SURA'S

MATHEMATICS

TERM - I 90 Minutes

CBSE - Class X

Strictly as per the Latest CBSE Syllabus released on 5th July, 2021 (CBSE Cir.No.Acad-51/2021)

Salient Features

- Chapterwise Concept Map and Quick Notes.
- As per Latest NCERT Norms, the Objective Type Questions - Multiple Choice Questions and Case Based Questions are included.
- Useful for Board Exam 2021-22 (November - December)

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केन्द्रीय माध्यमिक शिक्षा बोर्ड
(शिक्षा मंत्रालय, भारत सरकार के अधीन एक स्वायत्त संगठन)
CENTRAL BOARD OF SECONDARY EDUCATION
(An Autonomous Organisation under the Ministry of Education, Govt. of India)

NO.: F.1001/CBSE-Acad/Curriculum/2021 — **July 22, 2021**
Cir. No. Acad- 53/2021

All the Heads of Schools affiliated to CBSE

Subject: Term wise syllabus for Board Examinations to be held in the academic session 2021-22 for Secondary and Senior Secondary classes and guidelines for the conduct of the Internal Assessment/Practicum/Project.

This is in continuation to Board's circular number Acad 51/2021 dated July 05,2021 regarding Special Scheme of Assessment for Board Examination for Classes X and XII for the Session 2021- 22. The syllabus for the two terms mentioned in the scheme in all subjects for classes IX to XII are hereby notified vides this circular. In addition to syllabus for term end board examinations, guidelines for the conduct of Internal Assessment/Practicum/Project are also enclosed.

Schools are requested to share the term wise syllabus and guidelines for the conduct of board examinations and Internal Assessment / Practicum / Project available on CBSE Academic Website http://www.cbseacademic.nic.in at the link http://cbseacademic.nic.in/Term-wise-curriculum_2022.html with all their teachers and students

Dr Joseph Emmanuel
Director (Academics)

CBSE/DIR (ACAD)/2021

Date: July 05, 2021
Circular No: Acad-51/2021

All the Heads of Schools affiliated to CBSE

Subject: Special Scheme of Assessment for Board Examination Classes X and XII for the Session 2021-22

COVID 19 pandemic caused almost all CBSE schools to function in a virtual mode for most part of the academic session of 2020-21. Due to the extreme risk associated with the conduct of Board examinations during the second wave in April 2021, CBSE had to cancel both its class X and XII Board examinations of the year 2021 and results are to be declared on the basis of a credible, reliable, flexible and valid alternative assessment policy. This, in turn, also necessitated deliberations over alternative ways to look at the learning objectives as well as the conduct of the Board Examinations for the academic session 2021-22 in case the situation remains unfeasible.

CBSE has also held stake holder consultations with Government schools as well as private independent schools from across the country especially schools from the remote rural areas and a majority of them have requested for the rationalization of the syllabus, similar to last year in view of reduced time permitted for organizing online classes. The Board has also considered the concerns regarding differential availability of electronic gadgets, connectivity and effectiveness of online teaching and other socio-economic issues specially with respect to students from economically weaker section and those residing in far flung areas of the country. In a survey conducted by CBSE, it was revealed that the rationalized syllabus notified for the session 2020-21 was effective for schools in covering the syllabus and helped learners in achieving learning objectives in a less stressful manner.

In the above backdrop and in line with the Board's continued focus on assessing stipulated learning outcomes by making the examinations competencies and core concepts based, student-centric, transparent, technology-driven, and having advance provision of alternatives for different future scenarios, the following schemes are introduced for the Academic Session for Class X and Class XII 2021-22.

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2. **Special Scheme for 2021-22**

   A. **Academic session to be divided into 2 Terms with approximately 50% syllabus in each term:**
   The syllabus for the Academic session 2021-22 will be divided into 2 terms by following a systematic approach by looking into the interconnectivity of concepts and topics by the Subject Experts and the Board will conduct examinations at the end of each term on the basis of the bifurcated syllabus. This is done to increase the probability of having a Board conducted classes X and XII examinations at the end of the academic session.

   B. **The syllabus for the Board examination 2021-22 will be rationalized** similar to that of the last academic session to be notified in July 2021. For academic transactions, however, schools will follow the curriculum and syllabus released by the Board vide Circular no. F.1001/CBSE-Acad/Curriculum/2021 dated 31 March 2021. Schools will also use alternative academic calendar and inputs from the NCERT on transacting the curriculum.

   C. **Efforts will be made to make Internal Assessment/ Practical/ Project work more credible and valid** as per the guidelines and Moderation Policy to be announced by the Board to ensure fair distribution of marks.

3. **Details of Curriculum Transaction**

   - Schools will continue teaching in distance mode till the authorities permit in-person mode of teaching in schools.
   - **Classes IX-X: Internal Assessment** (throughout the year-irrespective of Term I and II) would include the *3 periodic tests, student enrichment, portfolio and practical work/ speaking listening activities/ project*.
   - **Classes XI-XII: Internal Assessment** (throughout the year-irrespective of Term I and II) would include end of topic or unit tests/ exploratory activities/ practicals/ projects.
   - Schools would create a student profile for all assessment undertaken over the year and retain the evidences in digital format.
   - CBSE will facilitate schools to upload marks of Internal Assessment on the CBSE IT platform.
   - Guidelines for Internal Assessment for all subjects will also be released along with the rationalized term wise divided syllabus for the session 2021-22.The Board would also provide additional resources like sample assessments, question banks, teacher training etc. for more reliable and valid internal assessments.

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4. **Term I Examinations:**

- At the end of the first term, the Board will organize **Term I Examination** in a flexible schedule to be conducted between November-December 2021 with a window period of 4-8 weeks for schools situated in different parts of country and abroad. Dates for conduct of examinations will be notified subsequently.
- The Question Paper will have Multiple Choice Questions (MCQ) including case-based MCQs and MCQs on assertion-reasoning type. Duration of test will be **90 minutes** and it will cover only the rationalized syllabus of **Term I only** (i.e. approx. 50% of the entire syllabus).
- Question Papers will be sent by the CBSE to schools along with marking scheme.
- The exams will be conducted under the supervision of the External Center Superintendents and Observers appointed by CBSE.
- The responses of students will be captured on OMR sheets which, after scanning may be directly uploaded at CBSE portal or alternatively may be evaluated and marks obtained will be uploaded by the school on the very same day. The final direction in this regard will be conveyed to schools by the Examination Unit of the Board.
- Marks of the **Term I** Examination will contribute to the final overall score of students.

