

TERM 2
MAR 2016
EXAMS

OSWAAL CBSE CCE QUESTION BANK

with complete solutions

MATHEMATICS

TERM 2
OCTOBER - MARCH 2016

Class
10

Examination Paper 2015 and
Toppers Answers of March 2014 Exam



SUMMATIVE & FORMATIVE ASSESSMENT

HIGHLIGHTS

- Strictly based on the 'Latest Design of the Question Paper' issued by CBSE for March 2016 Exams
- Questions from all sets of **CBSE (Delhi, Outside Delhi & Foreign)** from 2011 to 2015 Term 2 Examinations
- Summative Assessment Questions as per the latest design - VSA, Short & Long Answer Questions, Value Based & HOTS Questions
- Answers of **CBSE Marking Scheme 2011 to 2015** with detailed explanations as per the word limit specified by Board



FOR TERM 2
March 2016
EXAMS

 **OSWAAL**

CBSE Continuous and Comprehensive Evaluation (CCE)

QUESTION BANK

with complete solutions

MATHEMATICS

**SUMMATIVE & FORMATIVE
ASSESSMENT**

**Class
10**

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PREFACE

CBSE always believes in Global Trends of Educational Transformation. The CBSE curriculum gets its lead from National Curriculum Framework – 2005 and Right to Free and Compulsory Education Act – 2009. CBSE introduced CCE in the later half of 2009. CCE has been started to improve the quality of Education and was meant to lessen the burden of studies on Students. CCE stands for Continuous & Comprehensive Evaluation. The term 'Continuous' in CCE refers to periodicity and regularity in assessment and the term 'Comprehensive' refers to overall assessment of the learner, in both curricular & co curricular scheme of things.

These **Oswaal CCE Question Banks for Classes IX & X** have been written so as to supplement the need of the students to prepare for these progressive assessments at school during the entire year.

Oswaal CCE Question Bank has been divided into two sections: Summative Assessment (SA) & Formative Assessment (FA). In the Summative section, chapters are arranged 'TOPICWISE' where each topic is explained in detail and covers all typologies of Questions specified by CBSE, with well labelled diagrams and high quality figures/diagrams for fast learning. Answers from CBSE Marking scheme are highlighted in order to specify the correct method of answering questions for attaining maximum marks.

Formative section of the book will assist the students to prepare for the frequent class room based evaluation, both as an individual and as a group activity. The various formative techniques include Quizzes, Chapter assignment, Work sheets, Projects, Seminar, Symposium, Action Plans, etc. These activities have been elaborated by CBSE Board on www.cbse.nic.in. The students can read through all these components while revising a chapter to be always prepared for the surprise FA's in the class.

At last we would like to thank our authors, editors, reviewers and specially students who regularly send us suggestions which helps in continuous improvement of this book and makes this book stand in the category of "One of the Best". Wish you all Happy Learning.

–Publisher

SYLLABUS

Mathematics Class - X For Term II (October-March) COURSE STRUCTURE

SECOND TERM

Time : 3 Hours

Marks 90

UNITS	MARKS
II. ALGEBRA (Contd.)	23
III. GEOMETRY (Contd.)	17
IV. TRIGONOMETRY (Contd.)	08
V. PROBABILITY	08
VI. COORDINATE GEOMETRY	11
VII. MENSURATION	23
TOTAL	90

UNIT II : ALGEBRA (Contd.)

3. QUADRATIC EQUATIONS

(15) Periods

Standard form of a quadratic equation $ax^2 + bx + c = 0$, ($a \neq 0$). Solution of the quadratic equations (only real roots) by factorization, by completing the square and by using quadratic formula. Relationship discriminant and nature of roots.

Situational problems based on quadratic equations related to day to day activities to be incorporated.

4. ARITHMETIC PROGRESSIONS

(8) Periods

Motivation for studying Arithmetic Progression Derivation of the n^{th} term and sum of first n terms of A.P and their application in solving daily life problems.

UNIT III : GEOMETRY (Contd.)

2. CIRCLES

(8) Periods

Tangents to a circle at a point.

(i) **(Prove)** The tangent at any point of a circle is perpendicular to the radius through the point of contact.

