DAV PUBLIC SCHOOL, IFFCO, PARADEEP
SUMMER HOLIDAY HOME WORK STD – X (2019-20)

HINDI	1. निम्नलिखित विषयों पर अनुच्छेद लिखिए- (क) युवाशक्ति और राजनीति (ख) भ्रष्टाचार (ग) सूचना प्रौद्योगिकी: वर्तमान और भविष्य 2. निम्नलिखित विषयों पर 50 शब्दों में संवाद लिखिए- (क) दो सहेलियों के बीच भ्रामक विज्ञापनों के सन्दर्भ में होने वाले संवाद को लिखिए। (ख) दो मित्रों के बीच विद्यालय के वार्षिक उत्सव की तैयारी हेतु संवाद लिखिए। (ग) वोट डालना हमारा एक अति महत्त्वपूर्ण कर्त्तव्य है। इस विषय पर अध्यापक और छात्र के मध्य होने वाले संवाद को लिखिए। 3. निम्नलिखित विषयों पर 20 से 25 शब्दों में विज्ञापन लेखन कीजिए- (क) एक प्रसिद्ध मोबाइल फोन कंपनी की ओर से अपने नए उत्पाद के लिए विज्ञापन लिखिए। (ख) एक जूते बनाने वाली अंतर्राष्ट्रीय कंपनी के लिए विज्ञापन लिखिए। (ग) आपके क्षेत्र में एक नया अस्पताल खुला है। उसके लिए एक आकर्षक विज्ञापन लिखिए।

ENGLISH	1. Learn and revise all the chapters taught so far for PSVT.
	2. Collect and write speeches of prominent world leaders which have left a mark in the world history. (5 speeches)
	3. Maintain the news copy by writing international news, national news, state news and sports news on a daily basis.
	4. Write 10 inspirational quotes (each) on success, motivation and achievement.
	5. Download and print last 5 years question paper on English language and Literature.(Term-1)
	6. Prepare GD topics on –
	       a) Zoos should be banned in the world.
	       b) Student Elections can pollute the atmosphere of educational institutions.
	7. Make a tense chart providing appropriate examples.

ODIA	• ରଚନା- ଆଦର୍ଶ ଛାତ୍ର, ଦେଶପ୍ରେମ • ଫକୀର ମୋହନ ଓ ଉପେନ୍ଦ୍ର ଭଞ୍ଜ ଙ୍କ ଜୀବନୀ ପଢ଼ି ୧୫୦ ଶବ୍ଦ ମଧ୍ୟରେ ଲେଖ । • ପତ୍ର ଲିଖନ- ବନ୍ୟଜନ୍ତୁ ସୁରକ୍ଷା ନିମନ୍ତେ ଜନସାଧାରଣଙ୍କ ସଚେତନତା ପାଇଁ ସମ୍ପାଦକୀୟ ପତ୍ରଟିଏ ଲେଖ । • ଜାତୀୟ ରାଜପଥରେ ସଡ଼କ ଦୁର୍ଘଟଣା ବୃଦ୍ଧି ପାଉଛି ଜନ ସଚେତନତା ପାଇଁ ସମ୍ପାଦକୀୟ ପତ୍ର ଟିଏ ଲେଖ । • ୫୦ଟି ରୂଢ଼ି ଶବ୍ଦର ବାକ୍ୟ ଗଠନ କର। • ଭାଷଣ- ସ୍ୱାଧୀନତା ଦିବସ (୨୫୦ ଶବ୍ଦ) • ଜନ୍ମ ଭୂମି ଓ ମାନ ଗୋବିନ୍ଦଙ୍କ ମହାନତା ବିଷୟରୁ ୧୦ଟି କରି ବହୁ ବିକଳ୍ପିତ ପ୍ରଶ୍ନ ଓ ଉତ୍ତର ତିଆରି କର ।
SANSKRIT	1. अव्ययम् (पाठ्यक्रमात् प्रदत्त- अव्ययान् लिखित्वा-वाक्यानि रचयत।) 2. सन्धिः(स्वरः ,व्यञ्जनम् ,विसर्गश्च) 3. समासः(तत्पुरुष-द्वन्द्व-अव्ययीभाव-बहुव्रीहि-कर्मधारय -द्विगु) 4. प्रत्ययः(शतृ,शानच्,क्त , क्तवतु, तव्यत् ,अनीयर्) 5. वाच्यपरिवर्त्तनम् (कर्तृ ,कर्म , भाव) इति एतेषु प्रत्येकं पञ्चोदाहरणानि लिखत । 6. शब्दरूपलेखनम् - विद्वस्, गच्छत्, आत्मन् नदी 7. धातुरूपलेखनम् - श्रु, ज्ञा, लभ्, सेव् (पञ्चलकारेषु) 8. अनुच्छेद लेखनम् — वार्षिकोत्सवः,अथवा अन्य कस्यचित् उत्सवस्य विषये लिखत।
MATHS	1. Do all the exercises of NCERT EXEMPLAR PROBLEMS of ch-1 and ch-2 in Exemplar problem copy. 2. Activity-1: To draw the graph of a linear polynomial, a quadratic polynomial and a cubic polynomial and to find the zeroes from the graph. Activity-2: Verify the conditions of consistency/inconsistency for the following pair of equations by graphical method. (i) $x - y - 6 = 0$; $x + y + 10 = 0$ (ii) $x + y - 9 = 0$; $3x + 3y - 27 = 0$ (iii) $4x + 8y - 24 = 0$; $3x + 6y - 12 = 0$ *Activities to be done in mathematics Lab notebook.