5. **Term II Examination/ Year-end Examination:**

- At the end of the second term, the Board would organize **Term II or Year-end Examination** based on the rationalized syllabus of Term II only (i.e. approximately 50% of the entire syllabus).
- This examination would be held around **March-April 2022** at the examination centres fixed by the Board.
- The paper will be of **2 hours duration** and have questions of different formats (case-based/ situation based, open ended- short answer/ long answer type).
- In case the situation is not conducive for normal descriptive examination **a 90 minute MCQ** based exam will be conducted at the end of the Term II also.
- Marks of the Term II Examination would contribute to the final overall score.

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6. **Assessment / Examination as per different situations**

   A. **In case the situation of the pandemic improves and students are able to come to schools or centres for taking the exams.**

   Board would conduct Term I and Term II examinations at schools/centres and the theory marks will be distributed equally between the two exams.

   B. **In case the situation of the pandemic forces complete closure of schools during November-December 2021, but Term II exams are held at schools or centres.**

   Term I MCQ based examination would be done by students online/offline from home - in this case, the weightage of this exam for the final score would be reduced, and weightage of Term II exams will be increased for declaration of final result.

   C. **In case the situation of the pandemic forces complete closure of schools during March-April 2022, but Term I exams are held at schools or centres.**

   Results would be based on the performance of students on Term I MCQ based examination and internal assessments. The weightage of marks of Term I examination conducted by the Board will be increased to provide year end results of candidates.

   D. **In case the situation of the pandemic forces complete closure of schools and Board conducted Term I and II exams are taken by the candidates from home in the session 2021-22.**

   Results would be computed on the basis of the Internal Assessment/Practical/Project Work and Theory marks of Term-I and II exams taken by the candidate from home in Class X / XII subject to the moderation or other measures to ensure validity and reliability of the assessment.

   In all the above cases, data analysis of marks of students will be undertaken to ensure the integrity of internal assessments and home based exams.

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CONTENTS

Course Structure

Class X (2021 - 22)

TERM - I

One Paper (90 Minutes)		Max. Marks : 50
Units	**Unit Name**	**Marks**
I	NUMBER SYSTEMS	6
II	ALGEBRA	10
III	COORDINATE GEOMETRY	6
IV	GEOMETRY	6
V	TRIGONOMETRY	5
VI	MENSURATION	4
VII	STATISTICS & PROBABILITY	3
	Total	40
	INTERNAL ASSESSMENT	10
	TOTAL	50

TERM - I

Internal Assessment	Marks	Total Marks
Periodic Tests	3	10 marks for the term
Multiple Assessments	2	
Portfolio	2	
Student Enrichment Activities-practical work	3	

UNIT-NUMBER SYSTEMS

1. REAL NUMBER

Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples. Decimal representation of rational numbers in terms of terminating/ non-terminating recurring decimals.

UNIT-ALGEBRA

2. POLYNOMIALS

Zeroes of a polynomial. Relationship between zeroes and coefficients of quadratic polynomials only.

3. PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Pair of linear equations in two variables and graphical method of their solution, consistency/ inconsistency. Algebraic conditions for number of solutions. Solution of a pair of linear equations in two variables algebraically - by substitution and by elimination. Simple situational problems. Simple problems on equations reducible to linear equations.

UNIT-COORDINATE GEOMETRY

4. COORDINATE GEOMETRY

LINES (In two-dimensions)

Review: Concepts of coordinate geometry, graphs of linear equations. Distance formula. Section formula (internal division)

UNIT-GEOMETRY

5. TRIANGLES

Definitions, examples, counter examples of similar triangles.

1. (Prove) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.
3. (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar.
4. (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.
5. (Motivate) If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar.
6. (Motivate) If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, the triangles on each side of the perpendicular are similar to the whole triangle and to each other.
7. (Motivate) The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.
8. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.
9. (Motivate) In a triangle, if the square on one side is equal to sum of the squares on the other two sides, the angle opposite to the first side is a right angle.

UNIT- TRIGONOMETRY

6. INTRODUCTION TO TRIGONOMETRY

Trigonometric ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined). Values of the trigonometric ratios of 300, 450 and 600. Relationships between the ratios.

TRIGONOMETRIC IDENTITIES

Proof and applications of the identity sin2A + cos2A = 1. Only simple identities to be given

UNIT-MENSURATION

7. AREAS RELATED TO CIRCLES

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° and 90° only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)

UNIT- STATISTICS & PROBABILITY

8. PROBABILITY

Classical definition of probability. Simple problems on finding the probability of an event.

TERM - II

Units	Unit Name	Marks
I	ALGEBRA(Cont.)	10
II	GEOMETRY(Cont.)	9
III	TRIGONOMETRY(Cont.)	7
IV	MENSURATION(Cont.)	6
V	STATISTICS & PROBABILITY(Cont.)	8
	Total	40
	INTERNAL ASSESSMENT	10
	TOTAL	50

UNIT-ALGEBRA

1. QUADRATIC EQUATIONS (10) Periods

Standard form of a quadratic equation $ax^2 + bx + c = 0$, $(a \neq 0)$. Solutions of quadratic equations (only real roots) by factorization, and by using quadratic formula. Relationship between discriminant and nature of roots. Situational problems based on quadratic equations related to day to day activities (problems on equations reducible to quadratic equations are excluded)

2. ARITHMETIC PROGRESSIONS

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

(Applications based on sum to n terms of an A.P. are excluded)

UNIT- GEOMETRY

3. CIRCLES

Tangent to a circle at, point of contact

1. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact.
2. (Prove) The lengths of tangents drawn from an external point to a circle are equal.

4. CONSTRUCTIONS

1. Division of a line segment in a given ratio (internally).
2. Tangents to a circle from a point outside it.

UNIT-TRIGONOMETRY

5. SOME APPLICATIONS OF TRIGONOMETRY

HEIGHTS AND DISTANCES-Angle of elevation, Angle of Depression.

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-MENSURATION

6. SURFACE AREAS AND VOLUMES

1. Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones.
2. 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).

