SAMPLE CONTENT

2859 MCQs

20 YEARS

PREVIOUS SOLVED PAPERS

2004 – 2023

MHT-CET

CHAPTER-WISE & TOPIC-WISE

MATHEMATICS

- Quick Review
- Smart Keys
- Statistical analysis of all the shifts of 2023

Target Publications® Pvt. Ltd.

20 YEARS
2004 - 2023

MHT-CET

PREVIOUS SOLVED PAPERS

MATHEMATICS

Chapter-wise & Topic-wise

Salient Features

- A compilation of 20 years of MHT-CET questions ***(2004-2023)*** that aligns with the most recent MHT CET syllabus
- **'2859'** unique MCQs
- Chapter-wise and Topic-wise segregation of MCQs
- MCQs arranged in year-wise flow in each topic
- Quick Review provided for the revision of concepts
- Includes Important Study Techniques for holistic learning:
  - Thinking Hatke
  - Caution
  - Shortcuts
- Solutions provided wherever required
- Trend analysis of all the shifts of MHT-CET 2023 examination in the form of:
  - Graphs of difficulty levels of each shift
  - Tables of Chapter-wise analysis of all shifts

Printed at: **India Printing Works,** Mumbai

P.O. No. 10904

TEID: 3295

PREFACE

Target's **'MHT-CET Mathematics : Previous Solved Papers (PSP)'** is a compilation of past 20 years' (2004-2023) questions asked in the MHT-CET examinations conducted by State Common Entrance Test Cell, Maharashtra State. This book is curated as per the **latest MHT-CET syllabus**.

The book consists of chapter-wise categorization of questions. Each chapter goes with a topic-wise flow. All the questions pertaining to a topic are arranged year-wise in a flow that concludes with the latest year. A special topic **Concept fusion** is drafted at the end of the MCQ section to cover multifarious questions. We have provided answers to all the questions and detailed solutions are given wherever required. The solutions will serve as valuable learning tools in understanding the concepts.

Selection of **unique MCQs** is prioritized while making this book to prevent the recurrence of identical questions. This will enable students to save time spent on repetitive questions.

We have infused several **Smart Keys** such as **Cautions, Thinking Hatke and Shortcuts**. These Important Study Techniques are created to help students with key objectives such as time management, easy memorization, revision and non-conventional yet simple methods for MCQ solving. To ensure adequate revision, each chapter begins with a **Quick review**.

A statistical analysis of the number of questions asked per chapter in each shift of MHT-CET 2023 examination is offered in tabular form. This analysis would help students understand the weighting allotted to each chapter. A graphical representation of analysis of all the papers (12 papers of PCM group) is also included at the start of the book to elaborate on the breakdown of the difficulty level of questions asked in the examination. Studying these representations should undoubtedly aid students in planning their study strategy for the examination. *There is a possibility that the weightage to a chapter and the level of difficulty of the question paper in the future examination may vary.*

This book would provide students with confidence regarding their exam preparedness. We are confident that this book will comprehensively cater to the needs of students and effectively assist them to achieve their goal.

Publisher

Edition: First

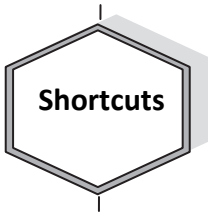
The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

Please write to us on : mail@targetpublications.org

A book affects eternity; one can never tell where its influence stops.

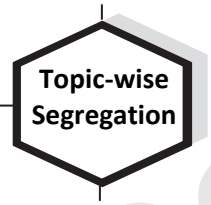
FEATURES

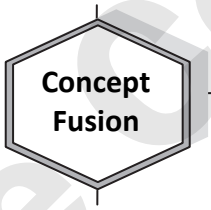
Quick Review includes tables/charts to summarize the key points of important concepts in the chapter. This is our attempt to help students to reinforce key concepts.



Shortcuts incorporate important theoretical or formula based short tricks, beneficial in solving MCQs.

