12k $\therefore \cos \theta = \frac{QR}{PR} = \frac{12k}{13k} = \frac{12}{13}$ and $\tan \theta = \frac{PQ}{QR} = \frac{5k}{12k} = \frac{5}{12}$

iii.

Total surface area of cone = $\pi r(1 + r)$ $\therefore 704 = \frac{22}{7} \times 7(1 + 7)$ $\therefore \frac{704}{22} = 1 + 7$ 7(1 + 7)32 = 1 + 7

$$\therefore$$
 l = 25 cm



Sample Paper – 1 – Part 2 - Solution

Q.2. (B)



Given:

ABCD is a rectangle.

To prove: Rectangle ABCD is a parallelogram.

Solution:

Proof:

ABCD is a rectangle.

 $\therefore \angle A \cong \angle C = 90^{\circ} \dots [Given]$

 $\angle B \cong \angle D = 90^{\circ} \dots$ [Angles of a rectangle]

 \therefore Rectangle ABCD is a parallelogram. [A quadrilateral is a parallelogram, if pairs of its opposite angles are congruent]

ii.



Draw a perpendicular from 0 to line AB.

So, $OE \perp PQ$ and $OE \perp AB$

We know that the perpendicular drawn from the center of the circle to the chord bisects the chord.

```
So, PE = EQ .....(1)
And, AE = EB .....(2)
Now, equation (2) – equation (1)
AE - PE = EB - EQ
\therefore AP = BQ
Hence proved.
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Sample Paper – 1 – Part 2 - Solution

iii.

$$\cos \theta = \frac{35}{37}$$
Now,

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\Rightarrow \sin^2 \theta + (35/37)^2 = 1$$

$$\Rightarrow \sin^2 \theta = 1 - \frac{1225}{1369} = \frac{1369 - 1225}{1369} = \frac{144}{1369}$$

$$\Rightarrow \sin^2 \theta = \left(\frac{12}{37}\right)^2$$

$$\Rightarrow \sin^2 \theta = \left(\frac{12}{37}\right)^2$$

$$\Rightarrow \sin \theta = \frac{12}{37}$$

$$\therefore \tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{\frac{12}{37}}{\frac{35}{37}} = \frac{12}{35}$$

iv.

Given: Side of cube (l) = 4.5 cm Area of vertical faces of cube $= 4l^2$ $= 4 (4.5)^2 = 4 \times 20.25 = 81$ sq.cm. Total surface area of the cube $= 6l^2$ $= 6 (4.5)^2$ $= 6 \times 20.25$ = 121.5 sq.cm.

 \therefore The surface area of all vertical faces and the total surface area of the cube are 81 sq. cm and 121.5 sq. cm respectively.

v.



 $\angle I = 108^{\circ} \dots [Given]$ side IJ || side KL and side IL is their transversal ... [Given] $\therefore \angle I + \angle L = 180^{\circ} \dots [Interior angles]$ $\therefore 108^{\circ} + \angle L = 180^{\circ}$ $\therefore \angle L = 180^{\circ} - 108^{\circ} = 72^{\circ}$ $\angle K = 53^{\circ} \dots [Given]$ side IJ || side KL and side JK is their transversal ... [Given] $\therefore \angle J + \angle K = 180^{\circ} \dots [Interior angles]$ $\therefore \angle J + 53^{\circ} = 180^{\circ}$



Sample Paper – 1 – Part 2 - Solution

 $\therefore \angle J = 180^{\circ} - 53^{\circ} = 127^{\circ}$ $\therefore \angle L = 72^{\circ}, \angle J = 127^{\circ}$

Q. 3. (A)



Given: ED = DF, AD = DB, AE = EC **To prove:** $\Box AFBE$ is a parallelogram **Proof:** seg AB and seg EF are diagonals of $\Box AFBE$. seg AD \cong seg DB D is the midpoint of AB seg $ED \cong$ seg DF (By construction) \therefore Diagonals of $\Box AFBE$ bisect each other $\therefore \Box AFBE$ is a parallelogram By parallelogram test

ii.

Given: Length (l) =10 cm, curved surface area of the cone = 188.4 sq.cm To find: Perpendicular height (h) of the cone Curved surface area of the cone = πr

$$\therefore 188.4 = \boxed{3.14 \times r \times 10}$$

$$\therefore r = \frac{188.4}{\boxed{3.14 \times r \times 10}}$$

$$= \frac{188.4}{\boxed{3.14 \times r \times 10}}$$

$$= \frac{188.4}{\boxed{3.14}}$$

$$= \frac{1884}{\boxed{314}}$$

$$\therefore r = \boxed{6 \text{ cm}}$$

Now, $l^2 = r^2 + h^2$

$$\therefore 10^2 = \boxed{6^2 + h^2}$$

$$\therefore 100 = 36 + h^2$$

$$\therefore 100 - 36 = h^2$$

$$\therefore h^2 = 64$$

$$\therefore h = \boxed{8 \text{ cm}} \dots [\text{Taking square root on both sides}]$$

$$\therefore \text{ The perpendicular height of the cone is } \boxed{8 \text{ cm}}.$$



Sample Paper – 1 – Part 2 - Solution





Let the chord be AB and O be the centre of the circle.

OC be the perpendicular drawn from the centre to the chord AB.

We know that, perpendicular drawn from the centre of the circle to the chord bisects the chord.

So, $OC \perp AB$. In $\triangle OCA$, $OC^2 + AC^2 = OA^2$ $\therefore 30^2 + AC^2 = 34^2$ $\therefore 900 + AC^2 = 1156$ $\therefore AC^2 = 256$ $\therefore AC = 16 \text{ cm}$ Thus, $AB = 2 \times AC = 2 \times 16 = 32$ \therefore The length of the chord is 32 cm.



In right △TSU

 $TU^{2} = SU^{2} + TS^{2}$ ∴ $TU^{2} = 12^{2} + 5^{2} = 144 + 25 = 169$ ∴ TU = 13Now, $\sin T = \frac{SU}{TU} = \frac{12}{13}$ $\cos T = \frac{TS}{TU} = \frac{5}{13}$



Sample Paper – 1 – Part 2 - Solution

$$\tan T = \frac{SU}{TS} = \frac{12}{5}$$
Also,

$$\sin U = \frac{TS}{TU} = \frac{5}{13}$$

$$\cos U = \frac{SU}{TU} = \frac{12}{13}$$

$$\tan U = \frac{TS}{SU} = \frac{5}{12}$$

iii.



Let ABCD be the rhombus.
AC = 20 cm, BD = 21 cm
AO =
$$\frac{1}{2}$$
 AC ... [Diagonals of a rhombus bisect each other]
= $\frac{1}{2} \times 20 = 10$ cm ... (i)
Also, BO = $\frac{1}{2}$ BD
= $\frac{1}{2} \times 21 = \frac{21}{2}$ cm ... (ii)

In $\triangle AOB$, $\angle AOB = 90^{\circ}$... [Diagonals of a rhombus are perpendicular to each other] $\therefore AB^2 = AO^2 + BO^2$... [Pythagoras theorem]

$$= (10)^{2} + \left(\frac{21}{2}\right)^{2}$$
$$= (10)^{2} + \frac{441}{4}$$
$$= \frac{400 + 441}{4}$$

$$\therefore AB^2 = \frac{841}{4}$$



Sample Paper – 1 – Part 2 - Solution

$$\therefore AB = \sqrt{\frac{841}{4}} \dots [Taking square root on both sides]$$

$$\therefore AB = \frac{29}{2}$$

$$\therefore AB = 14.5 \text{ cm}$$

Perimeter of ABCD = 4 × AB
= 4 × 14.5
= 58 cm

: The side and perimeter of the rhombus are 14.5 cm and 58 cm respectively.

iv.

Given: Height (h) = 24 cm, Volume of cone = 1232 cm³ Volume of Cone = $\frac{1}{3}\pi r^2 h$ $\therefore 1232 = \frac{1}{3} \times \frac{22}{7} \times r^2 h$ $\therefore r^2 = \frac{1232 \times 3 \times 7}{22 \times 24}$ $= \frac{56 \times 1 \times 7}{1 \times 8}$ $\therefore r^2 = 49$ $\therefore r = \sqrt{49} \dots$ [Taking square root on both sides] $\therefore r = 7 \text{ cm}$ Now, $l^2 = r^2 + h^2$ $\therefore l^2 = 7^2 + 24^2$ $\therefore l^2 = 49 + 576 = 625$ $\therefore l = \sqrt{625} \dots$ [Taking square root on both sides]

$$\therefore$$
 l = 25

Curved surface area of cone = π r l

$$= \frac{22}{7} \times 7 \times 25$$

= 22 × 25
= 550 sq.cm
∴ The surface area of the cone is 550 sq.cm.



Sample Paper – 1 – Part 2 - Solution



In right Δ LMN, \angle N = θ .

 $\cos \theta = \frac{24}{25}$ $\Rightarrow \frac{MN}{LN} = \frac{24}{25}$

Let MN = 24k and LN = 25k.

Using Pythagoras theorem, we have

$$LN^{2} = LM^{2} + MN^{2}$$

$$\Rightarrow (25k)^{2} = LM^{2} + (24k)^{2}$$

$$\Rightarrow LM^{2} = 625k^{2} - 576k^{2} = 49k^{2}$$

$$\Rightarrow LM^{2} = (7k)^{2}$$

$$\Rightarrow LM = 7k$$

Now,

$$\sin \theta = \frac{\mathrm{LM}}{\mathrm{LN}} = \frac{7k}{25k} = \frac{7}{25}$$
$$\tan \theta = \frac{\mathrm{LM}}{\mathrm{NM}} = \frac{7k}{24k} = \frac{7}{24}$$

Also,

$$\sin^2 \theta = \left(\frac{7}{25}\right)^2 = \frac{49}{625}$$

 $\cos^2 \theta = \left(\frac{24}{25}\right)^2 = \frac{576}{625}$



Sample Paper – 1 – Part 2 - Solution

ii.



Let AB and CD be the two chords.

AB = CD = 16 cm

Radius = A0 = 10 cm

Let OE be the perpendicular drawn from the centre of the circle to the chord AB. Perpendicular drawn from the centre of the circle to the chord bisects the chord. So, AE = EB = 8 cm

In Δ AEO,

 $EO^2 + AE^2 = AO^2$

 $\therefore E0^2 + 8^2 = 10^2$

 $\therefore EO^2 = 100 - 64$

 $\therefore EO^2 = 36$

 $\therefore EO = 6 cm$

We know that, congruent chords of a circle are equidistant from the centre.

So, EO = OF = 6 cm

Distance of these chords from the centre is 6 cm.

iii.

Given: Ratio of radius of base and height of a cone = 5:12 Volume = 314 cubic metre To find: Perpendicular height (h) and slant height (l)

The ratio of radius and height of cone is 5 : 12

Let the common multiple be x.

 $\therefore \text{ Radius of base } (r) = 5x \text{ and perpendicular height } (h) = 12x$ $\text{Volume of cone} = \frac{1}{3}\pi r^2 h$ $\therefore 314 = \frac{1}{3} \times 3.14 \times (5x)^2 \times (12x)$ $\therefore 314 = \frac{1}{3} \times 3.14 \times 25x^2 \times (12x)$ $\therefore x^3 = \frac{314 \times 3}{3.14 \times 25 \times 12}$ $= \frac{314 \times 3 \times 100}{314 \times 25 \times 12}$



Sample Paper – 1 – Part 2 - Solution

 $\begin{array}{l} \therefore x^{3} = 1 \\ \therefore x = 1 \dots [Taking cube root on both sides] \\ \therefore r = 5x = 5(1) = 5m \\ \therefore h = 12x = 12(1) = 12 m \\ Now, l^{2} = r^{2} + h^{2} \\ = 5^{2} + 12^{2} \\ = 25 + 144 \\ \therefore l^{2} = 169 \\ \therefore l = \sqrt{169} \dots [Taking square root on both sides] \\ \therefore l = 13 m \\ Hence, the perpendicular height and slant height of the cone are 12 m and 13 m \end{array}$

Q.5.

respectively.

i.



Given: seg PD is a median of \triangle PQR. Point T is the midpoint of seg PD.

To Prove: $\frac{PM}{PR} = \frac{1}{3}$

Construction: Draw seg DN || seg QM such that P-M-N and M-N-R. Proof:

In ΔPDN,

Point T is the midpoint of seg PD and seg TM || seg DN ... [Given]

 \div Point M is the midpoint of seg PN ... [Construction and Q-T-M]

: PM = MN ... [Converse of midpoint theorem]

In ΔQMR,

Point D is the midpoint of seg QR and seg DN || seg QM [Construction]



∴ Point N is the midpoint of seg MR. [Converse of midpoint theorem]

 \therefore RN = MN ... (ii)

 \therefore PM = MN = RN ... (iii) [From (i) and (ii)] Now, PR = PM + MN + RN ... [P-M-R-Q-T-M]


Maharashtra IX | MATHEMATICS

Sample Paper – 1 – Part 2 - Solution

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\therefore PR = PM + PM + PM \dots [From (iii)]
\therefore PR = 3PM
\therefore \frac{PM}{PR} = \frac{1}{3}
```