UNIT-STATISTICS & PROBABILITY

7. STATISTICS

Mean, median and mode of grouped data (bimodal situation to be avoided). Mean by Direct Method and Assumed Mean Method only

TERM - II

Internal Assessment	Marks	Total Marks
Periodic Tests	3	10 marks for the term
Multiple Assessments	2	
Portfolio	2	
Student Enrichment Activities-practical work	3	

Chapter 1

Real Numbers

Mind Map

REAL NUMBERS

Theorems

1. Let p be a prime number. If p divides a^2, then p divides a, where a is a positive integer.
2. $\sqrt{2}, \sqrt{3}$ are irrational
3. Let x be a rational number whose x decimal expansion terminates. Then x can be expressed in the form, $\frac{p}{q}$ where p & q are coprime, the prime factorisation of q is of the form $2^n 5^m$ where, are n, m are non-negative integers.
4. Let $x = \frac{p}{q}$ be a rational number, such that the prime factorisation of q is of the form $2^n 5^m$ where, n, m are non-negative integers. Then, x has decimal expansion which terminates.
5. Let $x = \frac{p}{q}$ be a rational number, such that the prime factorisation of q is not of the form $2^n 5^m$ where, n, m are non-negative integers. Then, x has decimal expansion which is non-terminating repeating.

Euclid's

Division Lemma

Given positive integers a and b, there exist unique integers q and r satisfying $a = bq + r$; $0 \leq r < b$

Division Algorithm

Steps to obtain the HCF of two positive integers, say c and d, with $c > d$.

Step 1: Apply Euclid's Division Lemma, to c & d, $c = dq + r$.

Step 2: If r = zero, d is the HCF of c and d. If $r \neq 0$, apply Euclid's Division lemma to d and r.

Step 3: Continue the process till the remainder is zero.

Fundamental Theorem of Arithmetic

Every composite number can be expressed as a product of primes, and this factorisation is unique, apart from the order in which the prime factors occur

Composite Number $x = P_1 \times P_2 \times P_3 ... \times P_n$ where $P_1 P_2 ... P_n$ are prime numbers.

Prime Factorization Method

For any two positive integers, a and b

HCF $(a, b) \times$ LCM $(a, b) = a \times b$

For Example

$f(x) = 3x^2y$

$g(x) = 6xy$

HCF $= 3xy$

LCM $= 6x^2y^2$

QUICK NOTES

1.1 Euclid's division lemma tells us above divisibility of integers.

- It states that any positive integer can be divided by any other positive integer is in such a way that is leaves a remainder *r* that is smaller than *a*.
- It is a usual long division process.
- It provides us a step-wise procedure to compute the HCF of two positive integers.
- This step-wise procedure is known as Euclid's algorithm.
- A lemma is a proven statement used for proving another statement.
- An algorithm is a series of well-defined steps which gives a procedure for solving a type of problem.
- Although, Euclid's division algorithm is stated for any positive integers, it can be extended for all Integers except zero.
- Euclid's division lemma and algorithm has many applications related to finding the properties of numbers.

1.2 The Fundamental Theorem of Arithmetic.

- The fundamental theorem of Arithmetic states that every composite number can be factorised as a product of primes. It says that any given composite number can be factorised as a product of prime numbers in a unique way.
- The prime factorisation of a natural number is unique except for the order of its factors. This method is called prime factorisation method. The fundamental theorem of arithmetic has many applications.

1.3 Irrational Numbers

A number '*s*' is called irrational if it cannot be written in the form $\frac{p}{q}$; where p and q are integers and $q \neq 0$. In this section, we will prove that square root numbers are irrational. The proof is based on the method called 'Proof by Contradiction'.

1.4 Rational Number and their Decimal Expansions

In this session, we are going to consider a rational number and explore when the decimal expansion of $\frac{p}{q}$ is terminating and when it is non-terminating repeating or recurring.

Theorem 1.5 :

- Let x be a rational number whose decimal expansion terminates. Then x can be expressed in the form $\frac{p}{q}$ where p and q are coprime and the prime factorisation of q is of the form $\alpha^n s^m$ where n, m are non-negative integers

Theorem 1.6 :

- Let $x = \frac{p}{q}$ be a rational number, such that the prime factorisation of q is of the form 2^n5^m, where n, m are non-negative integers. Then x has a decimal expansion which terminates.

Theorem 1.7:

- Let $x = \frac{p}{q}$, where p and q are coprimes, be a rational number, such that the prime factorisation of q is not of the form 2^n5^m, where n, m are non-negative integers. Then, x has a decimal expansion which is non-terminating repeating (recurring).

1 MARK

I. Multiple Choice Questions :

Choose the correct answer from the given four options in the following questions.

Q1. ***For some integer m, every even integer is of the form (Exemplar)***

(A) m (B) m + 1 (C) 2m (D) 2m + 1

Ans : (C) 2*m*

Sol. We know that, even integers are 2,4,6, …….
Where, m is an integer

[Since, here integer is represented by m]

m = ..., –1, 0, 1, 2, 3......

$\therefore 2m$ = ..., –2, 0, 2, 4, 6,......

Q2. ***If HCF (a, b) = 12 and a × b = 1800 then LCM (a, b) is***

(A) 1200 (B) 510 (C) 150 (D) 900

Ans : (C) 150

Q3. ***For some integer q, every odd integer is of the form (Exemplar)***

(A) q (B) q+1 (C) 2q (D) 2q+1

Ans : (D) 2q + 1

Sol. We know that, odd integers are 1, 3, 5, ….
So, it can be written in the form of 2q +1
Where, q is an integer

or q = ...,–1, 0, 1, 2, 3,.....

$\therefore 2q + 1$ = ..., –3, –1, 1, 3, 5......

Q4. ***n^2 – 1 is divisible by 8, if n is***

(A) an integer (B) a natural number

(C) an odd integer (D) an even integer

Ans : (C) an odd integer

Sol. Let $a = n^2 - 1$
Here n can be even or odd

Case I :

n = Even i.e., $n = 2k$, where k is an integer.

$\Rightarrow a = (2k)^2 - 1$

$\Rightarrow a = 4k^2 - 1$

At $k = -1$,

$a = 4(-1)^2 - 1 = 4 - 1 = 3$,

Which is not divisible by 8.

At $k = 0$,

$a = 4(0)^2 - 1 = 0 - 1 = -1$,

Which is not divisible by 8.