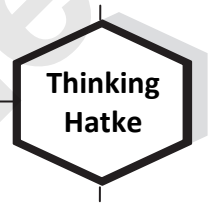
MCQs are **segregated topic-wise** in each chapter**.** This is our attempt to cater to individualistic pace and preferences of studying a chapter in students and enable easy assimilation of questions based on the specific concept.

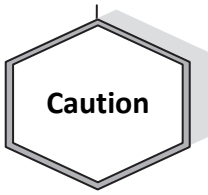




Concept Fusion topic encompasses questions whose solutions require knowledge of concepts covered in different topics from same chapter or from different chapters.

Thinking Hatke reveals quick witted approach to crack the specific question.





Caution apprises students about mistakes often made while solving MCQs.

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MHT-CET PAPER PATTERN

- There will be three papers of Multiple Choice Questions (MCQs) in 'Mathematics', 'Physics and Chemistry' and 'Biology' of 100 marks each.
- Duration of each paper will be 90 minutes.
- Questions will be based on the syllabus prescribed by Maharashtra State Board of Secondary and Higher Secondary Education with approximately 20% weightage given to Std. XI and 80% weightage will be given to Std. XII curriculum.
- Difficulty level of questions will be at par with JEE (Main) for Mathematics, Physics, Chemistry and at par with NEET for Biology.
- There will be no negative marking.
- Questions will be mainly application based.
- Details of the papers are as given below:

Paper	Subject	Approximate No. of Multiple Choice Questions (MCQs) based on		Mark(s) Per Question	Total Marks
		Std. XI	Std. XII		
Paper I	Mathematics	10	40	2	100
Paper II	Physics	10	40	1	100
	Chemistry	10	40		
Paper III	Biology	20	80	1	100

- Questions will be set on
  i. the entire syllabus of Std. XII of Physics, Chemistry, Mathematics and Biology subjects prescribed by Maharashtra Bureau of Textbook Production and curriculum Research, Pune, and
  ii. chapters / units from Std. XI curriculum as mentioned below:

Sr. No.	Subject	Chapters / Units of Std. XI
1	Physics	Motion in a plane, Laws of motion, Gravitation, Thermal properties of matter, Sound, Optics, Electrostatics, Semiconductors
2	Chemistry	Some Basic Concepts of Chemistry, Structure of Atom, Chemical Bonding, Redox Reactions, Elements of Group 1 and Group 2, States of Matter: Gaseous and Liquid States, Basic Principles of Organic Chemistry, Adsorption and Colloids, Hydrocarbons
3	Mathematics	Trigonometry - II, Straight Line, Circle, Measures of Dispersion, Probability, Complex Numbers, Permutations and Combinations, Functions, Limits, Continuity
4	Biology	Biomolecules, Respiration and Energy Transfer, Human Nutrition, Excretion and osmoregulation