(ii) **(Prove)** The lengths of tangents drawn from an external point to circle are equal.

3. CONSTRUCTIONS

(8) Periods

(i) Division of a line segment in a given ratio (internally).

(ii) Tangent to a circle from a point outside it.

(iii) Construction of a triangle similar to a given triangle.

UNIT IV : TRIGONOMETRY

3. HEIGHTS AND DISTANCES

(8) Periods

Simple problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only 30° , 45° , 60° .

UNIT V : STATISTICS AND PROBABILITY

2. PROBABILITY

(10) Periods

Classical definition of probability. Simple problems on single events (not using set notation).

UNIT VI : COORDINATE GEOMETRY

1. LINES (In two dimensions)

(14) Periods

Review : concepts of coordinate geometry graphs of linear equations. Distance between two points and section formula (internal Division). Area of a triangle.

UNIT VII : MENSURATION

1. AREAS RELATED TO CIRCLES

(12) Periods

Motivate the area of a circle; area of sectors and segments of a circle. Problems based on areas and perimeter / circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of 60° , 90° and 120° only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)

2. SURFACE AREAS AND VOLUMES

(12) Periods

- (i) Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/ cones. Frustum of a cone.
- (ii) Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids be taken.)

PRESCRIBED BOOKS :

1. Mathematics - Textbook for class X - NCERT Publication
2. Guidelines for Mathematics Laboratory in Schools, class X - CBSE Publication
3. A Handbook for Designing Mathematics Laboratory in Schools - NCERT Publication
4. Laboratory Manual - Mathematics, secondary stage - NCERT Publication
5. Mathematics - Exemplar Problems for class X - NCERT Publication

BOOST YOUR LEARNING

1



EXERCISE

Exercise optimizes your mindset, by improving alertness, attention, and motivation.

It prepares and encourages nerve cells to bind to one another, which is the cellular basis for learning new information.

It also spurs the development of new nerve cells in the hippocampus, an area of the brain related to memory and learning.

EAT RIGHT

Nuts, seeds and avocados provide antioxidants, blueberries help protect the brain and improve learning, wholegrains and pulses slow release energy to the brain, beans are rich in magnesium and improve blood flow and dark chocolate helps enhance focus and concentration.

2



3



LEARN MUSIC

One study showed that children who had extra-curricular music classes, developed higher verbal IQ, and visual abilities, in comparison to those with no musical training

SPACED REPETITION

Break up and distribute your study rather than doing it in a single block for better retentivity and recall.

4



5



CONTEXT

Vary your environment rather than sticking to the same study setting.

SLEEP

Sleep recharges the brain and improves concentration. While we sleep our brain strengthens and consolidates memories.

6



Question Paper Design For Mathematics

(CODE NO. 041) CLASS X (2015-16)

Time : 3 hours

Max. Marks : 90

S. No.	Typology of Questions	Very Short Answer (VSA) (1 Mark)	Short Answer - I (SA) (2 Marks)	Short Answer - II (SA) (3 Marks)	Long Answer (LA) (4 Marks)	Total Marks	% Weightage
1.	Remembering - (Knowledge based Simple recall questions, to know specific facts, terms, concepts, principles, or theories; Identify, define, or recite, information)	1	2	2	3	23	26%
2.	Understanding- (Comprehension -to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	1	1	4	23	26%
3.	Application (Use abstract information in concrete situation, to apply knowledge to new situations; Use given content to interpret a situation, provide an example, or solve a problem)	1	2	3	2	22	24%
4.	High Order Thinking Skills (Analysis & Synthesis - Classify, compare, contrast, or differentiate between different pieces of information; Organize and/or integrate unique pieces of information from a variety of sources)	-	1	4	1	14	16%
5.	Creating, Evaluation and Multi Disciplinary (Generating new ideas, product or - ways of viewing things Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	-	-	-	2*	8	8%
	Total	4 × 1 = 4	6 × 2 = 12	10 × 3 = 30	11 × 4 = 44	90	100%

*One of the LA (4 marks) will be to assess the values inherent in the texts.



