

Guidelines for the preparation of MATHEMATICS Question Papers for 9th and 10th Classes

- ❖ In Mathematics 80 marks were allotted for Summative Assessment Question paper.
- ❖ In Summative Assessment Question paper there will be Two parts, i.e. Part-A; and Part-B.
- ❖ Part-A and Part-B contains different types of questions as shown below:

	Types of Questions	Number of questions	Questions to be answered	Marks for each question	Total Marks	Allotted Time
Part-A	Very Short Answer Question	6	6	02	12	TWO HOURS THIRTY MINUTES 2 hr. 30 Min.
	Short Answer Question	6	6	04	24	
	Essay type Questions	6	4	06	24	
Part-B	Multiple Choice Questions [MCQ]	20	20	01	20	30 Minutes
TOTAL		18+20MCQ	16+20MCQ	-	80 Marks	3 hours

Important Note:

- ❖ Prepare question paper for 80 marks.
- ❖ The total marks allotted for Part-A is **60**.
- ❖ The allotted time for Part-A is **TWO HOURS THIRTY MINUTES**
- ❖ The total marks allotted for Part-B is **20**.
- ❖ The allotted time for Part-B is **Thirty Minutes**
- ❖ Question paper should be prepared based on the **Academic Standards**
- ❖ The Academic Standards weightage is shown in the following table:

S. No.	Academic Standards.	Percentage	Marks	VSAQ	SAQ	Essay	MCQ	TOTAL Marks
1	Problem Solving	40%	37					37
2	Reasoning and proof	20%	18					18
3	Communication	10%	09					09
4	Connection	15%	14					14
5	Visualization and representation	15%	14					14
TOTAL		100%	80 M (+12M choice)	6Q (12 Marks)	6Q (24 Marks)	6Q (24 Marks +12M choice)	20 Q (20 Marks)	80 M (+12M choice)

Important Note:

- Question should be prepared as per the weightage of Academic Standards.
- There should be no deviation in Academic Standards, Problem Solving, Reasoning and Proof.
- There may be small deviation means upto 5% in Academic Standards, Communication, Connections and Visualization and Representation.

PART- A:

- ❖ The **Part-A** question Paper contains **THREE** sections. The **First section** includes **SIX very short answer type questions**, answer ALL of them. Each question carries **2 marks** and the total **marks** allotted to this section are **12**. The Solutions for these problems should be in general to **3-4 Steps**.
- ❖ The **Second section** includes **SIX short answer type questions**, answer ALL of them. Each question carries **4 marks** and the total **marks** allotted to this section are **24**. The Solutions for these problems should be in general to **5-6 Steps**.
- ❖ The **Third section** includes **SIX Essay type questions**, Answer any 4 out of 6 questions. Each question carries **6 marks** and the total **marks** allotted to this section are **24**. The Solutions for these problems should be in general to **8-10 Steps**.

PART- B:

- ❖ The **Part-B** Paper contains **TWENTY Multiple Choice Questions**, each question carries **1 mark** and the total marks allotted to this part are 20.
Marks will not be awarded for OVERWRITING, CORRECTED and ERASED answers.
- ❖ In MCQ questions, options such as All of the above, none of the above and both A and B should not be given.

General Instructions:

- ❖ Care should be taken while preparing question paper in such a way that questions must be given from **ALL allotted Units/ Lessons**, but there is **NO need to give unit/lesson-wise weightage in the question paper**.
- ❖ All questions in the question paper should be thought provoking, open ended, analytical. **Rote memory questions should be avoided in the question paper. The questions should test the understanding level of the student.**
- ❖ All questions should be without any ambiguity and they should be clear with objectivity.
- ❖ Sub-questions should not be given in the question paper. If it is needed can be given only for **ONE QUESTION**.
- ❖ The length of the Solution must be kept in mind while preparing different types of problems.
- ❖ While preparing question paper, avoid problems from the text book as it is, Can take those problems by changing their nature of questioning.
- ❖ The entire question paper should be prepared in such a way that 50% questions easy, 30% questions are average and the remaining 20% questions are of higher order thinking.