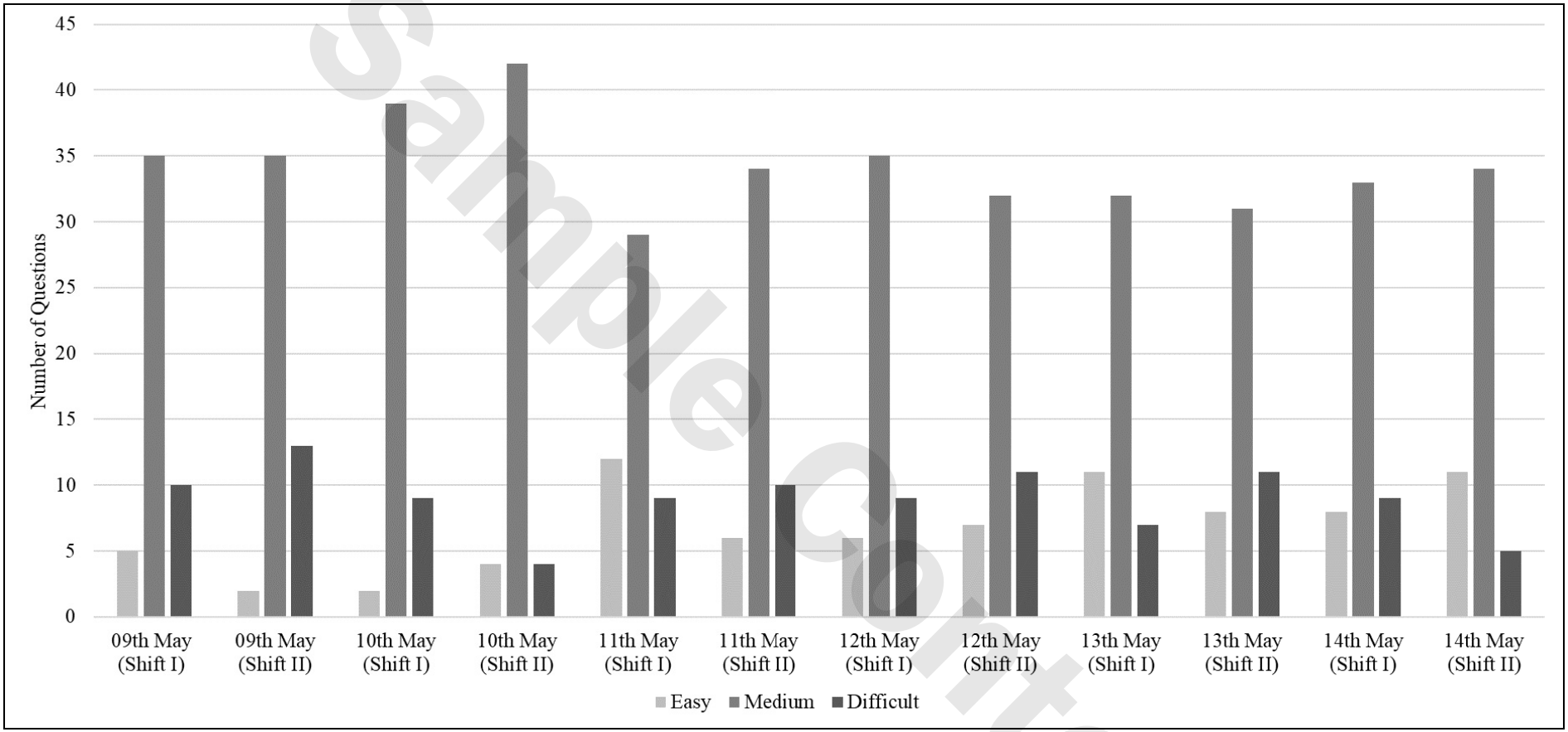
MATHEMATICS

Chapter-wise Analysis of MHT-CET 2023 Exam Papers (PCM Group)

Ch. No.	Std.	Part	Chapter Name	09th May Shift I	09th May Shift II	10th May Shift I	10th May Shift II	11th May Shift I	11th May Shift II	12th May Shift I	12th May Shift II	13th May Shift I	13th May Shift II	14th May Shift I	14th May Shift II	Total
3	11th	I	Trigonometry-II	1	1	1	1	1	1	1	1	1	1	1	1	12
5	11th	I	Straight line	1	1	1	1	1	1	1	1	1	1	1	1	12
6	11th	I	Circle	1	1	1	1	1	1	1	1	1	1	1	1	12
8	11th	I	Measures of Dispersion	1	1	1	1	1	1	1	1	1	1	1	1	12
9	11th	I	Probability	1	1	1	1	1	1	1	1	1	1	1	1	12
1	11th	II	Complex Numbers	1	1	1	1	1	1	1	1	1	1	1	1	12
3	11th	II	Permutations and Combinations	1	1	1	1	1	1	1	1	1	1	1	1	12
6	11th	II	Functions	1	1	1	1	1	1	1	1	1	1	1	1	12
7	11th	II	Limits	1	1	1	1	1	1	1	1	1	1	1	1	12
8	11th	II	Continuity	1	1	1	1	1	1	1	1	1	1	1	1	12
1	12th	I	Mathematical Logic	2	2	2	2	1	2	2	2	2	2	2	2	23
2	12th	I	Matrices	1	1	1	1	2	1	1	1	1	1	1	1	13
3	12th	I	Trigonometric Functions	5	5	5	5	5	5	5	6	5	5	4	5	60
4	12th	I	Pair of straight Lines	0	1	1	1	2	1	1	1	1	1	1	1	12
5	12th	I	Vectors	7	6	7	7	8	6	5	6	6	6	6	5	75
6	12th	I	Line and Plane	3	4	3	3	3	4	5	4	4	4	4	4	45
7	12th	I	Linear Programming	1	1	1	1	1	1	1	1	1	1	1	1	12
1	12th	II	Differentiation	3	3	3	3	4	3	3	3	3	3	3	3	37
2	12th	II	Applications of Derivatives	6	6	5	5	4	5	5	5	3	5	4	6	59
3	12th	II	Indefinite Integration	5	4	4	4	3	4	4	3	4	4	6	4	49
4	12th	II	Definite Integration	0	1	1	1	2	0	1	1	1	1	1	1	11
5	12th	II	Application of Definite Integration	1	1	1	1	1	2	1	1	1	1	1	1	13
6	12th	II	Differential Equations	2	2	3	3	2	3	3	3	4	3	3	3	34
7	12th	II	Probability Distributions	2	2	2	2	1	2	2	2	2	2	2	2	23
8	12th	II	Binomial Distribution	2	1	1	1	1	1	1	1	2	1	1	1	14
			Total	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**600**