SCIENCE	**PHYSICS:** • Solve NCERT Exemplar and NCERT Exercise questions of the chapter "Reflection and Refraction of Light" (Up to Reflection) in your homework copy. (Find the questions in TATA App.) • Draw the Ray Diagrams for image formation by spherical lens for all the position of object in your classwork copy. **(Use HB Pencil and ruler)** **CHEMISTRY:** Q.1 State one basic difference between a physical change and a chemical change? Q.2 What is meant by a chemical reaction? Q.3 $AgNO_3$ (aq) + NaCl (aq) → AgCl(s) ↓ + $NaNO_3$ (aq) $\quad$ FeS + H_2SO_4 → $FeSO_4$ + H_2S ↑ Consider the above mentioned two chemical equations with two different kinds of arrows (↓ and↑) along with product. What do these two different arrows indicate? Q.4. what happens chemically when quicklime is added to water filled in a bucket? Q.5. On What basis is a chemical equation balanced? Q.6 Hydrogen being a highly inflammable gas and oxygen being a supporter of combustion, yet water which is a compound made up of hydrogen and oxygen is used to extinguish fire, Why? Q.7 Give an example each for thermal decomposition and photochemical decomposition reaction. Write relevant balanced chemical equation also. Q.8 Write the name of some observation with the help of us we can determine whether a chemical reaction has taken place or not? Q.9 A Magnesium ribbon is burnt in Oxygen to give a white compound X accompanied by emission of light. If the burning ribbon is now placed in an atmosphere of nitrogen, It continues to burn and forms a compound Y. (a) Write the chemical formulae of X and Y? (b) Write a balanced chemical equation, when X is dissolved in water. Q.10 What happens when Zn granules are treated are treated with dilute solution of H_2SO_4, HCl, HNO_3, NaCl, and NaOH ? Q.11 What are the products obtained when $FeSO_4$ is heated. Write the chemical reactions involved.
SCIENCE	**BIOLOGY:** • Why is diffusion insufficient to meet the oxygen requirements of Multicellular organisms like humans? • Write the chemical equation representing photosynthesis in plants. • Why it is a controversy that viruses are living organisms or non-living things? • What do you mean by emulsification of fat? • Why do fishes die when taken out of water? • How absorption of digested food mainly occurs in the small intestine? • List the three events that occur during the process of photosynthesis. Explain the role of stomata in this process. • Draw the human digestive system & label the following parts: a) Oesophagus $\quad$ b) Liver $\quad$ c) Pancreas $\quad$ d) Gall bladder $\quad$ e) Small intestine • Peristalsis is considered as the significant movement occurring all along the gut during digestion. Discuss. • Write down in science practical record, Experiment 1.Preparing a temporary mount of a leaf peel to show stomata & 2. Experimentally show that carbon dioxide is given out during respiration from any Lab manual. • Solve NCERT Exemplar questions of the chapter "The Life Processes" in your homework copy up till taught.
SOCIAL SCIENCE	❖ **Geo-** Imagine yourself as one of the head of states attending the international earth summit at Rio de Janeiro, Brazil in 1992. Discuss some measure taken by your country to combat environmental damage, poverty and disease. ❖ **History – 1.** Define the different stages of unification of Germany. $\quad$ **2.** Why Balkan area become a zone of conflict. Explain. ❖ **POL. Sc. – 1.** Explain the various steps taken to setup Belgian model of government. $\quad$ **2.** Explain the various causes of throwing out of Kashmir Pandit from the land of Kashmir. ❖ **Eco. – "Every area has different developmental goals"** Make a project report based on ten developmental goals in your locality. (Paradeep)

➢ Solve the NTSE Questions given in the school connect in the respective H.W copies.
➢ Prepare 10(Maths, English, Sanskrit, Hindi)/ 15(Social Science & Science) new questions subject wise apart from Book Exercise questions from the chapter taught so far by going through the chapter thoroughly where only specific answer can be formed.