ii.

Steps of construction:

- 1. Draw XZ = 6.9 cm.
- 2. With X as centre and 6.7 cm as radius, draw an arc above the line XZ. Also, with Z as centre and 5.8 cm as radius, draw an arc cutting the previous drawn arc at point Y. Δ XYZ is thus obtained.
- 3. Construct the angle bisectors of $\angle X$ and $\angle Z$ and let them meet at point 0.
- 4. Through point O, draw a perpendicular to line XZ. Let the perpendicular meet the line XZ at point P.
- 5. With O as centre and OP as radius, draw a circle inside the ΔXYZ .

This is the required incircle.





MSB IX | Science and Technology | Paper-I

Sample Paper 1 – Solution

Maharashtra State Board Class IX Science and Technology Paper – I Sample Paper 1 - Solution

1.

- (A)
 - (i) Correct option c: 20 Hz to 20,000 Hz. Audible range of sound for human beings is 20 Hz to 20,000 Hz.
 - (ii) Correct option b: Mercury Red colour used in Rang Panchami contains a high proportion of mercury.
 - (iii) Correct option d: Real, inverted, highly magnified As the image formed is inverted and at infinity, the image is real, inverted and highly magnified.
 - (iv) Correct option b: Anthracite Among all types of coal available, anthracite contains the maximum percentage of carbon (95%).
 - (v) Correct option c: EcholocationThe technique used by bats to find their way or locate their food is echolocation.

(B)

- (i) Alkenes have the general formula C_nH_{2n} .
- (ii) Yes, natural gas is mostly composed of methane (>85%), a hydrocarbon with the chemical formula CH₄.

(iii)

 $CH_{3}COOH \rightarrow CH_{4} + CO_{2}\uparrow$

- (iv) Radioactivity is the process in which the nucleus of an unstable atom spontaneously emits particles and energy. There are three types of radiations: alpha, beta, and gamma. Exposure to these radiations can be harmful to living organisms.
- (v) **<u>Strontium-90</u>** is used as a tracer in the research of various crops.



2.