MATHEMATICS

Difficulty level-wise Analysis of MHT-CET 2023 Exam Papers (PCM Group)



E – Easy: Questions whose answers can be directly and easily answered by the information given in Std. XI and XII Textbooks.
M – Medium: These questions require students to identify and apply the appropriate concepts which they studied from Std. XI and XII Textbooks.
D – Difficult: The most Challenging Questions that require application of various concepts and encourage students to think beyond the information given in the textbooks.

Analysis

- **Analysis of questions by difficulty level:** While the distribution of easy, medium, and difficult questions varies among the twelve papers, a notable trend is the prevalence of medium-level questions, with a smaller number of both difficult and easy questions.
  This suggests that the entrance exam places a strong emphasis on the comprehension and practical application of concepts. Students are encouraged to approach their preparation by meticulously studying the chapters, with a particular focus on effectively applying formulas and concepts in order to excel in the entrance exam.

Chapter

3 Trigonometry - II

Quick Review

	Trigonometric functions of sum and difference of two angles	Formulae
i.	**sin (A + B)**	$\sin A \cos B + \cos A \sin B$
ii.	**sin (A – B)**	$\sin A \cos B - \cos A \sin B$
iii.	**cos (A + B)**	$\cos A \cos B - \sin A \sin B$
iv.	**cos (A – B)**	$\cos A \cos B + \sin A \sin B$
v.	**tan (A + B)**	$\frac{\tan A + \tan B}{1 - \tan A \tan B}$
vi.	**tan (A – B)**	$\frac{\tan A - \tan B}{1 + \tan A \tan B}$
vii.	**cot (A + B)**	$\frac{\cot A \cot B - 1}{\cot A + \cot B}$
viii.	**cot (A – B)**	$\frac{\cot A \cot B + 1}{\cot B - \cot A}$
ix.	**sin(A + B) sin(A – B)**	$= \sin^2 A - \sin^2 B$ $= \cos^2 B - \cos^2 A$
x.	**cos(A + B) cos(A – B)**	$= \cos^2 A - \sin^2 B$ $= \cos^2 B - \sin^2 A$

➢ **Trigonometric functions of sum and difference of three angles:**

i. $\sin (A + B + C) = \sin A \cos B \cos C + \cos A \sin B \cos C + \cos A \cos B \sin C - \sin A \sin B \sin C$

or

$\sin (A + B + C) = \cos A \cos B \cos C (\tan A + \tan B + \tan C - \tan A \tan B \tan C)$

ii. $\cos (A + B + C) = \cos A \cos B \cos C - \sin A \sin B \cos C - \sin A \cos B \sin C - \cos A \sin B \sin C$

or

$\cos (A + B + C) = \cos A \cos B \cos C (1 - \tan A \tan B - \tan B \tan C - \tan C \tan A)$

iii. $\tan (A + B + C) = \frac{\tan A + \tan B + \tan C - \tan A \tan B \tan C}{1 - \tan A \tan B - \tan B \tan C - \tan C \tan A}$

iv. $\cot (A + B + C) = \frac{\cot A \cot B \cot C - \cot A - \cot B - \cot C}{\cot A \cot B + \cot B \cot C + \cot C \cot A - 1}$