Case II :

n = odd i.e., $n = 2k + 1$,

Where k is an integer

$\Rightarrow a = (2k + 1)^2 - 1$

$\Rightarrow a = 4k^2 + 4k + 1 - 1$

$\Rightarrow a = 4k^2 + 4k$

$\Rightarrow a = 4k\ (k + 1)$

At $k = -1$,

$a = 4(-1)(-1 + 1) = 0$

Which is divisible by 8

At $k = 0$,

$a = 4(0)(0 + 1) = 0$

Which is divisible by 8

At $k = 1$,

$a = 4(1)(1 + 1) = 8$ Which is divisible by 8

Hence, we can conclude from above two cases, if n is odd, then $n^2 - 1$ is divisible by 8.

Q5. ***If $m^n = 32$, where m and n are positive integers, then the value of $(mn)^n$ is***

(A) 9755625 (B) 9785625

(C) 9765625 (D) 9865265

Ans : (C) 9765625

Q6. ***For any positive integer a and b, there exist unique integers q and r such that a = 3q + r, where r must satisfy.***

(A) $0 < r \le 3$ (B) $0 \le r < 3$

(C) $1 < r < 3$ (D) $0 < r < 3$

Ans : (B) $0 \le r < 3$

Q7. ***If the HCF of 65 and 117 is expressible in the form 65m – 117, then the value of m is (Exemplar)***

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

Ans : (B) 2

Sol. Using Euclid's division algorithm,

$b = aq + r, 0 \le r < a$

[$\because$ Dividend = Divisor × Quotient + Remainder]

$\Rightarrow 117 = 65 \times 1 + 52$

$\Rightarrow 65 = 52 \times 1 + 13$

$\Rightarrow 52 = 13 \times 4 + 0$

$\therefore$ HCF (65, 117) = 13 ...(i)

Also, given that, HCF (65, 117) = $65m - 117$ ...(ii)

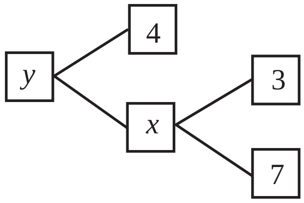
From Equations (i) and (ii), we get

$65m - 117 = 13$

$\Rightarrow 65m = 130$

$\Rightarrow m = 2$

Q8. ***The values of x and y is the given figure are***



(A) $x + 10, y = 15$ (B) $x = 10, y = 40$
(C) $x = 21, y = 25$ (D) $x = 21, y = 84$

Ans : (D) $x = 21, y = 84$

Q9. ***The largest number which divides 70 and 125, leaving remainders 5 and 8 respectively, is*** ***(Exemplar)***

(A) 13 (B) 65 (C) 875 (D) 1750

Ans : (A) 13

Sol. Since, 5 and 8 are the remainders of 70 and 125, respectively.

After subtracting these remainders from the numbers, we have the numbers 65 = (70 – 5), 117 = (125 – 8), which is divisible by the required number.

Now, required number = HCF of 65, 117

[Since we need the largest number]

For this, $117 = 65 \times 1 + 52$

[∵ Dividend = Divisor × Quotient + Remainder]

$\Rightarrow 65 = 52 \times 1 + 13$

$\Rightarrow 52 = 13 \times 4 + 0$

$\therefore$ HCF = 13

Hence, 13 is the largest number which divides 70 and 125, leaving remainders 5 and 8.

Q10. ***If two positive integers a and b are written and $a = x^3y^2$ and $b = xy^3$, where x, y are the prime numbers, then HCF (a, b) is*** ***(Exemplar)***

(A) xy (B) xy^2 (C) x^3y^3 (D) x^2y^2

Ans : (B) xy^2

Sol. Given that,

$a = x^3 y^2 = x \times x \times x \times y \times y$ and

$b = xy^3 = x \times y \times y \times y$

$\therefore$ HCF of a and b

$= \text{HCF}(x^3 y^2, xy^3)$

$= x \times y \times y = xy^2$

[Since, HCF is the product of the smallest power of each common prime factor involved in the number]

Q11. ***Given that LCM of (91, 26) = 182 then HCF (91, 26) is***

(A) 21 (B) 31 (C) 7 (D) 13

Ans : (D) 13

Q12. ***If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM(p, q) is*** ***(Exemplar)***

(A) ab (B) a^2b^2 (C) a^3b^2 (D) a^3b^3

Ans : (C) a^3b^2

Sol. Given that,

$p = ab^2 = a \times b \times b$ and

$q = a^3b = a \times a \times a \times b$

$\therefore$ LCM of p and q $= \text{LCM}(ab^2, a^3b)$

$= a \times b \times b \times a \times a = a^3b^2$

[Since, LCM is the product of the greatest power of each prime factor involved in the numbers]

Q13. ***If HCF of 55 and 99 is expressible in the form 55 m – 99, then the value of m:***

(A) 6 (B) 2 (C) 5 (D) 7

Ans : (B) 2

Sol. HCF (55, 99) = 11,

$\therefore 55m - 99 = 11$

$\Rightarrow 55m - 99 = 110$

$\Rightarrow m = 2$

Q14. ***The product of a non-zero rational and an irrational number is*** ***(Exemplar)***

(A) always irrational (B) always rational
(C) rational or irrational (D) one

Ans : (A) always irrational

Sol. Product of a non-zero rational and an irrational number is always irrational.

For example :

$\frac{3}{4}$ is a rational and $\sqrt{2}$ is irrational number but their product is an irrational number.

$$\frac{3}{4} \times \sqrt{2} = \frac{3\sqrt{2}}{4}$$

Q15. ***If the LCM of 12 and 42 is 10 m + 4 then the value of m is***

(A) 8 (B) 32 (C) 1 (D) 5

Ans : (A) 8

Q16. ***The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is (Exemplar)***

(A) 10 (B) 1000 (C) 504 (D) 2520

Ans : (D) 2520

Sol. Factors of 1 to 10 numbers are as follows :

$1 = 1$, $6 = 1\times2\times3$

$2 = 1\times2$, $7 = 1\times7$

$3 = 1\times3$, $8 = 1\times2\times2\times2$

$4 = 1\times2\times2$, $9 = 1\times3\times3$

$5 = 1\times5$, $10 = 1\times2\times5$

$\therefore$ LCM of number 1 to 10

$= \text{LCM}(1, 2, 3, 4, 5, 6, 7, 8, 9, 10)$

$= 1\times2\times2\times2\times3\times3\times5\times7 = 2520$

Q17. ***If A = 2n + 13, B = n + 7 where n is a natural number then HCF of A and B.***

(A) 4 (B) 3

(C) 1 (D) None of the above

Ans : (C) 1

Sol. If n = 1 then A = 15, B = 8

$\therefore$ H.C.F (15,8) = 1

If n = 2 then A = 17, B = 9,

H.C.F (17, 9) = 1

Q18. ***The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after : (Exemplar)***

(A) one decimal place (B) two decimal places

(C) three decimal places (D) four decimal places

Ans : (D) four decimal places

Sol. Given rational number

$$= \frac{14587}{1250} = \frac{14587}{2^1\times5^4}$$

$$= \frac{14587}{10\times5^3}\times\frac{(2)^3}{(2)^3} = \frac{14587\times8}{10\times1000}$$

$$= \frac{116696}{10000} = 11.6696$$

Hence, given rational number will terminate after four decimal places.