Mathematics – X E/M

Blue Print for this Model Paper

Sl. No.	Academic Standards.	Percentage	Marks	VSAQ (2)	SAQ (4)	Essay (6)	MCQ (1)	TOTAL Marks
1	Problem Solving	40%	37	2(4M)	2(8M)	2(12M)	13(13M)	37
2	Reasoning and proof	20%	18	2(4M)	1(4M)	1(6M)	4(4M)	18
3	Communication	10%	09	1(2M)	1(4M)	-	3(3M)	09
4	Connection	15%	14	-	2(8M)	1(6M)	-	14
5	Visualization and representation	15%	14	1(2M)	-	2(12M)	-	14
TOTAL		100%	80 M (+12M choice)	6Q (12 Marks)	6Q (24 Marks)	6Q (24 Marks +12M choice)	20 Q (20 Marks)	80 M (+12M choice)

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MATHEMATICS
Model Paper

Time: 3 hours

Max. Marks: 80

Instructions:

1. Answer all the questions under Part-A on a separate answer book.
2. Write the answers to the questions under Part-B on the question paper itself and attach it to the answer book of Part-A.

PART-A

Time: 2½ hours

Marks: 60

SECTION – I

(Marks: 6×2 = 12)

Note: (i) Answer ALL the following questions.

(ii) Each question carries 2 marks.

1. If $A = \{x: x \in N, x < 5\}$ and $B = \{x: x \in N, 2 < x < 7\}$ then draw Venn diagram for $A \cup B$.
2. Check whether the given pair of linear equations $x + 2y - 4 = 0$ and $2x + 4y - 12 = 0$ is intersecting lines or parallel lines.
3. Give one example each for an Arithmetic progression and a Geometric progression.
4. Find the probability of getting a 'vowel' if a letter is chosen randomly from English alphabet.
5. Find the volume of a Sphere whose radius is 2.8 cm
6. If $A = 60^\circ$, $B = 30^\circ$, then is it right to say $\sin(A+B) = \sin A + \sin B$?

SECTION – II

(Marks: 6×4 = 24)

Note: (i) Answer ALL the following questions.

(ii) Each question carries 4 marks.

7. If $\log(1+\tan\theta+\sec\theta) + \log(1+\cot\theta-\operatorname{cosec}\theta) = \log k$ ($0^\circ < \theta < 90^\circ$) then find the value of k.
8. Write the formula for mode of a grouped data and explain each term of it.

9. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 100m high, then find the height of the building.
10. Prove that $x^2 + 2x + 1$ divides $x^4 - 2x^3 - 4x^2 + 2x + 3$ exactly.
11. In a circle of radius 3.5cm, a chord subtends a right angle at the centre. Find the area of the corresponding major segment (Take $\pi = \frac{22}{7}$)
12. Find the area of the triangle whose vertices are (5, 2) (3, -5) and (-3, -4).

SECTION – III

(Marks: $4 \times 6 = 24$)

- Note: (i) Answer any 4 of the following questions.
(ii) Each question carries 6 marks.

13. Find mean for the following data.

CI	60-70	70-80	80-90	90-100	100-110	110-120	120-130
f	2	5	12	31	36	10	4

14. Prove that $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$
15. Solve $\frac{2}{x-1} + \frac{3}{y+1} = 2$ and $\frac{3}{x-1} + \frac{2}{y+1} = \frac{13}{6}$ where $x \neq 1, y \neq -1$
16. A metallic vessel is in the shape of a right circular cylinder mounted over a hemisphere. The common diameter is 56cm and the height of the cylindrical part is 21cm. Find the capacity of the vessel (Take $\pi = \frac{22}{7}$)
17. Solve the equations graphically $3x + 4y = 10$ and $4x - 3y = 5$
18. Draw a circle of radius 5cm. From a point 9cm away from its centre, construct a pair of tangents to the circle.

PART-B

Time: 30 minutes

Marks : 20

Note: (i) Answer all the questions

(ii) Each question carries 1 mark

(iii) Answers are to be written in Question paper only

(iv) Marks will not be awarded in any case of over writing, rewriting or erased answers.

Note: Write the capital letters (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.