➢ **Formulae to convert sum or difference into product:**

i.	**sin C + sin D**	$2\sin\frac{C+D}{2}\cos\frac{C-D}{2}$
ii.	**sin C – sin D**	$2\cos\frac{C+D}{2}\sin\frac{C-D}{2}$
iii.	**cos C + cos D**	$2\cos\frac{C+D}{2}\cos\frac{C-D}{2}$
iv.	**cos C – cos D**	$=2\sin\frac{C+D}{2}\sin\frac{D-C}{2}$ $=-2\sin\frac{C+D}{2}\sin\frac{C-D}{2}$

➢ **Formulae to convert product into sum or difference:**

i.	**2 sin A cos B**	sin(A + B) + sin(A – B)
ii.	**2 cos A sin B**	sin(A + B) – sin(A – B)
iii.	**2 cos A cos B**	cos(A + B) + cos(A – B)
iv.	**2 sin A sin B**	cos(A – B) – cos(A + B)

➢ **Trigonometric functions of angles of a triangle:**

i. If A, B, C are the angles of a triangle ABC, then $A + B + C = \pi$

a. $\sin(B + C) = \sin(\pi - A) = \sin A$
$\sin(C + A) = \sin B$
$\sin(A + B) = \sin C$

b. $\cos(B + C) = \cos(\pi - A) = -\cos A$
$\cos(C + A) = -\cos B$
$\cos(A + B) = -\cos C$

c. $\tan(B + C) = \tan(\pi - A) = -\tan A$
$\tan(C + A) = -\tan B$
$\tan(A + B) = -\tan C$

ii. If $A + B + C = \pi$, then $\frac{A+B}{2} = \frac{\pi}{2} - \frac{C}{2}$,

$\frac{C+A}{2} = \frac{\pi}{2} - \frac{B}{2}$ and $\frac{B+C}{2} = \frac{\pi}{2} - \frac{A}{2}$

a. $\sin\left(\frac{A+B}{2}\right) = \sin\left(\frac{\pi}{2} - \frac{C}{2}\right) = \cos\frac{C}{2}$

$\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$

$\sin\left(\frac{C+A}{2}\right) = \cos\frac{B}{2}$

b. $\cos\left(\frac{A+B}{2}\right) = \sin\frac{C}{2}$

$\cos\left(\frac{B+C}{2}\right) = \sin\frac{A}{2}$

$\cos\left(\frac{C+A}{2}\right) = \sin\frac{B}{2}$

➢ **Some Important results:**

i. $\sin 15° = \frac{\sqrt{3}-1}{2\sqrt{2}}$

ii. $\cos 15° = \frac{\sqrt{3}+1}{2\sqrt{2}}$

iii. $\sin 18° = \frac{\sqrt{5}-1}{4}$

iv. $\cos 36° = \frac{\sqrt{5}+1}{4}$

Shortcuts

1. $\sin n\pi = 0, \cos n\pi = (-1)^n$

2. i. $\sin(n\pi + \theta) = (-1)^n \sin\theta$
ii. $\cos(n\pi + \theta) = (-1)^n \cos\theta$
iii. $\sin(n\pi - \theta) = (-1)^{n-1} \sin\theta$
iv. $\cos(n\pi - \theta) = (-1)^n \cos\theta$

3. $\sin\left(\frac{n\pi}{2} + \theta\right) = (-1)^{\frac{n-1}{2}} \cos\theta$, if n is odd

$= (-1)^{\frac{n}{2}} \sin\theta$, if n is even

4. $\cos\left(\frac{n\pi}{2} + \theta\right) = (-1)^{\frac{n+1}{2}} \sin\theta$, if n is odd