REAL NUMBERS

(A) Main Concepts and Results

- Euclid's Division Lemma : Given two positive integers a and b, there exist unique integers q and r satisfying $a = bq + r$, $0 \le r < b$.

- Euclid's Division Algorithm to obtain the HCF of two positive integers, say c and d, $c > d$.

  Step 1: Apply Euclid's division lemma to c and d, to find whole numbers q and r, such that $c = dq + r$, $0 \le r < d$.

  Step 2 : If $r = 0$, d is the HCF of c and d. If $r \ne 0$, apply the division lemma to d and r.

  Step 3 : Continue the process till the remainder is zero. The divisor at this stage will be the required HCF.

- Fundamental Theorem of Arithmetic : Every composite number can be expressed as a product of primes, and this expression (factorisation) is unique, apart from the order in which the prime factors occur.

- Let p be a prime number. If p divides a^2, then p divides a, where a is a positive integer.

- $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ are irrational numbers.

- The sum or difference of a rational and an irrational number is irrational.

- The product or quotient of a non-zero rational number and an irrational number is irrational.

- For any two positive integers a and b, HCF $(a, b) \times$ LCM $(a, b) = a \times b$.

- Let $x = \dfrac{p}{q}$, p and q are co-prime, be a rational number whose decimal expansion terminates. Then, the prime factorisation of q is of the form $2^m.5^n$; m, n are non-negative integers.

- Let $x = \dfrac{p}{q}$ be a rational number such that the prime factorisation of q is not of the form $2^m.5^n$; m, n being non-negative integers. Then, x has a non-terminating repeating decimal expansion.

(B) Multiple Choice Questions

Choose the correct answer from the given four options:

Sample Question 1 : The decimal expansion of the rational number $\dfrac{33}{2^2.5}$ will terminate after

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

(C) three decimal places   (D) more than 3 decimal places

Solution : Answer (B)

Sample Question 2 : Euclid's division lemma states that for two positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy

(A) $1 < r < b$ (B) $0 < r \le b$

(C) $0 \le r < b$ (D) $0 < r < b$

Solution : Answer (C)

EXERCISE 1.1

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

1. For some integer m, every even integer is of the form

    (A) m (B) $m + 1$

    (C) $2m$ (D) $2m + 1$

2. For some integer q, every odd integer is of the form

    (A) q (B) $q + 1$

    (C) $2q$ (D) $2q + 1$

3. $n^2 - 1$ is divisible by 8, if n is

   (A) an integer   (B) a natural number

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

4. If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is

   (A) 4   (B) 2

   (C) 1   (D) 3

5. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is

   (A) 13   (B) 65

   (C) 875   (D) 1750

6. If two positive integers a and b are written as

$a = x^3 y^2$ and $b = xy^3$; x, y are prime numbers, then HCF (a, b) is

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

7. If two positive integers p and q can be expressed as

$p = ab^2$ and $q = a^3 b$; a, b being prime numbers, then LCM (p, q) is

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

8. The product of a non-zero rational and an irrational number is

   (A) always irrational   (B) always rational

   (C) rational or irrational   (D) one

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

   (A) 10   (B) 100   (C) 504   (D) 2520

10. The decimal expansion of the rational number $\dfrac{14587}{1250}$ will terminate after:

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

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

(C) Short Answer Questions with Reasoning

Sample Question 1: The values of the remainder r, when a positive integer a is divided by 3 are 0 and 1 only. Justify your answer.

Solution : No.

According to Euclid's division lemma,

$$a = 3q + r, \text{ where } 0 \leq r < 3$$

and r is an integer. Therefore, the values of r can be 0, 1 or 2.

Sample Question 2: Can the number 6^n, n being a natural number, end with the digit 5? Give reasons.

Solution : No, because $6^n = (2 \times 3)^n = 2^n \times 3^n$, so the only primes in the factorisation of 6^n are 2 and 3, and not 5.

Hence, it cannot end with the digit 5.

EXERCISE 1.2

1. Write whether every positive integer can be of the form $4q + 2$, where q is an integer. Justify your answer.

2. "The product of two consecutive positive integers is divisible by 2". Is this statement true or false? Give reasons.

3. "The product of three consecutive positive integers is divisible by 6". Is this statement true or false"? Justify your answer.

4. Write whether the square of any positive integer can be of the form $3m + 2$, where m is a natural number. Justify your answer.