Examination
PAPER

Summative Assessment -II
(2014 - 15)
Class-X

Mathematics
Code : UDICCY2

Time allowed : 3 Hours

Max. Marks : 80

General Instructions :

- (i) All questions are compulsory.
- (ii) The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each, Section-B comprises of 6 questions of 2 marks each, Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 11 questions of 4 marks each.
- (iii) There is no overall choice.
- (iv) Use of calculator is not permitted.

SECTION A

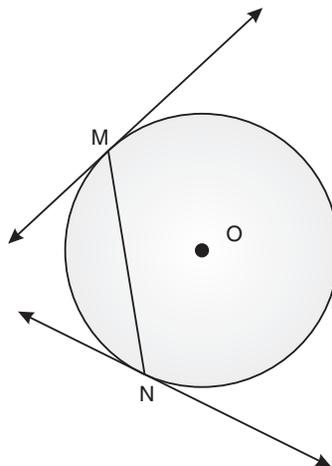
Question numbers 1 to 4 carry one mark each.

1. Find the positive root of $\sqrt{3x^2 + 6} = 9$. 1
2. The ratio of the length of a rod and its shadow is $1 : \frac{1}{\sqrt{3}}$. What is the angle of elevation of the source of light ? 1
3. What is the probability that a non leap year has 53 Mondays ? 1
4. Find the area of the triangle with vertices (0, 0), (6, 0) and (0, 5). 1

SECTION B

Question numbers 5 to 10 carry two marks each.

5. The seventeenth term of an A.P exceeds its 10th term by 7. Find the common difference. 2
6. In a cricket match, Harbhajan took three wickets less than twice the number of wickets taken by Zaheer. The product of the number of wickets taken by these two is 20. Represent the above situation in the form of a quadratic equation. 2
7. Prove that tangents drawn at the ends of a chord of a circle make equal angles with the chord. 2

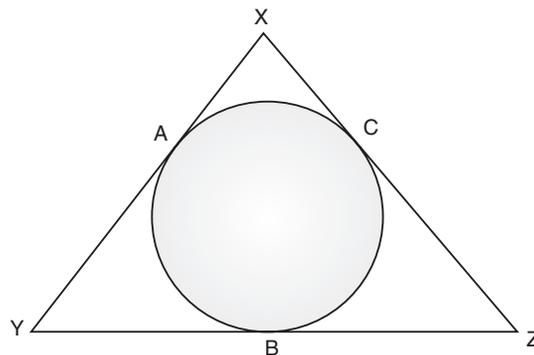


8. Draw a line segment of length 7 cm. Find a point P on it which divides it in the ratio 3 : 5. 2
9. Draw tangents to a circle of radius 6 cm from a point P at a distance of 10 cm from its centre. 2
10. Find the area of the square that can be inscribed in a circle of radius 8 cm. 2

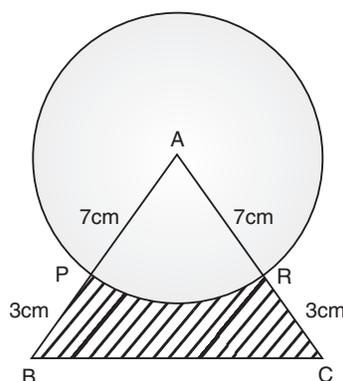
SECTION C

Question numbers 11 to 20 carry 3 marks each.

11. Determine an AP whose third term is 9 and when fifth term is subtracted from 8th term, we get 6. 3
12. Find the values of k for which the quadratic equation $(k - 2)x^2 + 2(2k - 3)x + (5k - 6) = 0$ has equal roots. 3
13. ΔXYZ is circumscribing a circle, touching the circle at A, B and C as shown in the figure. If $AX = 4$ cm, $AY = 6$ cm and $XZ = 12$ cm, find the length of YZ . 3