- (A)
 - i) Teflon coating is given to colored metal sheets of two-wheelers and fourwheelers because.
 - The atmosphere and chemical substances have no effect on Teflon.
 - Teflon coating offers protection against damage due to high temperature and rain.
 - ii) Graphite is a conductor of electricity because it is composed of layers of carbon atoms arranged in a hexagonal lattice. The electrons in the outer shells of these carbon atoms are not tightly bound to a particular atom and are free to move through the lattice, allowing an electrical current to flow through it.
 Note: Graphite has a relatively low electrical conductivity compared to other conductors, such as metals, but is still able to conduct electricity due to the

presence of these free electrons.

iii) Biogas is considered an eco-friendly fuel because it is produced from renewable resources, such as agricultural waste and food waste, and has a lower carbon footprint compared to fossil fuels. The production and use of biogas can also help reduce greenhouse gas emissions and contribute to a more sustainable energy system.

(B)

(i) Focal length of a concave mirror = 15 cm

We know that the focal length is half the radius of curvature.

 $\therefore f = \frac{R}{2}$ $\Rightarrow R = 2f$ $\therefore R = 2 \times 15 = 30 \text{ cm}$

(ii)

- A concave mirror is also called a converging mirror.
- The image formed by a convex mirror is always small in size, virtual and erect.
- (iii) <u>Harmful effects of artificial food colours:</u>
 - Food colours added to pickles, jams and sauces contain small quantities of lead and mercury. These can be harmful for those who consume these products on a regular basis.
 - Diseases like ADHD (attention deficit hyperactivity disorder) can affect children who consume foods with added food colours, especially when such food is consumed in excess.



(iv) <u>Uses of radioactive isotopes in agriculture:</u>

- The genes and chromosomes that give seeds properties like fast growth, higher productivity, etc. can be modified by means of radiation.
- The radioactive isotope cobalt-60 is used for food preservation.
- Onions and potatoes are irradiated with gamma rays from cobalt-60 to prevent their sprouting.
- Strontium-90 is used as a tracer in the research on various crops.
- (v) Wavelength of sound waves = 0.02 mVelocity of sound = 330 m/sFrequency of sound waves

$$\nu = \frac{v}{\lambda} = \frac{330}{0.02} = 16500 \text{ Hz} = 16.5 \text{ kHz}.$$

3.

(i)

Diamond	Graphite		
1. Pure diamond is colorless and	1. Graphite is greyish black,		
transparent.	opaque and shiny.		
2. It is the hardest naturally	2. It is soft and greasy to touch.		
occurring substance.			
3. It has a high density, i.e., 3.5	3. It has a comparatively low		
g/cm ³ .	density, i.e., 2.39 g/cm ³ .		
4. It is a bad conductor of	4. It is a good conductor of		
electricity.	electricity.		

(ii) <u>Chemical name of bleaching powder:</u>

CaOCl2 - Calcium oxychloride

Reaction involved in the preparation: $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$

Uses of bleaching powder:

- It is used for disinfecting drinking water.
- It is used for bleaching of cloth.



MSB IX | Science and Technology | Paper-I

Sample Paper 1 – Solution

(iii)



Outer ear or pinna:

- a) It collects sound waves coming from the source of sound.
- b) It has a funnel-like shape which makes it possible to collect the sound waves and pass them to the middle ear.
- c) The collected sound waves pass through the tube to the cavity in the middle ear.



(v) In the presence of UV light and at a temperature of 250°C to 400°C, methane and chlorine react to give methyl chloride.

This reaction is called chlorination of methane.

$$CH_4 + Cl_2 \xrightarrow{\text{Light}} CH_3Cl + HCl$$

Uses of methane:

- Methane is used as natural gas in fabric mills, paper mills, food processing industries and petroleum purification plants.
- It is used for production of organic compounds such as ethanol, methyl chloride, methylene chloride and acetylene.
- It is used as a domestic fuel.



(vi) The <u>chemical name</u> of baking powder is sodium hydrogen carbonate or sodium carbonate.

Molecular formula: NaHCO3

Baking powder mixed with tartaric acid is used in making cakes. The carbon dioxide produced during the reaction causes bread or cake to rise making them soft and spongy.

(vii) <u>Rules based on the laws of reflection of light for drawing a ray diagram are:</u>**Rule 1**: If an incident ray is parallel to the principal axis, then the reflected ray passes through the principal focus.



Rule 2: If an incident ray passes through the principal focus of the mirror, then the reflected ray is parallel to the principal axis.



Rule 3: If an incident ray passes through the centre of curvature of the mirror, then the reflected ray traces the same path back.





(viii) <u>Properties of sodium chloride (NaCl)</u>:

- Common salt is a colourless and crystalline ionic compound.
- There is no water of crystallisation in its crystalline structure.
- It is a neutral salt and is salty in taste.

Uses of sodium chloride (NaCl):

- It is used for the production of salts such as Na₂CO₃ and NaHCO₃.
- It is used in the production of chlorine gas.
- When an electric current is passed through a saturated solution of sodium chloride (brine), it is electrolysed. Hydrogen gas is released at the cathode, while chlorine gas is released at the anode.

 $2 \text{ N a Cl} + 2 \text{ H}_2 \text{ O} \rightarrow 2 \text{ N a O H} + \text{ Cl}_2 \uparrow + \text{ H}_2 \uparrow$

4.

(i)

- (a) Ultrasounds are waves with a high frequency. Even in the presence of obstacles, ultrasound can travel along well-defined paths. Cracks and flaws in metal blocks can be detected using ultrasound. The metal block allows ultrasonic waves to pass through, and detectors are used to detect the transmitted waves. If even a minor flaw or defect exists, the ultrasound is reflected back, indicating the presence of the flaw or defect.
- (b) Bats hunt for prey and fly at night by emitting and detecting ultrasonic wave reflections. The bat's high-pitched ultrasonic squeaks are reflected from obstacles or prey and returned to the bat's ear. The nature of reflection informs the bat about the location and characteristics of the obstacle or prey.
- (c) Certain families of moths have extremely sensitive hearing equipment. These moths can hear the bat's high-frequency squeaks and recognise when a bat is nearby, allowing them to avoid capture.

(ii) <u>Crystalline allotropes of carbon:</u>

- 1. Diamond
- 2. Graphite
- 3. Fullerene

Uses of Diamond: (any two)

- Diamonds are used in ornaments.
- Being the hardest substance, diamond is used to cut glass and other metals.
- Diamond-tipped tools are used for cutting and drilling of rocks.
- Diamond absorbs harmful radiation. Hence, it is used in space satellites to make radiation-proof windows.



Uses of Graphite: (any two)

- Being soft and slippery with a high melting point, graphite is used as a lubricant in fast-moving machinery.
- It is used to make the core of lead pencils.
- It is used in a carbon brush, an important part of dynamos and electric motors.
- In a dry cell, a graphite rod is used as the positive electrode.
- Graphite is also used in arc lamps which emit very bright light.

Uses of Fullerene: (any two)

- Fullerene is used as an insulator.
- It is used as a catalyst in water purification.
- At a certain temperature, it exhibits superconductivity.



Maharashtra State Board Class IX Science and Technology Paper – II Sample Paper 1

Time: 2 Hours.

Max. Marks: 40

Note:

- i. All questions are compulsory.
- ii. Use of a calculator is not allowed.
- iii. The numbers to the right of the questions indicate full marks.
- iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
- v. For each MCQ, the correct alternative (A), (B), (C), (D), with sub-question number is to be written as an answer.
- vi. Scientifically correct and labelled diagrams should be drawn wherever necessary.