5. A positive integer is of the form $3q + 1$, q being a natural number. Can you write its square in any form other than $3m + 1$, i.e., $3m$ or $3m + 2$ for some integer m? Justify your answer.

6. The numbers 525 and 3000 are both divisible only by 3, 5, 15, 25 and 75. What is HCF (525, 3000)? Justify your answer.

7. Explain why $3 \times 5 \times 7 + 7$ is a composite number.

8. Can two numbers have 18 as their HCF and 380 as their LCM? Give reasons.

9. Without actually performing the long division, find if $\dfrac{987}{10500}$ will have terminating or non-terminating (repeating) decimal expansion. Give reasons for your answer.

10. A rational number in its decimal expansion is 327.7081. What can you say about the prime factors of q, when this number is expressed in the form $\dfrac{p}{q}$? Give reasons.

(D) Short Answer Questions

Sample Question 1: Using Euclid's division algorithm, find which of the following pairs of numbers are co-prime:

(i) 231, 396   (ii) 847, 2160

Solution : Let us find the HCF of each pair of numbers.

(i) $396 = 231 \times 1 + 165$

        $231 = 165 \times 1 + 66$

        $165 = 66 \times 2 + 33$

        $66 = 33 \times 2 + 0$

Therefore, HCF = 33. Hence, numbers are not co-prime.

(ii) $2160 = 847 \times 2 + 466$

        $847 = 466 \times 1 + 381$

        $466 = 381 \times 1 + 85$

        $381 = 85 \times 4 + 41$

        $85 = 41 \times 2 + 3$

        $41 = 3 \times 13 + 2$

        $3 = 2 \times 1 + 1$

        $2 = 1 \times 2 + 0$

Therefore, the HCF = 1. Hence, the numbers are co-prime.

Sample Question 2: Show that the square of an odd positive integer is of the form $8m + 1$, for some whole number m.

Solution: Any positive odd integer is of the form $2q + 1$, where q is a whole number.

Therefore, $(2q + 1)^2 = 4q^2 + 4q + 1 = 4q(q + 1) + 1,$ (1)

        $q(q + 1)$ is either 0 or even. So, it is $2m$, where m is a whole number.

Therefore, $(2q + 1)^2 = 4.2\,m + 1 = 8\,m + 1.$ [From (1)]

Sample Question 3: Prove that $\sqrt{2} + \sqrt{3}$ is irrational.

Solution : Let us suppose that $\sqrt{2} + \sqrt{3}$ is rational. Let $\sqrt{2} + \sqrt{3} = a$, where a is rational.

Therefore, $\sqrt{2} = a - \sqrt{3}$

Squaring on both sides, we get

$2 = a^2 + 3 - 2a\sqrt{3}$

Therefore, $\sqrt{3} = \dfrac{a^2 + 1}{2a}$, which is a contradiction as the right hand side is a rational

number while $\sqrt{3}$ is irrational. Hence, $\sqrt{2} + \sqrt{3}$ is irrational.

<h2 style="text-align:center">EXERCISE 1.3</h2>

1. Show that the square of any positive integer is either of the form $4q$ or $4q + 1$ for some integer q.

2. Show that cube of any positive integer is of the form $4m$, $4m + 1$ or $4m + 3$, for some integer m.

3. Show that the square of any positive integer cannot be of the form $5q + 2$ or $5q + 3$ for any integer q.

4. Show that the square of any positive integer cannot be of the form $6m + 2$ or $6m + 5$ for any integer m.

5. Show that the square of any odd integer is of the form $4q + 1$, for some integer q.

6. If n is an odd integer, then show that $n^2 - 1$ is divisible by 8.

7. Prove that if x and y are both odd positive integers, then $x^2 + y^2$ is even but not divisible by 4.

8. Use Euclid's division algorithm to find the HCF of 441, 567, 693.

9. Using Euclid's division algorithm, find the largest number that divides 1251, 9377 and 15628 leaving remainders 1, 2 and 3, respectively.

10. Prove that $\sqrt{3} + \sqrt{5}$ is irrational.

11. Show that 12^n cannot end with the digit 0 or 5 for any natural number n.

12. On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?

13. Write the denominator of the rational number $\dfrac{257}{5000}$ in the form $2^m \times 5^n$, where

m, *n* are non-negative integers. Hence, write its decimal expansion, without actual division.

14. Prove that $\sqrt{p} + \sqrt{q}$ is irrational, where *p*, *q* are primes.

(E) Long Answer Questions

Sample Question 1 : Show that the square of an odd positive integer can be of the form $6q + 1$ or $6q + 3$ for some integer *q*.