$= (-1)^{\frac{n}{2}} \cos\theta$, if n is even

5. $\left|\sin\frac{A}{2} + \cos\frac{A}{2}\right| = \sqrt{1 + \sin A}$

or $\sin\frac{A}{2} + \cos\frac{A}{2} = \pm\sqrt{1 + \sin A}$

i.e., $\begin{cases} +\text{ve}, \text{ if } 2n\pi - \frac{\pi}{4} \le \frac{A}{2} \le 2n\pi + \frac{3\pi}{4} \\ -\text{ve, otherwise} \end{cases}$

6. $\left|\sin\frac{A}{2} - \cos\frac{A}{2}\right| = \sqrt{1 - \sin A}$

or $\sin\frac{A}{2} - \cos\frac{A}{2} = \pm\sqrt{1 - \sin A}$

i.e., $\begin{cases} +\text{ve}, \text{ if } 2n\pi + \frac{\pi}{4} \le \frac{A}{2} \le 2n\pi + \frac{5\pi}{4} \\ -\text{ve, otherwise} \end{cases}$

7. $\tan x.\ \tan 2x.\ \tan 3x = \tan 3x - \tan 2x - \tan x$

8. $\tan 2\alpha.\ \tan 3\alpha.\ \tan 5\alpha = \tan 5\alpha - \tan 3\alpha - \tan 2\alpha$

9. $\frac{1-\cos\theta}{\sin\theta} = \tan\frac{\theta}{2}$, where $\theta \neq (2n+1)\pi$

10. $\frac{1+\cos\theta}{\sin\theta} = \cot\frac{\theta}{2}$, where $\theta \neq 2n\pi$

11. $\frac{1-\cos\theta}{1+\cos\theta} = \tan^2\frac{\theta}{2}$, where $\theta \neq (2n+1)\pi$

12. $\frac{1+\cos\theta}{1-\cos\theta} = \cot^2\frac{\theta}{2}$, where $\theta \neq 2n\pi$

13. $\cos\alpha.\ \cos 2\alpha.\ \cos 2^2\alpha.\ \cos 2^3\alpha \ldots\ldots \cos 2^{n-1}\alpha$

$= \frac{\sin 2^n\alpha}{2^n \sin\alpha}$, if $\alpha \neq n\pi$

$= 1$, if $\alpha = 2n\pi$

$= -1$, if $\alpha = (2n+1)\pi$

14. i. $\tan(45° + \theta) = \frac{1+\tan\theta}{1-\tan\theta} = \frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}$

ii. $\tan(45° - \theta) = \frac{1-\tan\theta}{1+\tan\theta} = \frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta}$

15. Maximum and minimum values of

$a\cos\theta + b\sin\theta$ are $\sqrt{a^2+b^2}$ and $-\sqrt{a^2+b^2}$

i.e., $-\sqrt{a^2+b^2} \leq a\cos\theta + b\sin\theta \leq \sqrt{a^2+b^2}$

16. $\sin\alpha + \sin(\alpha+\beta) + \sin(\alpha+2\beta) + \ldots\ldots + \sin[\alpha+(n-1)\beta]$

$= \frac{\sin\left[\alpha+\left(\frac{n-1}{2}\right)\beta\right]}{\sin\frac{\beta}{2}} \cdot \sin\frac{n\beta}{2}$

If $\beta = \alpha$, then

$\sin\alpha + \sin 2\alpha + \sin 3\alpha + \ldots.. + \sin n\alpha$

$= \frac{\sin\left(\frac{n+1}{2}\right)\alpha.\sin\frac{n\alpha}{2}}{\sin\left(\frac{\alpha}{2}\right)}$

17. $\cos\alpha + \cos(\alpha+\beta) + \cos(\alpha+2\beta) + \ldots\ldots + \cos[\alpha+(n-1)\beta]$

$= \frac{\cos\left[\alpha+(n-1)\frac{\beta}{2}\right].\sin\left(\frac{n\beta}{2}\right)}{\sin\frac{\beta}{2}}$