Q19. ***If n is a natural number, then exactly one of numbers n, n + 2 and n + 1 must be a multiple of***

(A) 4 (B) 3 (C) 1 (D) 8

Ans : (B) 3

Q20. ***The LCM of 2.5, 0.5 and 0.175 is***

(A) 17.5 (B) 5.5

(C) 7 (D) None of the above

Ans : (A) 17.5

Sol. $2.5, 0.5, 0.175 = \frac{2500}{1000}, \frac{500}{100}, \frac{175}{1000}$

$$= \frac{1}{1000}(2500, 500, 175)$$

$$\Rightarrow \quad \text{L.C.M} = \frac{2^2\times5^4\times7}{1000} = 17.5$$

Q21. ***The rational number between 72 and 73 is***

(A) $\frac{3}{2}$ (B) $\frac{2}{3}$ (C) $\frac{6}{5}$ (D) $\frac{2}{5}$

Ans : (A) $\frac{3}{2}$

Q22. ***If the HCF and LCM of two positive integers*** a ***and*** b ***are*** x ***and*** y ***respectively, then*** $\frac{x^2y^2}{a^2b^2}$.

(A) 2 (B) 3 (C) 0 (D) 1

Ans : (D) 1

Sol. L.C.M × H.C.F = Product of numbers

$\Rightarrow \quad xy = ab$

Squaring on both sides, we get

$$x^2y^2 = a^2b^2$$

$$\frac{x^2y^2}{a^2b^2} = 1$$

Q23. ***The LCM of the smallest prime number and the smallest composite number is***

(A) 1 (B) 4 (C) 3 (D) 8

Ans : (B) 4

Sol. The smallest prime number = 2

The smallest composite number = 4

L.C.M of 2, 4 = 4

Q24. ***If the prime factorization of a natural number n is $2^4\times3^4\times5^3\times7$, then the number of consecutive zeros in*** n, ***is***

(A) 3 (B) 4 (C) 5 (D) 1

Ans : (A) 3

Sol. Prime factorization of N = $2^4 \times 3^4 \times 5^4 \times 7$

The number of consecutive zeros in N = Min (a, b)

Where a and b are the exponents of 2 and 5 respectively.

$\Rightarrow$ Min (a, b) = Min (4, 3) $\Rightarrow$ Min $(a, b) = 3$

$\therefore$ Number of consecutive zeros in N = 3

Q25. ***The LCM of 2a, 5a and 7a is***

(A) 70 (B) $70a$ (C) $70a^4$ (D) $70a^3$

Ans : (B) $70a$

Sol. $70a$ is the smallest or lowest number which is divisible by $2a$, $5a$ and $7a$.

Q26. ***The decimal expansion of $\frac{17}{8}$ will terminate after how many places of decimal.***

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

Ans : (A) 3

Sol.

```
      2.125
   ________
8 ) 17
    16
   ____
     10
      8
   ____
     20
     16
   ____
      40
      40
   ____
       0
   ____
```

$\therefore$ It is terminating after three decimal place.

Q27. ***The values of the remainder r, when a positive integer is divisible by 5 is.***

(A) 0, 1, 2 (B) 1, 2, 3 (C) 0, 1 (D) 1, 2, 3

Ans : (A) 0, 1, 2

Sol. According to Euclid division lemma, $a = bq + r$

$\Rightarrow a = 5q + r$ where $0 \le r < 5$ and r is an integer

Therefore the values of r will be 0, 1, 2

Q28. ***Two numbers are in the ratio 21 : 17. If their HCF is 5, the numbers are***

(A) 21, 17 (B) 5, 5

(C) 85, 105 (D) 21, 105

Ans : (C) 85, 105

Sol. Let the numbers be $21x$, $17x$

H.C.F $(21x, 17x) = 5$,

L.C.M $(21x, 17x) = 21 \times 17 \times x$

We know, L.C.M $\times$ H.C.F = Product of two numbers

$21 \times 17x \times 5 = 21 \times 17$

$\Rightarrow x = 5$

$\Rightarrow 21x = 21 \times 5 = 105$

$\Rightarrow 17x = 17 \times 5 = 85$

$\therefore$ Numbers are 105, 85

Q29. ***If a and b are two positive co-prime integers such that a = 12b, then HCF (a, b)***

(A) 12 (B) b (C) $12b$ (D) 1

Ans : (B) b

Sol. Since a and b are two positive co-prime they have 1 a common factor.

Also given $a = 12b$, therefore HCF $(12b, b) = b$

(since b is the highest number which divides $12b$, b)

Q30. ***A positive integer m when divided by 11 gives remainder 6. If 4m + 5 is divided by 11, the remainder is***

(A) 0 (B) 17 (C) 73 (D) 7

Ans : (D) 7

Sol. By Euclid division lemma, we write,

$m = 11q + 6$

$\therefore m = 11 + 6$

(Assume q = 1 or any positive whole number)

$\therefore m = 17$

Then $4m + 5 = 4(17) + 5 = 73$

When 73 is divided by 11, we get remainder 7.