Solution : We know that any positive integer can be of the form $6m$, $6m + 1$, $6m + 2$, $6m + 3$, $6m + 4$ or $6m + 5$, for some integer *m*.

Thus, an odd positive integer can be of the form $6m + 1$, $6m + 3$, or $6m + 5$
Thus we have:

$(6m +1)^2 = 36m^2 + 12m + 1 = 6(6m^2 + 2m) + 1 = 6q + 1$, q is an integer

$(6m + 3)^2 = 36m^2 + 36m + 9 = 6(6m^2 + 6m + 1) + 3 = 6q + 3$, q is an integer

$(6m + 5)^2 = 36m^2 + 60m + 25 = 6(6m^2 + 10m + 4) + 1 = 6q + 1$, q is an integer.

Thus, the square of an odd positive integer can be of the form $6q + 1$ or $6q + 3$.

EXERCISE 1.4

1. Show that the cube of a positive integer of the form $6q + r$, q is an integer and $r = 0, 1, 2, 3, 4, 5$ is also of the form $6m + r$.

2. Prove that one and only one out of n, $n + 2$ and $n + 4$ is divisible by 3, where n is any positive integer.

3. Prove that one of any three consecutive positive integers must be divisible by 3.

4. For any positive integer n, prove that $n^3 - n$ is divisible by 6.

5. Show that one and only one out of n, $n + 4$, $n + 8$, $n + 12$ and $n + 16$ is divisible by 5, where n is any positive integer.

[**Hint:** Any positive integer can be written in the form $5q$, $5q+1$, $5q+2$, $5q+3$, $5q+4$].

POLYNOMIALS

(A) Main Concepts and Results

- Geometrical meaning of zeroes of a polynomial: The zeroes of a polynomial $p(x)$ are precisely the x-coordinates of the points where the graph of $y = p(x)$ intersects the x-axis.

- Relation between the zeroes and coefficients of a polynomial: If α and β are the zeroes of a quadratic polynomial $ax^2 + bx + c$, then $\alpha + \beta = -\dfrac{b}{a}$, $\alpha\beta = \dfrac{c}{a}$.

- If α, β and γ are the zeroes of a cubic polynomial $ax^3 + bx^2 + cx + d$, then
$$\alpha + \beta + \gamma = -\frac{b}{a}, \quad \alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a} \text{ and } \alpha\beta\gamma = \frac{-d}{a}.$$

- The division algorithm states that given any polynomial $p(x)$ and any non-zero polynomial $g(x)$, there are polynomials $q(x)$ and $r(x)$ such that $p(x) = g(x)\, q(x) + r(x)$, where $r(x) = 0$ or degree $r(x) <$ degree $g(x)$.

(B) Multiple Choice Questions

Choose the correct answer from the given four options:

Sample Question 1: If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

   (A)   10   (B)   –10   (C)   5   (D)   –5

Solution : Answer (B)

Sample Question 2: Given that two of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ are 0, the third zero is

(A) $\dfrac{-b}{a}$ (B) $\dfrac{b}{a}$ (C) $\dfrac{c}{a}$ (D) $-\dfrac{d}{a}$

Solution : Answer (A). [**Hint**: Because if third zero is α, sum of the zeroes $= \alpha + 0 + 0 = \dfrac{-b}{a}$]