Q.1 (A) Choose the correct option and write its number for the following questions:

[5]

- (1) In sickle cell anaemia, there is substitution of amino acid valine to
 - (A) Glutamic acid
 - (B) Aspartic acid
 - (C) Cysteine
 - (D) Leucine
- (2) Which of the following is the correct combination of mirrors and lenses used in the Cassegrain telescope?
 - (A) Concave mirror, convex mirror, convex lens
 - (B) Concave mirror, plane mirror, convex lens
 - (C) Convex mirror, plane mirror, convex lens
 - (D) Plane mirror, concave lens, convex lens
- (3) Which hormone is effective in prevention and retardation of plant growth?
 - (A) Auxin
 - (B) Cytokinin
 - (C) Gibberellin
 - (D) Abscisic acid
- (4) Which of the following is an exotic breed of cow?
 - (A) Red Sindhi
 - (B) Sahiwal
 - (C) Jersey
 - (D) Gir



- (5) Chandra, launched by NASA in 1990, is a type of ______ telescope.
 - (a) (a)Radio
 - (b) (b)Ultraviolet
 - (c) (c)X-ray
 - (d) (d)Optical

Q.1 (B) Solve the following questions:

- State whether the following statement is True or False.
 Lymph tissue protects the body from infections.
- (2) Find the odd one out: Collenchyma, Sclerenchyma, Phloem, Parenchyma
- (3) Find the correlation:44 + X : Turner syndrome : : 44 + XXY :
- (4) Identify the type of telescope shown in the picture.



(5) Select the correct option in Group 'B' related to group 'A':

Group 'A'	Group 'B'
	(a) Calcitonin
Pancreas	(b) Glucagon
	(c) Adrenaline

Q.2 (A) Give scientific reasons: (Any two)

- (1) Genes are said to be the functional units of heredity.
- (2) It is necessary for people to have their blood examined before marriage.
- (3) Rearing of sheep is a livestock.

[5]

[4]



Q.2 (B) Solve the following questions: (Any three)

- (1) Define the following terms:
 - (a) Reflex action
 - (b) Tropism
- (2) Distinguish between striated and non-striated muscles. (Write 2 points of differences)
- (3) Draw a neat and well-labelled diagram of a refracting telescope.
- (4) Write short note: Agro-complementary business.
- (5) Identify the type of epithelial tissue and state its function.



Q.3 Solve the following questions: (Any five)

- (1) When a plant with purple flowers was crossed with a plant with white flowers, all flowers obtained were purple in the F₁ generation. If the F₁ generation plants were self-fertilised, what is expected in the F₂ progeny? Explain with the help of a flowchart.
- (2) State three commercial applications of biotechnology.
- (3) Why are telescopes launched in space? Explain in brief about the Hubble telescope launched in space.
- (4) Explain the construction and working of a Newtonian telescope.
- (5) Observe the given picture carefully.



- (a) What does the given picture depict?
- (b) Identify the parts labelled A, B and C.
- (c) List the function of part B.

[6]

[15]



(6) Complete the paragraph by choosing the appropriate words given in the brackets: (Brain, spinal cord, effector, receptor, sensory neuron, motor neuron, relay neuron)

When we inadvertently touch something hot such as a burning candle, we experience the reflex arc. The <u>receptor</u> detects the stimulus of change in temperature first. An electrical impulse is generated which is carried by the <u>sensory neuron</u>. The electrical impulse is then delivered to the <u>relay neuron</u> in the <u>spinal cord</u>. From there, the impulse reaches the <u>motor neuron</u>. The electrical impulse then travels to an <u>effector</u> organ such as a muscle or a gland which generates a response of withdrawal of hand.

- (7) How has tissue culture contributed to an increase in the production of good quality crops?
- (8) The following pictures show children suffering from certain genetic disorders. Identify the disorders A and B. Is it right to avoid living with a person suffering from a genetic disorder?



Q.4 Solve the following questions: (Any one)

[5]

(1) Read the paragraph and answer the questions given below:

Control and co-ordination in our body is also brought about with the help of hormones. Hormones are secreted by endocrine glands which do not have any arrangement of their own to either store or carry their secretions. Hence, as soon as hormones are produced, they are directly released into the blood circulation. It is very important that hormones are secreted only in the required quantity and there is a special mechanism which controls the quantity and timing of hormone secretion. Endocrine glands along with the nervous system are responsible for the control and co-ordination in our body. These two systems help each other to control and integrate the various activities of the body.

Questions:

- (a) What are endocrine glands?
- (b) How is nervous control different from chemical control?
- (c) Explain about feedback mechanism of hormone secretion.



- (d) Name two hormones secreted by the thyroid gland.
- (e) What is the role of parathormone in the body?
- (2) With respect to genetic disorders, answer the following questions:

Questions:

- (a) What are genetic disorders?
- (b) What is the chromosomal condition of a person suffering from Down's syndrome?
- (c) Define monogenic disorders.
- (d) Explain the genetic disorder albinism.
- (e) Give two examples of polygenic disorders.



Maharashtra State Board Class IX Science and Technology Paper – II Sample Paper 1 - Solution

Q.1 (A)

(1) (A) Glutamic acid

In sickle cell anaemia, there is a substitution of one amino acid valine for glutamic acid, the 6th amino acid in the beta polypeptide chain of haemoglobin (GAG to GUG).

(2) (A) concave mirror, convex mirror, convex lens



(3) (D) Abscisic acid

The hormone abscisic acid, is effective in prevention and retardation of growth, and leaf wilting.

(4) (C) Jersey

Jersey is an exotic breed of cow from the island of Jersey (Channel Islands).

(5) (C) X-ray

Chandra, launched by NASA in 1990, is a type of X-ray telescope.

Q.1 (B)

- (1) True. Lymph tissue protects the body from infections.
- (2) Phloem (Collenchyma, sclerenchyma and parenchyma are simple permanent tissues while phloem is a complex permanent tissue).
- (3) 44 + X : Turner syndrome : : 44 + XXY : <u>Klinefelter syndrome</u>.
- (4) The given picture shows a radio telescope.



MSB IX | Science and Technology | Paper - II

Sample Paper 1 - Solution

(5)

Group 'A'	Group 'B'
Pancreas	(b) Glucagon

Q.2 (A)

- (1) Genes are said to be the functional units of heredity because they
 - Control the structure and function of the cells of the body
 - Transmit hereditary characteristics from parents to offspring

(2) It is necessary for people to have their blood examined before marriage because:

- Genetic disorders are transmitted only by reproduction.
- If a carrier/sufferer of a genetic disorder marries a person who is also a carrier/ sufferer of the disorder, then there are chances that the disorder will be passed on to the offspring.
- In order to prevent this transmission, people should get their blood examined before marriage to know if they are a carrier of any genetic disorder.

(3) <u>Rearing of sheep is a livestock because:</u>

- Rearing of sheep refers to farming of sheep for various purposes.
- It is among the traditional businesses and occupations of the people of some countries around the world.
- Since ancient times, sheep have been reared as a domestic animal.
- Sheep are reared for their milk, meat and wool production.

Q.2 (B)

- (1)
 - (a) <u>Reflex action</u>: An immediate and involuntary response given to a stimulus from the environment is called a reflex action.
 - (b) <u>Tropism</u>: Movement or growth of any part of the plant in response to an external stimulus is called tropism or tropic movement.

(2) <u>Differences between striated and non-striated muscles:</u> (Any two points)

Striated muscles	Non-striated muscles	
• Muscle cells are long, cylindrical	• Muscle cells are short, spindle-	
and multinucleate.	shaped and uninucleate.	
• There are alternate dark and light	• Dark and light bands are absent in	
bands on these muscles.	these muscles.	