14. The horizontal distance between two towers is 60 m. The angle of elevation of the top of the taller tower as seen from the top of the shorter one is 30° . If the height of the taller tower is 150 m, then find the height of the shorter tower. 3
15. A number x is chosen from $-5, -4, -3, -2, -1, 0, 1, 2, 3$.
Find the probability that $|x| < 3$. 3
16. If the distance of $P(x, y)$ from $A(6, 2)$ and $B(-2, 6)$ are equal, prove that $y = 2x$. 3
17. If $(5, 2)$, $(-3, 4)$ and (x, y) are collinear, show that $x + 4y - 13 = 0$. 3
18. In a cylinder of base radius 10 cm, liquid is filled to the height of 9 cm. A metal cube of diagonal $8\sqrt{3}$ cm is immersed completely in the liquid. Find the height by which the water will rise in the cylinder. 3
19. A momento is made as shown in the figure. Its base PBCR is silver plated from the front side. Find the area which is silver plated. (Use $\pi = \frac{22}{7}$) 3

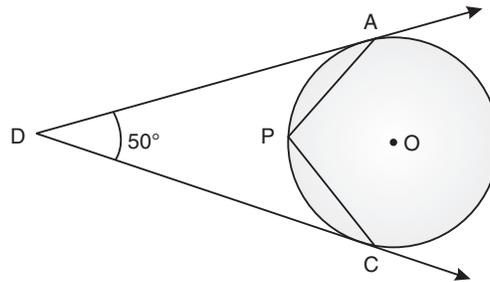


20. A glass is in the shape of a cylinder of radius 7 cm and height 10 cm. Find the volume of juice in litres required to fill 6 such glasses. (Use $\pi = \frac{22}{7}$) 3

SECTION D

Question numbers 21 to 31 carry 4 marks each.

21. Find the value of a, b and c such that the numbers $a, 7, b, 23$ and c are in A.P. 4
22. Find the roots of the quadratic equation $4x^2 + 4bx - (a^2 - b^2)50$ by the method of completing the square. 4
23. Find : 4
- $$\left(4 - \frac{1}{n}\right) + \left(7 - \frac{2}{n}\right) + \left(10 - \frac{3}{n}\right) \dots \text{ upto } n \text{ terms.}$$
24. In the given figure, O is the centre of the circle. Determine $\angle APC$, if DA and DC are tangents and $\angle ADC = 50^\circ$. 4



25. Draw $\triangle ABC$ such that $BC = 5$ cm, $\angle ABC = 60^\circ$ and $\angle ACB = 30^\circ$. Now construct $\triangle A'BC' \sim \triangle ABC$ with $A'B : AB = 3 : 2$. 4
26. Two posts are k metres apart and the height of one is double that of the other. If from the mid-point of the line segment joining their feet, an observer finds the angles of elevation of their tops to be complementary, then find the height of the shorter post. 4
27. A bag contains 15 balls of which x are blue and remaining red. If the number of red balls are increased by 5, the probability of drawing the red ball doubles. Find 4
- (i) P (red ball)
- (ii) P (blue ball)
- (iii) P (blue ball if 5 extra red balls are actually added)
28. $(1, -1)$, $(0, 4)$ and $(-5, 3)$ are vertices of a triangle. Check whether it is a scalene triangle, isosceles triangle or an equilateral triangle. Also, find the length of its median joining the vertex $(1, -1)$ to the mid-point of the opposite side. 4
29. A solid is consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm. It is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm. 4

30. Two circular beads of different sizes are joined together such that the distance between their centres is 14 cm. The sum of their areas is $130\pi\text{ cm}^2$. Find the radius each bead. 4
31. A child prepares a poster on "save water" on a square sheet whose each side measures 50 cm. At each corner of the sheet, she draws a quadrant of radius 15 cm in which she shows the ways to save water. At the centre, she draws a circle of diameter 21 cm and writes a slogan save water in it. Find the area of the remaining sheet. Write the value depicted. 4



SOLVED PAPER	Topper Answers C.B.S.E., 2014 Class–X (Term–2)	Mathematics
	Outside Delhi Set-II	

Time : 3 Hours

Max. Marks : 90

Outside Delhi Set-II	Code 30/2
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General Instructions :

- (i) All question are compulsory.
- (ii) The question paper consists of 34 questions divided into four sections– A, B, C and D.
- (iii) Section A contains 8 questions of 1 mark each, which are multiple choice type questions, Section B contains 6 questions of 2 marks each, Section C contains 10 question of 3 marks each and Section D contains 10 questions of 4 marks each.
- (iv) Use of calculators is not permitted.