Q31. ***The sum of the exponents of prime factors in the prime factorization of 250 is***

(A) 3 (B) 1 (C) 4 (D) 5

Ans : (C) 4

Sol. Prime factorization of 250 $= 2^1 \times 5^3$

$\therefore$ Sum of exponents $= 1 + 3 = 4$

Q32. ***If two positive integers m and n are expressible in the form $m = a^2 b^3$ and $n = a^3 b^2$, where a, b are prime numbers, then HCF (m, n) and LCM (m, n)***

(A) a^3b^3, a^2b^2 (B) a^3b, a^2b^2

(C) a^2b^2, a^3b^3 (D) ab^2, a^3b^2

Ans : (C) a^2b^2, a^3b^3

Sol. H.C.F (m, n) = H.C.F $(a^2b^3, a^3b^2) = a^2b^2$

(Since a^2b^2 is the highest term that divides a^2b^3, a^3b^2)

L.C.M (m, n) = L.C.M $(a^2b^3, a^3b^2) = a^3b^3$

(Since a^3b^3 is the smallest term which is multiple of a^2b^3, a^3b^2)

Q33. ***The ratio between the HCF and LCM of 5, 15 and 20 is***

(A) 12 : 1 (B) 1 : 12 (C) 60 : 5 (D) 12 : 5

Ans : (B) 1 : 12

Sol. L.C.M of (5, 15, 20) = 60

H.C.F of (5, 15, 20) = 5

Ratio between H.C.F and L.C.M = 5 : 60 = 1 : 12

Q34. ***If the least prime factors of two positive integers a and b are 5 and 13 respectively, then the least prime factor of a + b, is***

(A) 2 (B) 1 (C) 18 (D) 13

Ans : (A) 2

Sol. Given the prime factor of a is 5 and the prime factor of b is 13 respectively.

$\Rightarrow \quad a = 5x$ (multiple of 5)

$\Rightarrow \quad b = 13x$ (multiple of 13)

$\therefore a + b = 13x + 5x = 18x$

$\Rightarrow (a + b)$ is a even number

Therefore the least prime factor of an even number is 2.

Q35. **For what value of *n*, 6^n *cannot end with digit 5.***

(A) any (B) atmost two

(C) exactly one (D) atleast one

Ans : (A) any

Sol. If a number ends with 5, then it is not divisible by 2. However 6 is divisible by 2. Therefore 6^n cannot end with digit 5 for any values of n.

Q36. ***If $2^3 \times 3^a \times b \times 7$ is the prime factorization of 2520, then 5a + 2b is***

(A) 10 (B) 20 (C) 40 (D) 60

Ans : (B) 20

Sol. $2520 = 2^3 \times 3^2 \times 5 \times 7$ (prime factorization)

$\Rightarrow \quad a = 2, b = 5$

$\therefore 5a + 2b = 5(2) + 2(5)$

$= 10 + 10 = 20$

Q37. ***The largest number that will divide 398, 436 and 542 leaving remainder 7, 11 and 15 respectively is***

(A) 17 (B) 11 (C) 34 (D) 45

Ans : (A) 17

Sol. 398 – 7 = 391

436 – 11 = 425

542 – 15 = 527

H.C.F of (391, 425, 527) = 17

$\therefore$ Maximum number that divide 398, 436, 542

Leaving remainder 7, 11 and 15 respectively = 17

Q38. ***It two positive integers A and B can expressed as $A = xy^3$ and $B = x^4y^2z$ where x,y are prime numbers then LCM (A,B) is***

(A) xy^2 (B) x^4y^2z (C) x^4y^3 (D) x^4y^3z

Ans : (D) x^4y^3z

Q39. ***The least number that is divisible by all the number from 1 to 5*** **is**

(A) 5 (B) 60 (C) 20 (D) 100

Ans : (B) 60

Sol. L.C.M of (2,3,4,5) = 60 $\Rightarrow$ 60 is the least number that is divisible by all the number from 1 to 5

Q40. ***If HCF (16,y) = 8 and LCM (16,y) = 48, then the value of y*** **is**

(A) 24 (B) 16 (C) 8 (D) 48

Ans : (A) 24

Sol. H.C.F × L.C.M = Product of two number

$8 \times 48 = 16 \times y$

$\frac{8 \times 48}{16} = y$

$\Rightarrow \quad y = 24$

$\therefore$ The other number, $y = 24$

Q41. ***Euclid division lemma states that for two positive integers a and b, there exist unique integer q and r such that a = bq + r, where r must satisfy***

(A) $a < r < b$ (B) $0 < r \leq b$

(C) $1 < r < b$ (D) $0 \leq r < b$

Ans : (D) $0 \leq r < b$

II. Case Study Questions and Answers :

(i) Each case study has 5 case-based sub-parts.

(ii) An examinee is to attempt any 4 out of 5 sub-parts.

CASE STUDY : 1

To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a class library. There are two sections - section A and section B of grade X. There are 32 students in section A and 36 students in section B.

(i) What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?

(A) 144 (B) 128 (C) 288 (D) 272

Ans : (C) 288

Sol. Minimum number of books = LCM (32, 36) = 288

(ii) If the product of two positive integers is equal to the product of their HCF and LCM is true then, the HCF (32 , 36) is

(A) 2 (B) 4 (C) 6 (D) 8

Ans : (B) 4

Sol. H.C.F (32, 36) × LCM (32, 36) = 32 × 36

$$\therefore \text{H.C.F}(32, 36) = \frac{32 \times 36}{288} = 4$$

(iii) 36 can be expressed as a product of its primes as

(A) $2^2 \times 3^2$ (B) $2^1 \times 3^3$

(C) $2^3 \times 3^1$ (D) $2^0 \times 3^0$

Ans : (A) $2^2 \times 3^2$

(iv) 7 × 11 × 13 × 15 + 15 is a

(A) Prime number

(B) Composite number

(C) Neither prime nor composite

(D) None of the above

Ans : (B) Composite number

(v) If p and q are positive integers such that $p = ab^2$ and $q = a^2b$, where a, b are prime numbers, then the LCM (p, q) is

(A) ab (B) a^2b^2

(C) a^3b^2 (D) a^3b^3

Ans : (B) a^2b^2

CASE STUDY : 2

A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.

(i) In each room the same number of participants are to be seated and all of them being in the same subject, hence maximum number participants that can accommodated in each room are

(A) 14 (B) 12 (C) 16 (D) 18

Ans : (B) 12

Sol. Maximum number of participants

= H.C.F (60, 84, 108)

= 12

(ii) What is the minimum number of rooms required during the event?