MSB IX | Science and Technology | Paper - II

Sample Paper 1 - Solution

•	They move as per our will, hence	٠	Their movements are not under the
	they are called voluntary muscles.		control of our will, hence they are
			called involuntary muscles.
•	These muscles bring about	٠	These muscles are responsible for
	movements of arms and legs,		the movements of eye lids, passage
	running, speaking, etc.		of food through alimentary canal,
			contraction and relaxation of blood
			vessels.

(3) <u>Refracting telescope:</u>



(4) Agro-complementary business:

The businesses that are complementary to agriculture and generate supplementary income for the farmers are called agro complementary business. These include animal husbandry, poultry farming and sericulture.

- <u>Animal Husbandry</u>: It is practiced for milk production and for using the cattle as help in farming operations, e.g. cows and buffaloes are raised for milk whereas bulls and male buffaloes are used for pulling heavy loads.
- <u>Poultry Farming</u>: It is the rearing of egg and meat yielding chickens. Chickens raised for eggs are called layers while those raised for meat are called broilers.
- <u>Sericulture</u>: It is the practice of rearing of silkworms (moths) for silk production. The silk fibres obtained are processed, reeled and then woven into a fabric.

(5)

(A): <u>Squamous epithelium</u>: Selective transport of substances.

(B): <u>Columnar epithelium</u>: Secretion of digestive juices and absorption of nutrients.



Q.3



In the F_2 generation, 75% of the progeny will have purple flowers, while 25% of the progeny will have white flowers.

(2) <u>Commercial applications of biotechnology:</u> (Any three points)

- Biotechnology is used in the field of agriculture in order to improve crop variety and yields by the use of genetic modification and hybridization.
- Techniques such as artificial insemination and embryo transfer are useful in animal husbandry to improve quality and quantity of animal products such as meat, milk and wool.
- Gene therapy and therapeutic cloning have been utilized in treating genetic disorders.
- DNA fingerprinting techniques are useful in forensics and paternity testing.
- (3) When visible radiation emitted by the heavenly bodies passes through the Earth's atmosphere, some light is absorbed by the atmosphere, thus decreasing the intensity of light. To avoid this, telescopes are placed in the atmosphere. <u>Hubble telescope:</u>
 - Hubble telescope is an optical telescope.
 - It was launched into space in 1990 by NASA (National Aeronautics and Space Administration).
 - Its mirror has a diameter of 94 inches.
 - It orbits the Earth at an altitude of 589 km.



MSB IX | Science and Technology | Paper - II

Sample Paper 1 - Solution

(4) <u>Newtonian telescope:</u>



Construction:

• The Newtonian telescope consists of a concave mirror, plane mirror and eyepiece (convex lens).

Working:

- Light rays coming from the source are incident on a concave mirror.
- These rays are deflected by a small plane mirror before they converge to a focus.
- Thus, the rays are focused at the point lying perpendicular to the axis of the telescope.
- Then the rays pass through the eyepiece through which a magnified image is obtained.

(5)

- (a) The given picture depicts the structure of brain.
- (b) A \rightarrow Cerebrum, B \rightarrow Cerebellum, C \rightarrow Medulla oblongata
- (c) Functions of Part B (Cerebellum):
 - Co-ordination of voluntary movements.
 - Maintaining the body's balance.
- (6) When we inadvertently touch something hot such as a burning candle, we experience the reflex arc. The <u>receptor</u> detects the stimulus of change in temperature first. An electrical impulse is generated which is carried by the <u>sensory</u> <u>neuron</u>. The electrical impulse is then delivered to the <u>relay neuron</u> in the <u>spinal</u> <u>cord</u>. From there, the impulse reaches the <u>motor neuron</u>. The electrical impulse then travels to an <u>effector</u> organ such as a muscle or a gland which generates a response of withdrawal of hand.



(7) <u>Role of tissue culture in an increase in crop production:</u>

- It allows to grow those plants which bear flowers and fruits of excellent quality on a large scale.
- It enables to produce fully grown plants in shorter durations.
- It is possible to grow plants even if pollination or germinating seeds are not available.
- It involves growing cells in a more nutritive medium and protecting them from pathogens in bioreactors.
- It helps to produce large numbers of seedlings/plantlets in a short time using minimum resources and materials.
- It can produce embryos which always complete their growth.
- It is used to grow even rare and endangered plants and thus protect them from extinction.

(8) (A): Down syndrome

(B): Albinism

- No, it is not right to avoid living with a person suffering from a genetic disorder.
- Genetic disorders are not communicable diseases that would be transmitted to people who come in contact with the people suffering from genetic disorders.
- Genetic disorders are caused by changes in DNA sequences which can only be passed from one generation to another under specific circumstances.
- Rather, we should support and accept people with genetic disorders, so that they can live a normal life.

Q.4

(1)

- (a) Endocrine glands are ductless glands of the endocrine system which do not have ducts to store or transport their secretions. They secrete their products/hormones directly into the blood.
- (b) In nervous control, the nerve impulses are fast, but short lived whereas in chemical control, the action of hormones is very slow but long lasting.
- (c) The feedback mechanism of hormone secretion controls the quantity and the timing of hormone secretion. For example, whenever there is an increase in blood-glucose level, certain cells in the pancreas get stimulated and as a response, they release a greater quantity of insulin.



(d) <u>Hormones secreted by the thyroid gland:</u>

- 1. Thyroxine
- 2. Calcitonin
- (e) Parathormone secreted by the parathyroid gland controls the metabolism of calcium and phosphorus in the body.

(2)

- (a) Diseases or disorders occurring due to abnormalities in chromosomes and mutations in genes are called genetic disorders.
- (b) Down's syndrome is characterised by the presence of 47 chromosomes. It is described as trisomy of the 21st chromosome. Infants with this disorder have one extra chromosome with the 21st pair in every cell of their body.
- (c) Disorders or diseases occurring due to mutation of any single gene into a defective gene are called monogenic disorders.
- (d) Albinism is a genetic disorder in which the body cannot produce the brown pigment, melanin. The skin becomes pale, hairs are white and eyes are usually pink due to the absence of melanin pigment in the retina and sclera.
- (e) Examples of polygenic disorders: (Any two)
 - 1. Spina bifida
 - 2. Cleft lip and palate
 - 3. Constricted stomach
 - 4. Asthma



Sample Paper 1- Semester 2

MSB

Class IX Social Sciences- Geography Semester 2 Sample Paper 1

Time: 2 Hours.

Total Marks: 40

General Instructions:

- **1.** All the activities/questions are compulsory.
- **2.** Figures to the right indicate full marks.
- **3.** Answers should be written in blue/black ink only.
- 4. Draw neat diagrams and sketches wherever necessary.
- 5. Use of pencil/colour pencil is allowed for drawing, sketches and map work only.
- Complete the following sentences by choosing the appropriate alternatives from those given and rewrite the sentences in your answer book. [4]
 - (1) ______ rainfall generally occurs in the equatorial regions.
 - a) Orographic
 - b) Frontal
 - c) Cyclonic
 - d) Convectional

(2) While crossing the IDL, a person will have to add one day when travelling from

- a) West to east
- b) East to west
- c) South to north
- d) North to south
- (3) In the modern age today, ______is an important and an effective means of communication.
 - a) Satellites
 - b) Magazines
 - c) Radio
 - d) Newspapers
- (4) In seas where the supply of freshwater exceeds the rate of evaporation, salinity is
 - a) High
 - b) Medium
 - c) Low
 - d) Extremely high



Sample Paper 1- Semester 2

2. Match the following:

Match the follow	ring: [4
(1) Fog	(i) Water vapour turns into microscopic water particles and
	float in the air.
(2) Dew	(ii) Below 0 ^o Cthe water droplets stuck to the surfaces of cold
	objects freeze.
(3) frost	(iii) Strong thunderstorms carry water droplets above the
	freezing level.
(4) Hail	(iv) When moisture-laden air near the earth's surface comes
	into contact with very cold objects, condensation of the
	vapour takes place

3. (A) Answer the following in one sentence. (Any four)

[4]

- (a) Which longitude is used to determine the Greenwich Mean Time?
- (b) State any two negative effects of urbanization.
- (c) Mention any two positive impact of transportation.
- (d) What is domestic tourism?
- (e) Name two points that were taken into consideration while drawing the International Date Line.
- Observe the map of the Satara district below and answer the questions given below. 4. (any four) [4]



Name any two rivers flowing through the Satara district.