Section A

Question numbers 1 to 8 carry 1 mark each. For each of the question numbers 1 to 8, four alternative choices have been provided, of which only one is correct. Select the correct choice.

1. The probability that a number selected at random from the numbers 1, 2, 3, ..., 15 is multiple of 4, is:

- | | |
|--------------------|--------------------|
| (A) $\frac{4}{15}$ | (B) $\frac{2}{15}$ |
| (C) $\frac{1}{5}$ | (D) $\frac{1}{3}$ |

Ans. (c) $\frac{1}{5}$ ✓

2. The angle of depression of a car parked on the road from the top of a 150 m high tower is 30°. The distance of the car from the tower (in metres) is :

- | | |
|-------------------|-------------------|
| (A) $50\sqrt{3}$ | (B) $150\sqrt{3}$ |
| (C) $150\sqrt{2}$ | (D) 75 |

Ans. (B) $150\sqrt{3}$ ✓

3. Two circles touch each other externally at P. AB is a common tangent to the circles touching them at A and B. The value of $\angle APB$ is :

- | | |
|---------|---------|
| (A) 30° | (B) 45° |
| (C) 60° | (D) 90° |

Ans. (D) 90° ✓

4. If k , $2k - 1$ and $2k + 1$ are three consecutive terms of an A.P, the value of k is :

- (A) 2 (B) 3
(C) -3 (D) 5

Ans. (B) 3 ✓

5. A chord of a circle of radius 10 cm subtends a right angle at its centre. The length of the chord (in cm) is :

- (A) $5\sqrt{2}$ (B) $10\sqrt{2}$
(C) $\frac{5}{\sqrt{2}}$ (D) $10\sqrt{3}$

Ans. (B) $10\sqrt{2}$ ✓

6. ABCD is a rectangle whose three vertices are B(4, 0), C(4, 3) and D(0, 3). The length of one of its diagonals is :

- (A) 5 (B) 4
(C) 3 (D) 25

Ans. (A) 5 ✓

7. In a right triangle ABC, right-angled at B, BC = 12 cm and AB = 5 cm. The radius of the circle inscribed in the triangle (in cm) is :

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

Ans. (C) 2 cm ✓

8. In a family of 3 children, the probability of having at least one boy is :

- (A) $\frac{7}{8}$ (B) $\frac{1}{8}$
(C) $\frac{5}{8}$ (D) $\frac{3}{4}$

Ans. (A) $\frac{7}{8}$ ✓

Section B

Question numbers 9 to 14 carry 2 marks each.

9. In figure 1, common tangents AB and CD to the two circles with centres O_1 and O_2 intersect at E. Prove that $AB = CD$.

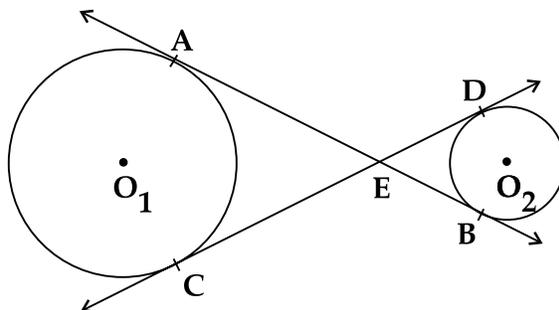


Figure 1

Ans.

EA and EC are tangents from point E to the circle with centre O,
 $EA = EC$ (1) | Lengths of tangents from an external point to the circle are equal |

EB and ED are tangents from point E to circle with centre O,
 $EB = ED$ (2) | Lengths of tangents from an external point to the circle are equal |

(1) + (2)

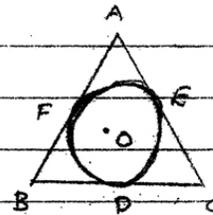
$$\Rightarrow EA + EB = EC + ED$$

$$\Rightarrow AB = CD \quad | \text{ Proved } |$$

10. The incircle of an isosceles triangle ABC, in which $AB = AC$, touches the sides BC, CA and AB at D, E and F respectively. Prove that $BD = DC$.