Marks $20 \times 1 = 20$

1. The value of k for which the system of equations $4x + y = 3$ and $8x + 2y = 5k$ has infinite solutions is ()
(A) $\frac{-5}{6}$ (B) $\frac{-6}{65}$ (C) $\frac{5}{6}$ (D) $\frac{6}{5}$
2. Among the following, a statement that is NOT true is ()
(A) $\sin \theta = \sqrt{1 - \cos^2 \theta}$ (B) $\sec^2 \theta - \tan^2 \theta = 1$
(C) $\cos \theta \cdot \operatorname{cosec} \theta = 1$ (D) $\tan \theta \cdot \cot \theta = 1$
3. The logarithmic form of $7 = 3^x$ is ()
(A) $\log_3 x = 7$ (B) $\log_7 3 = x$ (C) $\log_7 x = 3$ (D) $\log_3 7 = x$
4. The decimal form of $\frac{3}{8}$ is ()
(A) 3.75 (B) 0.365 (C) 0.375 (D) 0.0375
5. If 72, 63, 54, ..., is an Arithmetic progression, then the term that becomes zero in it is ()
(A) 11^{th} (B) 10^{th} (C) 9^{th} (D) 8^{th}
6. The equal set of $A = \{x : x \text{ is a letter of the word "FOLLOW"}\}$ is ()
(A) $\{f, o, l, l, o, w\}$ (B) $\{f, o, l, l, w\}$ (C) $\{f, l, o, w\}$ (D) $\{f, o, l, o, w\}$
7. If $n(A-B) = 5$, $n(B-A) = 7$ and $n(A \cap B) = 3$ then $n(A \cup B)$ is ()
(A) 9 (B) 12 (C) 10 (D) 15
8. Among the following, the value which is not possible for the probability of an event is ()
(A) $\frac{1}{3}$ (B) 0.5 (C) 25% (D) $\frac{4}{3}$
9. Among the following, a linear polynomial is ()
(A) $3x^2 + 2x - 4$ (B) $2x + 3$ (C) 5 (D) $x^3 - 3x^2 + 7$
10. If $p(x) = x^2 - 2x + 2$ then the value of $p(0)$ is ()
(A) 4 (B) 0 (C) 2 (D) -2

11. The value of Discriminant of $x^2 + x + 1 = 0$ is ()
 (A) 3 (B) 4 (C) -4 (D) -3
12. A quadratic equation whose roots are -2 and -3 is ()
 (A) $x^2 - 5x - 6 = 0$ (B) $x^2 + 5x + 6 = 0$ (C) $x^2 + 5x - 6 = 0$ (D) $x^2 - 5x + 6 = 0$
13. If the product of the first 5 terms of a Geometric progression is 243, then its third term is ()
 (A) 9 (B) 27 (C) 3 (D) 1
14. LCM of numbers $2^7 \times 3^4 \times 7$ and $2^3 \times 3^4 \times 11$ is ()
 (A) $2^3 \times 3^4$ (B) $2^7 \times 3^4$
 (C) $2^7 \times 3^4 \times 7 \times 11$ (D) $2^3 \times 3^4 \times 7 \times 11$
15. In an Arithmetic progression n^{th} term is $a_n = a + (n - 1)d$. In this formula "d" represents ()
 (A) Number of terms (B) n^{th} term
 (C) First term (D) Common difference
16. If $\sin A = \cos A$ ($0^\circ < A < 90^\circ$), then the value of $1 + \tan A$ is ()
 (A) 1 (B) 3
 (C) 2 (D) 0
17. If the radius of a cylinder is doubled and its height is halved, then the volume of the new cylinder formed is ()
 (A) 4 times the volume of the first cylinder
 (B) 3 times the volume of the first cylinder
 (C) 2 times the volume of the first cylinder
 (D) Volume remains the same
18. E and $\bar{E}$ are two complementary events in a random experiment. If $P(\bar{E}) = 0.07$ then the value of $P(E)$ is ()
 (A) 0.3 (B) 0.93 (C) 0.03 (D) 0.83
19. The mean of 9 observations is 45. In doing so, if an observation was wrongly taken as 42 for 24, then the correct mean of the data is ()
 (A) 34 (B) 43 (C) 37 (D) 45
20. Base radii and heights of a cylinder and a cone are equal. If the volume of cone is 9 cubic units, then the volume of the cylinder is ()
 (A) 27 cubic-units (B) 18 cubic-units (C) 9 cubic-units (D) 36 cubic-units

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