- (a) Name one famous hill station in the northwestern part of the district.
- (b) Name one lake in the eastern part of the Satara district.
- (c) Which two parts of the district are of comparative medium and lower elevation?
- (d) Name a famous mountain range in the western part of the district.



Sample Paper 1- Semester 2

- 5. Give geographical reasons for the following: (any two)
 - (a) IDL is proving to be very useful in today's times.
 - (b) There are more salt pans on the Western coast of India than its eastern coast.
 - (c) Mumbai receives more rainfall than Pune.
 - (d) India is a famous tourist spot.
- **6. (A)** The below table shows the rate of urbanisation in India. Study the data below and answer the questions. [6]

Year	Urban population (Percentage)
1961	17.79
1971	19.11
1981	23.34
1991	25.72
2001	28.06
2011	37.07

- (a) With the help of given statistical data showing urbanisation in India, prepare a simple bar graph on the graph provided to you.
- (b) In which decade urbanisation occurred slowly?
- (c) What was the percentage increase in population during period from 2001-2011?
- (B) The below figure shows the depth and temperature of sea water. Observe the figure and answer the following questions: [6]



- (a) What is the maximum temperature of seawater in equatorial areas?
- (b) How much is the above temperature at a depth of 500 m?
- (c) What is the temperature of seawater at the sea level in the mid-latitudes?
- (d) How much has this temperature changed at 1500m depth?
- (e) What does the thermal graph for the high latitudes say?
- (f) After what depth does the seawater temperature remain stable everywhere?

[4]



Sample Paper 1- Semester 2

- 7. Answer the following questions in detail (any two)
 - (a) Discuss any four factors affecting the choice of the mode of transportation.
 - (b) How does cyclonic rainfall occur?
 - (c) How does tourism lead to social development

[8]





Sample Paper 1- Semester 2

MSB

Class IX Social Sciences- Geography Semester 2 Sample Paper 1 Solutions

Answer 1

- (1) <u>Convectional rainfall</u> generally occurs in the equatorial regions.
- (2) While crossing the IDL, a person will have to add one day when travelling from <u>East to</u> <u>West.</u>
- (3) In the modern age today, <u>satellite</u> is an important and an effective means of communication.
- (4) In seas where the supply of freshwater exceeds the rate of evaporation, salinity is <u>low</u>.

Answer 2

(1) Fog	(i) Water vapour turns into microscopic water particles and float in the air.
(2) Dew	(ii) When moisture-laden air near the earth's surface comes into contact with very cold objects, condensation of the vapour takes place
(3) frost	(iii) Below 0°C the water droplets stuck to the surfaces of cold objects freeze.
(4) Hail	(iv) Strong thunderstorms carry water droplets above the freezing level.

Answer 3 (A)

- (a) The Prime Meridian is used to determine the Greenwich Mean Time.
- (b) Slums and traffic jams are two negative effects of urbanisation.
- (c) Two positive impact of transportation are rapid industrialisation and boost to trade and commerce.
- (d) Tourism within the limits of a country is called domestic tourism.
- (e) The direction of travel and the current day and date were taken into consideration while drawing the International Date Line.

Answer 4

- (a) Rivers Mand and Tarali two rivers flowing through the Satara district.
- (b) Mahabaleshwar is famous hill station in the northwestern part of the district.
- (c) A lake in the eastern part of the Satara district is the Mhaswad lake.
- (d) The central and the eastern parts of the district are comparatively of lower and medium elevations.
- (e) The Sahayadri Mountains is a famous mountain range in the western part of the district.



Sample Paper 1- Semester 2

Answer 5

(a) IDL is proving to be very useful in today's times:

- It has helped in coordinating between international airlines, transportation services, economic and trade activities.
- With the help of IDL, it has become easier to keep an accurate track of all calculations related to time especially when it comes to travelling from Eastern to Western Hemisphere and vice versa.
- It is only because of the IDL that the schedules of the traffic worldwide are organised properly.
- (b) There are more salt pans on the Western coast of India than its eastern coast:
 - The Arabian Sea lies lying to the west and Bay of Bengal lies to the east of India.
 - Many large peninsular rivers drain their waters in the Bay of Bengal and on the contrary, only small seasonal coastal rivers drain in the Arabian Sea.
 - Hence, the salinity of the eastern coast is 34%, while it is 35% in the Arabian Sea. Thus, there are more salt pans on the Western coast of India than its Eastern coast.
- (c) Mumbai receives more rainfall than Pune
 - Mumbai lies on the windward side of Western Ghats while Pune is located on the leeward side.
 - Rain bearing winds strike the Western Ghats and cause rainfall in Mumbai. These winds become dry and then go on to the leeward side of the western Ghats.
 - By the time, they go to the leeward side, they are already devoid of the moisture and hence cause little rainfall in Pune.

(d) India is a famous tourist spot

- India is a diverse country in terms of culture and nature. It is one of the ancient civilisations of the world and hence many historical sites.
- The richness of natural beauty in India, attractive landscapes, high mountains like the Himalayas and exquisite coastal areas attracts tourists.
- The diversity of Indian culture, festivals, traditions, costumes, variety of dishes made using Indian spices and hospitality of the Indians has resulted in opportunities of tourism in India.

Answer 6

(A)





Sample Paper 1- Semester 2

- (a) A simple bar graph showing urbanisation in India:
- (b) Urbanisation occurred slowly during the years 1961-1971. There was an increase of only 1.32% in urbanisation.
- (c) The percentage increase of population during period from 2001-2011 was 9.01.

(B)

- (a) The maximum temperature of sea water in equatorial areas is 18° C.
- (b) The temperature at the depth of 500 m is 11° C.
- (c) The temperature of seawater at the sea level in the mid-latitudes is 14° C approximately.
- (d) The temperature is about 5° C at the depth of 1500 m. Thus, the temperature of sea water at mid-latitudes has changed from 14°C at the sea level to about 5°C at the depth of 1500 m i.e. temperature has changed (reduced) by 9°.
- (e) In high latitudes the temperature of sea water at all depths remains constant at 4° C.
- (f) After 2000 m, the temperature of the sea water is uniform everywhere.

Answer 7

(a) Four factors affecting the choice of the mode of transportation are:

Cost: People decide the mode of transport based on cost. For transporting raw materials, the cheapest means for transportation is water transport. While road transport is relatively costly and airway transport is the costliest.

Speed: It is another factor. If people want to reach to their destination quickly, they prefer airways as it is the fastest means of transport.

Capacity: Waterways and railways are the suitable means to carry huge and heavy goods. Roadways can transport average amount of goods. Airways are costlier and can transport only limited goods.

Reliability: Transporting goods or people to the destination on time represents the reliability of means of transport. Roadways and railways are reliable means of transport.

(b) Occurrence of the cyclonic rainfall

- Cyclones are formed when the pressure at an area is less than the surrounding regions.
- Air from the surrounding region comes toward the center of the cyclone and starts moving upwards. As it rises, the temperature of the air reduces, condensation occurs and rainfall takes place.
- It rains in those regions where cyclones pass. Cyclonic rainfall occurs more in temperate zones and cyclone's area is also extensive.
- In tropical regions, the cyclonic rainfall is limited in extent and is stormy in nature.
- (c) Tourism and social development
 - Tourism encouraged societal progress as tourists learnt to respect and love each other while they visited new places. Tourists spread the culture while travelling to other countries. In the same way, languages, skills and art receive wide exposure through tourism.
 - It promotes understanding among people, with Indians from different parts of the country and with foreigners.