Ans.

10 | Given : A circle with centre O inscribed in an isosceles triangle with ~~side~~ $AB = AC$
 To prove : $BD = DC$



Proof :

$AF = AE$ (1) | Lengths of tangents from an external point to the circle are equal |

$BF = BD$ (2) | Lengths of tangents from an external point to circle are equal |

$CD = EC$ (3) | Lengths of tangents from an external point to circle are equal |

$$\begin{aligned}
 AB &= AC \quad | \text{ given } \checkmark \\
 AF + BF &= AE + EC \quad | \text{ i.e., } \checkmark \\
 BF &= EC \quad | \text{ since } AF = AE | \\
 BD &= CD \quad | \text{ from (2) and (3) | }
 \end{aligned}$$

11. Two different dice are tossed together. Find the probability

(i) that the number on each die is even.

(ii) that the sum of numbers appearing on the two dice is 5.

Ans. 11

(i) Even numbers occur in (2,2) (2,4) (2,6) (4,2) (4,4) (4,6) (6,2) (6,4) (6,6)

$$P(\text{number of each die is even}) = \frac{9}{36} = \frac{1}{4}$$

(ii) Sum of numbers are 5 in (1,4) (2,3) (3,2) (4,1)

$$P(\text{sum of numbers appearing on two dice is 5}) = \frac{4}{36} = \frac{1}{9}$$

12. If the total surface area of a solid hemisphere is 462 cm^2 , find its volume. [Take $\pi = \frac{22}{7}$]

Ans. 12

TSA of hemisphere = 462 cm^2

$$3\pi r^2 = 462$$

$$3 \times \frac{22}{7} \times r^2 = 462$$

$$r^2 = 49$$

$$r = 7 \text{ cm}$$

Volume of hemisphere = $\frac{2}{3}\pi r^3$

$$= \frac{2}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$$

$$= \frac{2156}{3} \text{ cm}^3$$

13. Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

Ans. 13

The sequence goes like this,

$$110, 120, 130, \dots, 990$$

Since they have a common difference of 10, they form an A.P., $a = 110$, $a_n = 990$, $d = 10$

$$a_n = a + (n-1)d$$

$$990 = 110 + (n-1) \times 10$$

$$990 - 110 = (n-1) \times 10$$

$$880 = (n-1) \times 10$$

$$n-1 = 88$$

$$n = 89$$

~~There are 89 terms between 101 and 999 divisible by 2 and 5.~~

14. Find the values of k for which the quadratic equation $9x^2 - 3kx + k = 0$ has equal roots..

Ans. 14. $a = 9, b = -3k, c = k$
 Since roots of the equation are equal
 $b^2 - 4ac = 0$
 $(-3k)^2 - (4 \times 9 \times k) = 0$
 $9k^2 - 36k = 0$
 $k^2 - 4k = 0$
 $k(k-4) = 0$
 $k = 0$ or $k = 4$
 Since $k = 0$ is not possible for the equation, $k = 4$

Section C

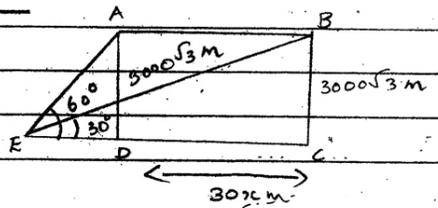
Question numbers 15 to 24 carry 3 marks each.

15. The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 30 seconds the angle of elevation becomes 30° . If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane.

Ans.

SECTION C

15. $\angle AED = 60^\circ, \angle BEC = 30^\circ$
 $AD = BC = 3000\sqrt{3}$ m
 Let the speed of the



aeroplane = x m/s
 then $DC = 30 \times x$
 $= 30x$ m ... (1)

$\triangle AED$ is right angled,

$$\tan 60^\circ = \frac{AD}{DE}$$

$$\sqrt{3} = \frac{3000\sqrt{3}}{DE}$$

$$DE = 3000$$
 m ... (2)

$\triangle BEC$ is right angled

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