EXERCISE 2.1

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

1. If one of the zeroes of the quadratic polynomial $(k-1)\,x^2 + k\,x + 1$ is –3, then the value of k is

   (A) $\dfrac{4}{3}$ (B) $\dfrac{-4}{3}$ (C) $\dfrac{2}{3}$ (D) $\dfrac{-2}{3}$

2. A quadratic polynomial, whose zeroes are –3 and 4, is

   (A) $x^2 - x + 12$ (B) $x^2 + x + 12$

   (C) $\dfrac{x^2}{2} - \dfrac{x}{2} - 6$ (D) $2x^2 + 2x - 24$

3. If the zeroes of the quadratic polynomial $x^2 + (a + 1)\,x + b$ are 2 and –3, then

   (A) $a = -7, b = -1$ (B) $a = 5, b = -1$

   (C) $a = 2, b = -6$ (D) $a = 0, b = -6$

4. The number of polynomials having zeroes as –2 and 5 is

   (A) 1   (B) 2   (C) 3   (D) more than 3

5. Given that one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, the product of the other two zeroes is

   (A) $-\dfrac{c}{a}$ (B) $\dfrac{c}{a}$ (C) 0 (D) $-\dfrac{b}{a}$

6. If one of the zeroes of the cubic polynomial $x^3 + ax^2 + bx + c$ is –1, then the product of the other two zeroes is

   (A) $b - a + 1$ (B) $b - a - 1$ (C) $a - b + 1$ (D) $a - b - 1$

7. The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are

(A)   both positive   (B) both negative

(C)   one positive and one negative   (D) both equal

8. The zeroes of the quadratic polynomial $x^2 + kx + k$, $k \neq 0$,

(A) cannot both be positive   (B) cannot both be negative

(C) are always unequal   (D) are always equal

9. If the zeroes of the quadratic polynomial $ax^2 + bx + c$, $c \neq 0$ are equal, then

(A) c and a have opposite signs   (B) c and b have opposite signs

(C) c and a have the same sign   (D) c and b have the same sign

10. If one of the zeroes of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then it

(A) has no linear term and the constant term is negative.

(B) has no linear term and the constant term is positive.

(C) can have a linear term but the constant term is negative.

(D) can have a linear term but the constant term is positive.

11. Which of the following is not the graph of a quadratic polynomial?

(A)

(B)

(C)

(D)
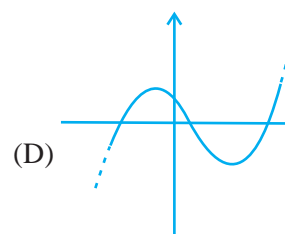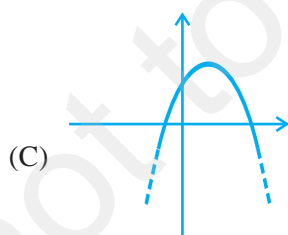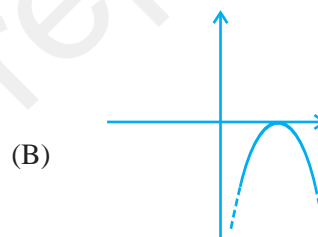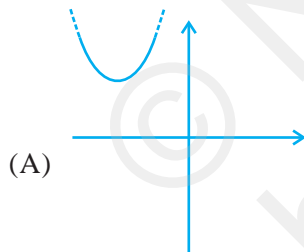
(C) Short Answer Questions with Reasoning

Sample Question 1: Can $x - 1$ be the remainder on division of a polynomial $p(x)$ by $2x + 3$? Justify your answer.

Solution : No, since degree $(x - 1) = 1 = $ degree $(2x + 3)$.

Sample Question 2: Is the following statement True or False? Justify your answer.

If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both negative, then a, b and c all have the same sign.

Solution : True, because $-\dfrac{b}{a} = $ sum of the zeroes < 0, so that $\dfrac{b}{a} > 0$. Also the product

of the zeroes $= \dfrac{c}{a} > 0$.

EXERCISE 2.2

1. Answer the following and justify:

    (i) Can $x^2 - 1$ be the quotient on division of $x^6 + 2x^3 + x - 1$ by a polynomial in x of degree 5?

    (ii) What will the quotient and remainder be on division of $ax^2 + bx + c$ by $px^3 + qx^2 + rx + s$, $p \neq 0$?

    (iii) If on division of a polynomial $p(x)$ by a polynomial $g(x)$, the quotient is zero, what is the relation between the degrees of $p(x)$ and $g(x)$?

    (iv) If on division of a non-zero polynomial $p(x)$ by a polynomial $g(x)$, the remainder is zero, what is the relation between the degrees of $p(x)$ and $g(x)$?

    (v) Can the quadratic polynomial $x^2 + kx + k$ have equal zeroes for some odd integer $k > 1$?

2. Are the following statements 'True' or 'False'? Justify your answers.

    (i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a, b and c all have the same sign.

    (ii) If the graph of a polynomial intersects the x-axis at only one point, it cannot be a quadratic polynomial.

    (iii) If the graph of a polynomial intersects the x-axis at exactly two points, it need not be a quadratic polynomial.

    (iv) If two of the zeroes of a cubic polynomial are zero, then it does not have linear and constant terms.

(v)   If all the zeroes of a cubic polynomial are negative, then all the coefficients and the constant term of the polynomial have the same sign.

(vi)   If all three zeroes of a cubic polynomial $x^3 + ax^2 - bx + c$ are positive, then at least one of a, b and c is non-negative.

(vii) The only value of k for which the quadratic polynomial $kx^2 + x + k$ has equal zeros is $\dfrac{1}{2}$

(D) Short Answer Questions

Sample Question 1: Find the zeroes of the polynomial $x^2 + \dfrac{1}{6}x - 2$, and verify the relation between the coefficients and the zeroes of the polynomial.