(A) 11 (B) 31 (C) 41 (D) 21

Ans : (D) 21

Sol. Number of rooms required

$$= \frac{\text{Total number of participants}}{12}$$

$$= \frac{60 + 84 + 108}{12}$$

$$= \frac{252}{12}$$

$$= 21$$

(iii) The LCM of 60, 84 and 108 is

(A) 3780 (B) 3680
(C) 4780 (D) 4680

Ans : (A) 3780

(iv) The product of HCF and LCM of 60, 84 and 108 is

(A) 55360 (B) 35360
(C) 45500 (D) 45360

Ans : (D) 45360

(v) 108 can be expressed as a product of its primes as

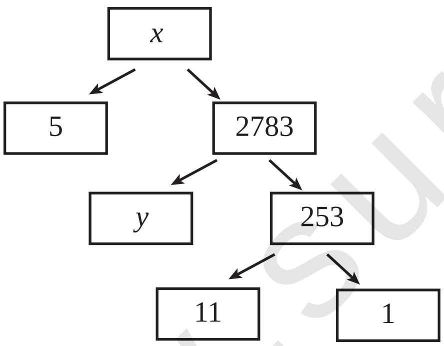
(A) $2^3 \times 3^2$ (B) $2^3 \times 3^3$
(C) $2^2 \times 3^2$ (D) $2^2 \times 3^3$

Ans : (D) $2^2 \times 3^3$

CASE STUDY : 3

A Mathematics Exhibition is being conducted in your School and one of your friends is making a model of a factor tree. He has some difficulty and asks for your help in completing a quiz for the audience.

Observe the following factor tree and answer the following:



(i) What will be the value of x?

(A) 15005 (B) 13915
(C) 56920 (D) 17429

Ans : (B) 13915

Sol. Value of $x = 2783 \times 5 = 13915$

(ii) What will be the value of y?

(A) 23 (B) 22 (C) 11 (D) 19

Ans : (C) 11

Sol. Value of $y = \frac{2783}{253} = 11$

(iii) What will be the value of z?

(A) 22 (B) 23 (C) 17 (D) 19

Ans : (A) 23

Sol. Value of $z = \frac{253}{11} = 23$

(iv) According to Fundamental Theorem of Arithmetic 13915 is a

(A) Composite number

(B) Prime number

(C) Neither prime nor composite

(D) Even number

Ans : (A) Composite number

(v) The prime factorization of 13915 is

(A) $5 \times 11^3 \times 13^2$ (B) $5 \times 11^3 \times 23^2$
(C) $5 \times 11^2 \times 23$ (D) $5 \times 11^2 \times 13^2$

Ans : (C) $5 \times 11^2 \times 23$

CASE STUDY : 4

A college conducted a seminar in Mathematics, Science and Computer Science. The number of participants in Mathematics, Science and Computer science are 60, 40, 108 respectively. The coordinator has made the arrangement such that in each room, the same number of participants are to be seated and all of them being in the same subject. Also they allotted the separate room for all the official other than participants.

(i) Find the minimum number of rooms required, if in each room same number of participants is to be seated and all of been in the same subject.

(A) 12 rooms (B) 21 rooms
(C) 14 rooms (D) 10 rooms

Ans : (B) 21 rooms

Sol. The minimum number of rooms required

$$= \frac{252}{12} = 21 \text{ rooms}$$

(ii) Find the minimum number of rooms required, if in each room same number of participants is to be seated and all of been in the same subject and also for officials.

(A) 10 rooms (B) 20 rooms
(C) 22 rooms (D) 12 rooms

Ans : (C) 22 rooms

Sol. The minimum number of rooms required = 21 + 1 = 22 rooms.

(iii) Find the total number of participants?

(A) 252 (B) 234 (C) 567 (D) 90

Ans : (A) 252

Sol. 60 + 40 + 108 = 252

(iv) Find the LCM of 60, 40, 108

(A) 3456 (B) 3780
(C) 8976 (D) 2134

Ans : (B) 3780

(v) Find the HCF of 60, 40, 108

(A) 10 (B) 12 (C) 19 (D) 8

Ans : (B) 12

Hint: First, find the HCF and LCM.

CASE STUDY : 5

A holy matriculation school was celebrating its 82th annual day ceremony. So the school management decided to distribute chocolates and candies to all the students in the school.

(i) Find the minimum number of students among whom 182 chocolates and 247 candies can be distributed such that each student gets same number of each.

(A) 12 (B) 13 (C) 14 (D) 15

Ans : (B) 13

Sol. In order to find the number of students, we need to find H.C.F of the number of chocolates and candies (ie) H.C.F (182, 247) = 13

Therefore the maximum of number of students=13

(ii) Find the number of chocolate each student will get?

(A) 24 (B) 20 (C) 13 (D) 14

Ans : (D) 14

Sol. Number of chocolate for each student

$$= \frac{\text{Total number of chocolate}}{\text{Total number of student}}$$

$$= \frac{182}{13}$$

$$= 14$$

(iii) Find the number of candies each student will get?

(A) 19 (B) 29 (C) 247 (D) 13

Ans : (A) 19

Sol. $$\text{Number of candies} = \frac{\text{Total number of candies}}{\text{Maximum number of student}}$$

$$= \frac{247}{13}$$

$$= 19$$

(iv) 182 can be expressed as a product of its primes as

(A) 2 × 5× 7× 9 (B) 2 × 7× 91× 13
(C) 2 × 7× 13 (D) 2 × 5× 7× 13

Ans : (C) 2 × 7× 13

Sol.

2	182
7	91
	13

∴ 182 = 2 × 7 × 13

(v) What is the total number of chocolates and candies?

(A) 429 (B) 729 (C) 247 (D) 182

Ans : (A) 429

Sol. Total Number = Number of chocolates + Number of candies

= 182 + 247 = 429

CASE STUDY : 6

Ramesh, Suresh and Dinesh are three brothers. Each of them have field in their own land. Each field is in rectangular shape of area 6m^2, 84m^2 and 180m^2 respectively.

(i) If the three rectangular fields are to be divided into identical rectangular flower beds then find the area of smaller field

(A) 12m^2 (B) 22m^2

(C) 32m^2 (D) 42m^2

Ans : (A) 12m^2

Sol. We need to find the HCF of the larger field that gives us the area of the smaller field.

$\Rightarrow$ H.C.F (60, 84, 108) = 12

Therefore area of the smaller field = 12m^2

(ii) Suppose each identical smaller rectangular flower beds, each having length 6m, find the breadth of each flower bed.

(A) 2m (B) 4m (C) 6m (D) 8m

Ans : (A) 2m

Sol. Area of smaller field = 12m

$\Rightarrow$ $l \times b$ = 12m

$\Rightarrow$ $6\times b$ = 12

$\Rightarrow$ b = 2m

(iii) What is the perimeter of the divided identical rectangular flower beds?