If $\beta = \alpha$, then

$\cos\alpha + \cos 2\alpha + \cos 3\alpha + \ldots\ldots + \cos n\alpha$

$= \frac{\cos\left(\frac{n+1}{2}\right)\alpha.\sin\left(\frac{n\alpha}{2}\right)}{\sin\left(\frac{\alpha}{2}\right)}$

18. $\sin\theta \sin(60° - \theta) \sin(60° + \theta) = \frac{1}{4}\sin 3\theta$

19. $\cos\theta \cos(60° - \theta) \cos(60° + \theta) = \frac{1}{4}\cos 3\theta$

20. $\tan\theta \tan(60° - \theta) \tan(60° + \theta) = \tan 3\theta$

21. If $A + B + C = 180°$, then

i. $\sin 2A + \sin 2B + \sin 2C = 4\sin A \sin B \sin C$

ii. $\cos 2A + \cos 2B + \cos 2C = -1 - 4\cos A \cos B \cos C$

iii. $\cos 2A + \cos 2B - \cos 2C = 1 - 4\sin A \sin B \cos C$

iv. $\sin A + \sin B + \sin C = 4\cos\frac{A}{2}\cos\frac{B}{2}\cos\frac{C}{2}$

v. $\cos A + \cos B + \cos C = 1 + 4\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}$

vi. $\cos A + \cos B - \cos C = -1 + 4\cos\frac{A}{2}\cos\frac{B}{2}\sin\frac{C}{2}$

vii. $\tan A + \tan B + \tan C = \tan A \tan B \tan C$

viii. $\cot A \cot B + \cot B \cot C + \cot C \cot A = 1$

ix. $\tan\frac{A}{2}\tan\frac{B}{2} + \tan\frac{B}{2}\tan\frac{C}{2} + \tan\frac{C}{2}\tan\frac{A}{2} = 1$

x. $\cot\frac{A}{2} + \cot\frac{B}{2} + \cot\frac{C}{2} = \cot\frac{A}{2}\cot\frac{B}{2}\cot\frac{C}{2}$

Multiple Choice Questions

3.1 Trigonometric functions of sum and difference of angles

1. If $2\sin\left(\theta+\frac{\pi}{3}\right) = \cos\left(\theta-\frac{\pi}{6}\right)$, then $\tan\theta =$ **[2018]**

(A) $\sqrt{3}$ (B) $-\frac{1}{\sqrt{3}}$

(C) $\frac{1}{\sqrt{3}}$ (D) $-\sqrt{3}$

2. $\cos(36° - A) \cdot \cos(36° + A) + \cos(54° + A) \cdot \cos(54° - A) =$ **[2019]**

(A) $\cos A$ (B) $\cos\frac{A}{2}$

(C) $\cos 2A$ (D) $\cos 3A$

3. If $\theta \in R$, then $\sin^6\theta + \cos^6\theta + 3\sin^2\theta\cos^2\theta =$ **[2019]**

(A) 3 (B) 1 (C) 8 (D) 2

Page no. **5** to **8** are purposely left blank.

To see complete chapter buy **Target Notes**

3.5 Trigonometric functions of angles of a triangle

1. If A, B, C are the angles of ΔABC then cot A · cot B + cot B · cot C + cot C · cot A = **[2018]**

(A) 0 (B) 1 (C) 2 (D) –1

2. In ΔABC, if tan A + tan B + tan C = 6 and tan A · tan B = 2 then tan C = **[2019]**

(A) 4 (B) 1 (C) 3 (D) 2

3. In ΔABC, with usual notations; if cos A = sin B – cos C, then cos A · cos C = **[2019]**

(A) $\frac{1}{4}$ (B) 0 (C) $\frac{1}{2}$ (D) $\frac{\sqrt{3}}{4}$

4. If A, B, C are angles of a ΔABC, then tan 2A + tan 2B + tan 2C = **[2020]**

(A) tan 2A tan 2B tan 2C
(B) tan A tan B tan C
(C) tan 3A tan 2B tan 2C
(D) tan 2A tan 3B tan 2C

5. If A, B, C, D are the angles of a cyclic quadrilateral taken in order, then cos A + cos B + cos C + cos D = **[2020]**