Solution : $x^2 + \dfrac{1}{6}x - 2 = \dfrac{1}{6}(6x^2 + x - 12) = \dfrac{1}{6}[6x^2 + 9x - 8x - 12]$

$$= \dfrac{1}{6}[3x(2x+3) - 4(2x+3)] = \dfrac{1}{6}(3x-4)(2x+3)$$

Hence, $\dfrac{4}{3}$ and $-\dfrac{3}{2}$ are the zeroes of the given polynomial.

The given polynomial is $x^2 + \dfrac{1}{6}x - 2$.

The sum of zeroes $= \dfrac{4}{3} + \left(-\dfrac{3}{2}\right) = \dfrac{-1}{6} = -\dfrac{\text{Coefficient of } x}{\text{Coefficient of } x^2}$ and

the product of zeroes $= \dfrac{4}{3}\left(\dfrac{-3}{2}\right) = -2 = \dfrac{\text{Constant term}}{\text{Coefficient of } x^2}$

EXERCISE 2.3

Find the zeroes of the following polynomials by factorisation method and verify the relations between the zeroes and the coefficients of the polynomials:

1. $4x^2 - 3x - 1$ 2. $3x^2 + 4x - 4$

3. $5t^2 + 12t + 7$ **4.** $t^3 - 2t^2 - 15t$

5. $2x^2 + \dfrac{7}{2}x + \dfrac{3}{4}$ **6.** $4x^2 + 5\sqrt{2}\,x - 3$

7. $2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$ **8.** $v^2 + 4\sqrt{3}\,v - 15$

9. $y^2 + \dfrac{3}{2}\sqrt{5}\,y - 5$ **10.** $7y^2 - \dfrac{11}{3}y - \dfrac{2}{3}$

(E) Long Answer Questions

Sample Question 1: Find a quadratic polynomial, the sum and product of whose

zeroes are $\sqrt{2}$ and $-\dfrac{3}{2}$, respectively. Also find its zeroes.

Solution : A quadratic polynomial, the sum and product of whose zeroes are

$\sqrt{2}$ and $-\dfrac{3}{2}$ is $x^2 - \sqrt{2}\,x - \dfrac{3}{2}$

$$x^2 - \sqrt{2}\,x - \dfrac{3}{2} = \dfrac{1}{2}\,[2x^2 - 2\sqrt{2}\,x - 3]$$

$$= \dfrac{1}{2}\,[2x^2 + \sqrt{2}\,x - 3\sqrt{2x} - 3]$$

$$= \dfrac{1}{2}\,[\sqrt{2}\,x\,(\sqrt{2}\,x + 1) - 3\,(\sqrt{2}\,x + 1)]$$

$$= \dfrac{1}{2}\,[\sqrt{2}\,x + 1]\,[\sqrt{2}\,x - 3]$$

Hence, the zeroes are $-\dfrac{1}{\sqrt{2}}$ and $\dfrac{3}{\sqrt{2}}$.

Sample Question 2: If the remainder on division of $x^3 + 2x^2 + kx + 3$ by $x - 3$ is 21, find the quotient and the value of k. Hence, find the zeroes of the cubic polynomial $x^3 + 2x^2 + kx - 18$.

Solution : Let $p(x) = x^3 + 2x^2 + kx + 3$

Then, $p(3) = 3^3 + 2 \times 3^2 + 3k + 3 = 21$

i.e., $3k = -27$

i.e., $k = -9$

Hence, the given polynomial will become $x^3 + 2x^2 - 9x + 3$.

Now, $x - 3) \overline{x^3 + 2x^2 - 9x + 3} (x^2 + 5x + 6$

$$
\begin{array}{r}
\underline{x^3 - 3x^2} \\
5x^2 - 9x + 3 \\
\underline{5x^2 - 15x} \\
6x + 3 \\
\underline{6x - 18} \\
21
\end{array}
$$

So, $x^3 + 2x^2 - 9x + 3 = (x^2 + 5x + 6)(x - 3) + 21$

i.e., $x^3 + 2x^2 - 9x - 18 = (x - 3)(x^2 + 5x + 6)$

                                            $= (x - 3)(x + 2)(x + 3)$

So, the zeroes of $x^3 + 2x^2 + kx - 18$ are $3, -2, -3$.

EXERCISE 2.4

1. For each of the following, find a quadratic polynomial whose sum and product respectively of the zeroes are as given. Also find the zeroes of these polynomials by factorisation.

   (i) $\dfrac{-8}{3}, \dfrac{4}{3}$ (ii) $\dfrac{21}{8}, \dfrac{5}{16}$

   (iii) $-2\sqrt{3}, -9$ (iv) $\dfrac{-3}{2\sqrt{5}}, -\dfrac{1}{2}$

2. Given that the zeroes of the cubic polynomial $x^3 - 6x^2 + 3x + 10$ are of the form a, $a + b$, $a + 2b$ for some real numbers a and b, find the values of a and b as well as the zeroes of the given polynomial.