Sample Paper 1- Semester 2

- Tourism gets a social dimension when rural lifestyle, tribal life and culture become part of it. Visits to tribal communities make the people familiar with the tribal culture, crafts and traditions.
- The tribal life in Melghat of Maharashtra and visits to model villages such as Anandwan project of the social activist Baba Amte, Ralegansiddhi, Hiwre Bazaar etc. create social consciousness among the people and give a social dimension to tourism.

MSB IX | SOCIAL SCIENCES- HISTORY AND POLITICAL SCIENCE

Sample Paper 1- Semester 2(2023)

MSB Class IX Social Sciences- History and Political Science Semester 2 Sample Paper 1

Time: 2 hours

Total Marks: 40

General Instructions:

- **1.** All the activities/questions are compulsory.
- 2. Figures to the right indicate full marks.
- **3.** Question Nos. 1 to 5 are based on History and Question Nos. 6 to 9 are based on Political Science.
- **4.** It is mandatory to write a complete statement as answer in Question Nos. 1(A) and 6.
- **5.** In Question Nos, 2(A) and 8(B) the appropriate answers are expected to be written by pen only in the concept map.
- **6.** The answers of Question No. 1(A) and (B) and Question No. 6 are repeated then only first attempted answer will be considered.
- **1.** (A) Choose the correct option from the given options and complete the sentences: (3)
 - (1) ______was the first completely indigenous communication satellite made by ISRO.
 - a) Aryabhatta
 - b) Insat 1B
 - c) Rohini-75
 - d) Apple

(2) The main center of bicycle manufacturing in India is______.

- a) Amritsar
- b) Pune
- c) Ludhiana
- d) Mumbai

(3) Karnam Malleshwari won a medal in Olympics 2000 for _____

- a) Gymnastics
- b) Weightlifting
- c) Boxing
- d) Swimming

(B) Identify the wrong pair in the following and rewrite it.

- (1) (i) Dr. N. Gopinathan _____ Open heart surgery
 - (ii) Ramchandra Sharma_____ a skilled craftsman

(iii) Dr. Subhase Mukhopadhyay ______ test tube baby

(iv) Dr. Mohan Rao_____ Polio

[3]



MSB IX | SOCIAL SCIENCES- HISTORY AND POLITICAL SCIENCE

Sample Paper 1- Semester 2(2023)

- (2) (i) Mrinal Gore _____ a socialist leader
 - (ii) Gaura Devi _____ Chipko movement
 - (iii) Dr. Phulrenu Guha _____ Chairperson of Indian Sports Federation
 - (iv) Pramila Dandavate _____ Mahila Dakshata Samiti
- (3) (i) Textile industry ______ forms 14% of total industrial production
 - (ii) Leather industry_____ It is primarily import oriented
 - (iii) Hand sculpting_____ It is labour intensive craft
 - (iv) Jute industry ______ India is a major exporter of jute products
- **2.** (A) Fill in the table below. (**any two**):

[4]

(i)

A TV channel that showed to the entire world a live visual	
reporting of the Iraq war.	
The captain of 1983 Indian cricket world cup team	
The player won the national championship of billiards for	
teenagers at the age of 15.	
Name any one English newspaper	

(ii)

An area of mineral oil deposit in Gujarat	
A satellite due to which Akashwani or Radio stations could be	
connected to each other.	
The father of India's missile programme	
The name of the Director of the Bhabha Atomic Research	
Centre when India conducted its first nuclear test	

(iii)

Name/event/case	Act that was passed as a result
Roop Kanwar committed sati	
The case of Mohammad Ahmed Khan vs Shah Bano	
Begum	
Increasing number of deaths of women due to dowry	
This Act was enacted in 1993 to prevent injustice to	
men and women.	

(B) Write short notes on (**any two**):

- (1) The institution of family
- (2) Chipko Movement
- (3) The automobile industry in India

[4]



Sample Paper 1- Semester 2(2023)

- 3. Explain the following statements with reasons (any two)
 - (1) India decided to conduct nuclear tests.
 - (2) The women's liberation movement began.
 - (3) Cricket began to be played all over India, to a greater or smaller extent.
 - (4) The campaign for pulse polio immunisation was taken up.
- **4.** Read the following extract and answer the questions below:

Urbanisation is a process of the concentration of population in a city or urban area. Increasing population is one major reason for urbanisation. A few other factors affecting urbanisation are air, water and the economic as well as social organisations necessary for community life. In the context of post-independence India, the increase in urban population is also due to factors such as reduction in the mortality rate, industrialisation, unavailability of means of livelihood in rural areas, job opportunities in cities and the resulting migration. To reduce the strain on cities, it is necessary to make jobs available in villages, achieve a balance in economic development, control the expansion of metros and provide necessary services and facilities in both the urban as well as rural areas.

(1) Define urbanisation.	[1]
(2) Name two factors that results in urbanisation.	[1]

- (3) Mention four steps that can be taken to reduce the increasing migration of people in cities. [2]
- 5. Answer the following questions in detail: (Any two)
 - (1) What problems are faced by the people of the Scheduled tribes?
 - (2) What steps have been taken by the Indian government in the field of rural electrification.
 - (3) What measures have been taken by the government to improve cultivation in the country?
 - (4) Discuss the progress made in the field of telecommunications in India.
- **6**. Choose the correct option from the given options and complete the statements: [2]
 - (1) The line demarcating the boundary between India and China is_____
 - (a) Durand line
 - (b) Redcliff line
 - (c) McMahon line
 - (d) Stafford line

(2) The principle of sustainable development was stressed at environmental conference held at _____.

- (a) Kyoto
- (b) Paris
- (c) Washington
- (d) Rio de Janeiro

[4]

[6]



MSB IX | SOCIAL SCIENCES- HISTORY AND POLITICAL SCIENCE

Sample Paper 1- Semester 2(2023)

- 7. State whether the following statements are true or false. Give reason for your answer.(Any two) [4]
 - (a) A resolution can be passed even if China exercises its veto power.
 - (b) India has an important position among the South Asian countries.
 - (c) The aim of a terrorist attack is to endanger the geographical boundaries.
- 8. (A) Explain the following concepts. (any one)
 - (a) Secretariat
 - (b) SAARC
 - (B) Do as directed:
 - (1) Complete the concept map:



(2) Complete the concept map



9. Answer in brief. (Any one)

(1) Discuss the evolution of relations between India and America.

(2) What is the role of the Peacekeeping Forces of the United Nations?

[2]

[2]

MSB IX| SOCIAL SCIENCES- HISTORY AND POLITICAL SCIENCE

Sample Paper 1- Semester 2 (2023)

MSB Class IX Social Sciences- History and Political Science Semester 2 Sample Paper 1 Solutions

Answer 1 (A)

- (1) <u>APPLE</u> was the first completely indigenous communication satellite made by ISRO.
- (2) The main center of bicycle manufacturing in India is Ludhiana.
- (3) Karnam Malleshwari won a medal in Olympics 2000 for boxing.