(A) 7m (B) 5m (C) 16m (D) 19m

Ans : (C) 16 m

Sol. Perimeter of the rectangular field = $2(l + b)$

= 2 (6 + 2)

= 16 m

(iv) Two rectangular field having area 60 m^2 and 108 m^2 are to be divided into identical rectangular flower beds, then the area of the flower bed is.

(A) 22 m^2 (B) 14 m^2 (C) 12 m^2 (D) 10 m^2

Ans : (C) 12 m^2

Sol. We need to find the H.C.F (60, 108) to get the area of the flower bed.

H.C.F (60, 108)= 12

$\therefore$ Area of the smaller field = 12 m^2

(v) 84 can be expressed as a product of its prime as

(A) $2 \times 2 \times 3 \times 7$ (B) $12 \times 4 \times 7$

(C) $2 \times 42 \times 21$ (D) $2 \times 2 \times 5 \times 7$

Ans : (A) $2 \times 2 \times 3 \times 7$

Sol.

2	84
2	42
3	21
7	7

$84 = 2 \times 2 \times 3 \times 7$

CASE STUDY : 7

A Ware house of plastic Manufacturing company consists of 165 plastic bottles arranged in certain number of columns. There are another set of 245 plastic jars, which is to be stored in the same number of columns.

Read Carefully the above paragraph and answer the questions.

(i) What is the maximum number of columns in which both plastic jars and plastic bottles can be stored?

(A) 11 (B) 3 (C) 7 (D) 5

Ans : (D) 5

Sol. No of plastic bottles = 165

No of plastic jars = 245

The maximum number of columns in which they can be stored = H.C.F. of 165 and 245.

∴ Prime factor of 165 = $3 \times 5 \times 11$

∴ Prime factor of 245 = $5 \times 7 \times 7$

∴ H.C.F (165, 245) = 5

The Maximum number of columns in which both plastic jars and plastic bottles can be stored = 5

(ii) Find the total number of plastic jars and plastic bottles.

(A) 410 (B) 245 (C) 165 (D) 510

Ans : (A) 410

Sol. Total number of product = No of plastic bottles + No of plastic jars

= 165 + 245

= 410

(iii) Find the sum of exponents of the prime factors of the maximum number in which they can be stored

(A) 1 (B) 0 (C) 2 (D) 3

Ans : (A) 1

Sol. We have proved the maximum number of columns = 5

∴Prime factors of 5 = 5

∴Sum of exponents = 1

(iv) What is the total number of row in which plastic bottles can be stored.

(A) 45 (B) 5 (C) 35 (D) 25

Ans : (C) 35

Sol. Number of rows of plastic bottles

$= \frac{\text{Total number of plastic bottles}}{\text{Maximum number of column}}$

$= \frac{165}{5}$

= 35

(v) Find the sum of exponents of the prime factors of total number of products.

(A) 3 (B) 4 (C) 5 (D) 6

Ans : (A) 3

Sol. Total number of products = 410

∴Prime factors of 410 = $2^1 \times 5^1 \times 41^1$

∴Sum of exponents = 1 + 1 + 1

= 3

CASE STUDY : 8

Two friends Aisha and Suchi have 40 and 61 number of same type of toys respectively, which they have to distribute among two groups of children such that each one gets equal number of toys. After distributing in such manner, Aisha and Suchi are left with 5 toys each.

(i) Find the number of toys received by each child.

(A) 7 (B) 6 (C) 5 (D) 8

Ans : (A) 7

Sol. Aisha and Suchi are left with 5 toys each

∴ Aisha have 40 – 5 = 35 toys

∴ Suchi have 61 – 5 = 56 toys

H.C.F of (35,56) = 7

∴ Number of toys received by each child = 7

(ii) Find the number of Children, in which Ashima distributed the toys.

(A) 8 (B) 7 (C) 4 (D) 5

Ans : (D) 5

Sol. Number of toys distributed by Aisha = 35

(∵ 40–5 = 35)

Number of toys received by each child = 7

∴ Number of children in which Aisha distributed the toys = $\frac{35}{7}$ = 5

(iii) Find the total number of children in which suchi distributed.

(A) 12 (B) 13 (C) 11 (D) 8

Ans : (D) 8

Sol. Number of toys distributed by Suchi = 56

Number of toys received by each child = 7

$\therefore$ Number of children in which Aisha distributed the toys = $\frac{56}{7}$ = 8

(iv) Find the total number of children in which Aisha and Suchi distributed.

(A) 12 (B) 13 (C) 11 (D) 17

Ans : (B) 13

Sol. Total number of children = Number of children in which Aisha distributed the toys + Number of children in which Suchi distributed the toys

= 5 + 8

= 13

(v) The smallest composite even number is.

(A) 8 (B) 4 (C) 2 (D) 6

Ans : (B) 4

CASE STUDY : 9

A book seller has 420 science stream books and 130 Arts stream books. He wants to stack them in such a way that each stack has the same number and they take up the least area of the surface.

(i) If a number has no factors other than 1 and number itself is.

(A) Composite

(B) prime

(C) Cannot be determined

(D) None of the above

Ans : (B) prime

(ii) What is the maximum number of books that can be placed in each stack for this purpose?

(A) 10 (B) 14

(C) 12 (D) 15

Ans : (A) 10

Sol. Maximum number of books = H.C.F. (420, 130)

= 10

(iii) Which Mathematical concept is used to solve the problem.

(A) Prime factorization method

(B) Area of triangle

(C) Arithmetic progression

(D) None of the above

Ans : (A) Prime factorization method

(iv) If the book seller doubles the quantity, then the maximum number of books that can be placed in each stack is?

(A) Remain same (B) Double

(C) Triple (D) None of these

Ans : (B) Double

Sol. If the book seller double the quantity, then there will be 840 science stream book and 260 arts stream book.

$\therefore$ Maximum number of books

= H.C.F (260, 840) = 20 ...(1)

$\therefore$ Maximum number of old books

= H.C.F (420, 310) =10 ...(2)

From 1 and 2, we can say that the maximum number of book that can be placed in each stack is doubled.

(v) Find the LCM of the given book streams.

(A) 5450 (B) 5460

(C) 2730 (D) None of the above

Ans : (B) 5460

Sol.

2	420, 130
5	210, 65
	42, 13

LCM of 142, 130 $= 2 \times 5 \times 42 \times 13$

$= 5460$