(A) –1 (B) $\frac{1}{2}$ (C) 0 (D) 1

6. If A + B + C = 180°, then the value of

$$\tan\left(\frac{A}{2}\right)\tan\left(\frac{B}{2}\right)+\tan\left(\frac{B}{2}\right)\tan\left(\frac{C}{2}\right)+\tan\left(\frac{C}{2}\right)\tan\left(\frac{A}{2}\right)$$

is **[2020]**

(A) 2 (B) 1 (C) –2 (D) –1

7. In a triangle ABC if $\frac{\sin A-\sin C}{\cos C-\cos A}=\cot B$, then A, B, C are in **[2020]**

(A) Harmonic progression
(B) Geometric progression
(C) Arithmetico-Geometric progression
(D) Arithmetic progression

Answers and Solutions to MCQs

3.1 Trigonometric functions of sum and difference of angles

1. (D)

$$2\sin\left(\theta+\frac{\pi}{3}\right)=\cos\left(\theta-\frac{\pi}{6}\right)$$

$$\Rightarrow 2\left(\sin\theta\cdot\cos\frac{\pi}{3}+\cos\theta\cdot\sin\frac{\pi}{3}\right)$$

$$=\cos\theta.\cos\frac{\pi}{6}+\sin\theta.\sin\frac{\pi}{6}$$

$$\Rightarrow 2\left(\frac{\sin\theta}{2}+\frac{\sqrt{3}}{2}\cos\theta\right)=\frac{\sqrt{3}}{2}\cos\theta+\frac{1}{2}\sin\theta$$

$$\Rightarrow \sin\theta+\sqrt{3}\cos\theta=0$$

$$\Rightarrow \tan\theta=-\sqrt{3}$$

2. (C)

$\cos(36^o - A)\cos(36^o + A)$
$+ \cos(54^o - A)\cos(54^o + A)$
$= \cos(36^o - A)\cos[90^o - (54^o - A)]$
$+ \cos(54^o - A)\cos[90^o - (36^o - A)]$
$= \sin(54^o - A)\cos(36^o - A)$
$+ \cos(54^o - A)\sin(36^o - A)$
$= \sin[(54^o - A) + (36^o - A)]$
$= \sin(90° - 2A) = \cos 2A$

3. (B)

$\sin^6\theta + \cos^6\theta + 3\sin^2\theta\cos^2\theta$
$= (\sin^2\theta)^3 + (\cos^2\theta)^3 + 3\sin^2\theta\cos^2\theta$
$= \{(\sin^2\theta + \cos^2\theta)[(\sin^2\theta)^2 - (\sin^2\theta)(\cos^2\theta)$
$+ (\cos^2\theta)^2]\} + 3\sin^2\theta\cos^2\theta$
$= [(1)(\sin^4\theta - \sin^2\theta\cos^2\theta + \cos^4\theta)]$
$+ 3\sin^2\theta\cos^2\theta$
$= \sin^4\theta + 2\sin^2\theta\cos^2\theta + \cos^4\theta$
$= (\sin^2\theta + \cos^2\theta)^2$
$= (1)^2 = 1$

4. (B)

$1 + \tan x = \sqrt{2} \Rightarrow \tan x = \sqrt{2} - 1$

$$\therefore \quad 1-\cot x = 1-\frac{1}{\tan x}$$

$$= 1-\frac{1}{\sqrt{2}-1}$$

$$= \frac{\sqrt{2}-2}{\sqrt{2}-1} = \frac{-\sqrt{2}\left(\sqrt{2}-1\right)}{\left(\sqrt{2}-1\right)} = -\sqrt{2}$$

5. (B)

$$\left(\sqrt{3}\sin 75°-\cos 75°\right)$$

$$= 2\left(\frac{\sqrt{3}}{2}\sin 75°-\frac{1}{2}\cos 75°\right)$$

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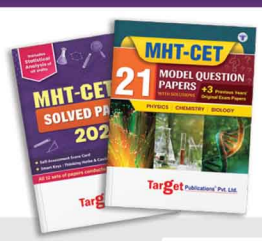

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