Answer 1 (B)

- (1) Wrong pair- (iv) Dr. Mohan Rao_____ Polio
- (2) Wrong pair-(iii) Dr. Phulrenu Guha _____ Chairperson of Indian Sports Federation
- (3) Wrong pair- (ii) Leather industry_____ It is primarily import oriented

Answer 2 (A)

(i)

A TV channel that showed to the entire world a live	CNN channel	
visual reporting of the Iraq war.		
The captain of 1983 Indian cricket world cup team	Kapil Dev	
The player won the national championship of billiards	Geet Sethi	
for teenagers at the age of 15.		
Name any one English newspaper	The Times of India	

(ii)

An area of mineral oil deposit in Gujarat	Ankleshwar	
A satellite due to which Akashwani or Radio stations could	INSAT	
be connected to each other.		
The father of India's missile programme	Dr. Abul Kalam	
	Azad	
The name of the Director of the Bhabha Atomic Research	Dr Raja Ramanna	
Centre when India conducted its first nuclear test		

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Name/event/case	Act that was passed as a result
Roon Kanwar committed sati	The Commission of Sati
	(Prevention) Act
The case of Mohammad Ahmed Khan vs Shah	Muslim Women's Act (Protection
Bano Begum	of rights on divorce)
Increasing number of deaths of women due to	Dowry Prohibition (Amendment)



Sample Paper 1- Semester 2 (2023)

dowry	Act
This Act was enacted in 1993 to prevent	Protection of Human Rights Act
injustice to men and women.	

Answer 2 (B)

(1) The institution of family

- The system of joint family prevailed in pre-independence time.
- India was known all over the world as the country of joint families
- However, the joint families began to break up after the wave of globalisation which paved way to the system of nuclear families.

(2) The Chipko Movement

- Chipko movement was started in 1973. It was because the trees in the Himalayan forests were to be cut down by the contractors for commercial purposes.
- To save the trees and the Himalayan ecology, Sunderlal Bahuguna and Chandi Prasad Bhat started the movement to prevent the felling of trees.
- Women in the Garhwal region participated in the movement. They held each other's hands and encircled the trees.
- Some prominent women associated with this movement were Gaura Devi, Sudesha Devi and Bachani Devi.

(3) The automobile industry in India

- India is one of the major producers of vehicles and export it to around 40 countries.
- The automobile industry is called the 'sunrise sector' in India.
- For example, India's tractor industry is the biggest in the world. One-third of the tractors manufactured world-wide are produced in India.

Answer 3

- (1) India decided to conduct nuclear tests because China had already acquired the nuclear capability and Pakistan was also making desperate efforts to acquire nuclear weapons with China's help. India realised that she has to strengthen her defences by acquiring nuclear weapons.
- (2) Women have been suppressed since years. They were denied education and no significance was given to them for all the household work done by them. Dowry, sati, child marriages and purdah system further led to the deterioration of womens' condition. As some women started receiving education, they realised that it was important for women to fight for their rights. Thus, the women's liberation movement began.
- (3) In 1983, the Indian team won the World Cup for cricket, under the captainship of Kapil Dev. This increased the popularity of the game. In the same year, Sunil Gavaskar broke the earlier record of maximum centuries in test cricket. In 1985, India won the 'Benson and Hedges' World Championship of cricket. As a result, cricket came to be played in all States to a lesser or greater extent.



Sample Paper 1- Semester 2 (2023)

(4) Before 1978, every year, six Indian infants out of every 10 who were born faced fatal health problems in the very first year of their birth. Polio was a common problem that was faced by the infants in India. Hence, the campaign for pulse polio immunisation was taken up.

Answer 4

Extract- Answers

- 1. Urbanisation is an increase in the number of people living in towns and cities.
- 2. Two factors that results in urbanisation are increase in population and migration of people from villages to cities.
- 3. Four steps that can be taken to reduce the increasing migration of people in cities are to create jobs in villages, achieve a balance in economic development, control the expansion of metros and provide necessary services and facilities in both the urban as well as rural areas.

Answer 5

- (1) Problems faced by the people of Scheduled tribes are:
 - They live in remote parts of the country and hence are socially and economically backward.
 - Agriculture is their main occupation. They also collect and sell forest produce.
 - In agriculture, they follow primitive methods. They do not have modern implements.
 - Since scheduled tribes live in remote regions, they are many a times unable to receive medical help.
- (2) Steps that have been taken by the Indian government in the field of rural electrification in India:
 - Electricity is required in villages primarily because automatic pumps are needed to water fields.
 - Apart from this, it is also needed to preserve food items like milk, eggs, fruits and vegetables.
 - During the First Five Years Plan, electricity was provided to three thousand villages in India.
 - 'Rural Electrification Co-operative Societies' were established in the states of Andhra Pradesh, Gujarat, Karnataka, Maharashtra and Uttar Pradesh.
- (3) Measures taken by the government to improve cultivation in the country
 - The government has been arranging study visits for farmers to learn new and innovative techniques of farming.
 - Modern tools, implements, seeds and fertilisers are supplied to the farmers.
 - Training in soil testing, pisciculture, poultry, cattle and goat rearing and dairy farming is provided to the farmers.

Get More Marks

- Sample Paper 1- Semester 2 (2023)
- The government also gives financial help to the farmers for building warehouses for storing farm produce.
- Farmers in India have started using modern techniques like drip irrigation and organic farming to increase production.

(4) Progress made in the field of telecommunications in India

- It was in Mumbai in 1972, Overseas Communication Service was established in Mumbai for the management of international telecommunication service.
- Later, in 1976, the International Subscriber Dialled Telephone Service was started to connect Mumbai and London directly on phone.
- Apart from this the telephone service, services like telex, teleprinter and radio images were also started.
- VSNL and MTNL are two public sector companies in telecommunication.
- In the 1990s, Videsh Sanchar Nigam Limited was the main internet service provider in India.

Answer 6

- (1) The line demarcating the boundary between India and China is McMahon line.
- (2) The principle of sustainable development was stressed at environmental conference held at <u>Rio de Janeiro</u>.

Answer 7

- (1) The statement is false. It is because China is a permanent member of the Security Council. If even one of the five permanent member uses its veto i.e., gives a negative vote, the decision cannot be taken.
- (2) True. India is the biggest country in the Indian subcontinent. She is also economically and technologically more advanced. Thus, India has an important position among the South Asian countries.
- (3) The statement is false. The aim of a terrorist attack is not to endanger the geographical boundaries but to challenge a regime in a country or their refusal to acknowledge the existence of the State.

Answer 8

(1) **Secretariat**: It is one of the organs of the United Nations. It has the responsibility of carrying out the administrative tasks of the United Nations. The Secretary General is the chief of the Secretariat. Some functions of the Secretariat is to organise the meetings of the General Assembly and Security Council and to compile and supply information to the media.

(2) **SAARC**: SAARC is South Asian Association for Regional Cooperation. It is an international organisation established by South Asian nations to ensure the development of the region. SAARC is a platform where South Asian countries come together and discuss common questions and areas of interests.


Sample Paper 1- Semester 2 (2023)







Answer 9

- (1) Relations between India and America
 - India and America are two powerful democratic systems and the latter has been an important trading partner of India. Many Indians have migrated to America for education
 - After the Cold War, the military relations between both countries have improved tremendously. India's adoption of free market economy has further strengthened economic relations.
 - There was a brief tension after India conducted nuclear tests in 1998. Many discussions were held to normalise the relations between both nations. Later, America was convinced that India will use nuclear weapons for peaceful purposes.
 - The Civil Nuclear Agreement signed in 2005 that was approved by the U.S. Congress in 2008 was an important landmark in Indo-American relations.



Sample Paper 1- Semester 2 (2023)

- (2) The role of the Peacekeeping Forces of the United Nations:
 - The peacekeeping activities of the UNO involves creating situations favourable for bringing about peace in troubled areas.
 - The UN peacekeeping force help these areas to progress towards peace. In conflict ridden areas, security is provided and help is extended for establishing harmony.
 - It works completely towards maintaining peace and security in the world.