3. Given that $\sqrt{2}$ is a zero of the cubic polynomial $6x^3 + \sqrt{2}\,x^2 - 10x - 4\sqrt{2}$, find its other two zeroes.

4. Find k so that $x^2 + 2x + k$ is a factor of $2x^4 + x^3 - 14\,x^2 + 5x + 6$. Also find all the zeroes of the two polynomials.

5. Given that $x - \sqrt{5}$ is a factor of the cubic polynomial $x^3 - 3\sqrt{5}x^2 + 13x - 3\sqrt{5}$, find all the zeroes of the polynomial.

6. For which values of a and b, are the zeroes of $q(x) = x^3 + 2x^2 + a$ also the zeroes of the polynomial $p(x) = x^5 - x^4 - 4x^3 + 3x^2 + 3x + b$? Which zeroes of $p(x)$ are not the zeroes of $q(x)$?
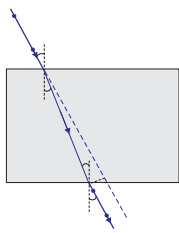
Light – Reflection and Refraction

Multiple Choice Questions

1. Which of the following can make a parallel beam of light when light from a point source is incident on it?

(a) Concave mirror as well as convex lens
(b) Convex mirror as well as concave lens
(c) Two plane mirrors placed at 90° to each other
(d) Concave mirror as well as concave lens

2. A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5 mm long image of the awl pin is formed at 30 cm in front of the mirror. The focal length of this mirror is

(a) – 30 cm   (b) – 20 cm
(c) – 40 cm   (d) – 60 cm

3. Under which of the following conditions a concave mirror can form an image larger than the actual object?

(a) When the object is kept at a distance equal to its radius of curvature
(b) When object is kept at a distance less than its focal length
(c) When object is placed between the focus and centre of curvature
(d) When object is kept at a distance greater than its radius of curvature

4. Figure 10.1 shows a ray of light as it travels from medium A to medium B. Refractive index of the medium B relative to medium A is

(a) $\sqrt{3}/\sqrt{2}$

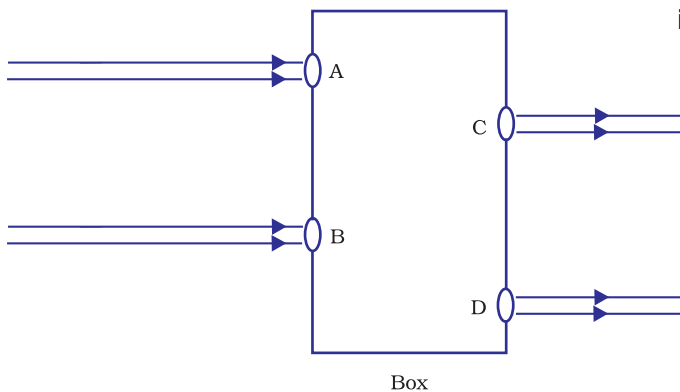(b) $\sqrt{2}/\sqrt{3}$

(c) $1/\sqrt{2}$

(d) $\sqrt{2}$
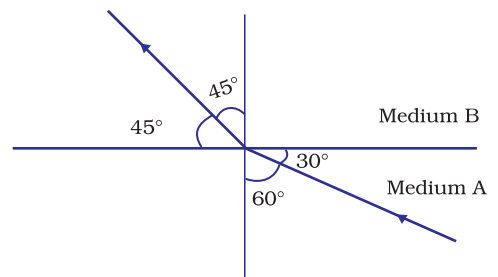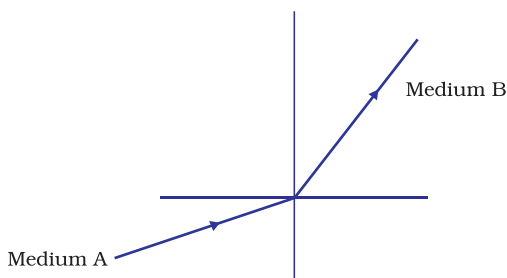
Fig. 10.1

Fig. 10.2

5. A light ray enters from medium A to medium B as shown in Figure 10.2. The refractive index of medium B relative to A will be

(a) greater than unity

(b) less than unity

(c) equal to unity

(d) zero

6. Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in the Figure10.3. Which of the following could be inside the box?

(a) A rectangular glass slab

(b) A convex lens

(c) A concave lens

(d) A prism

Box
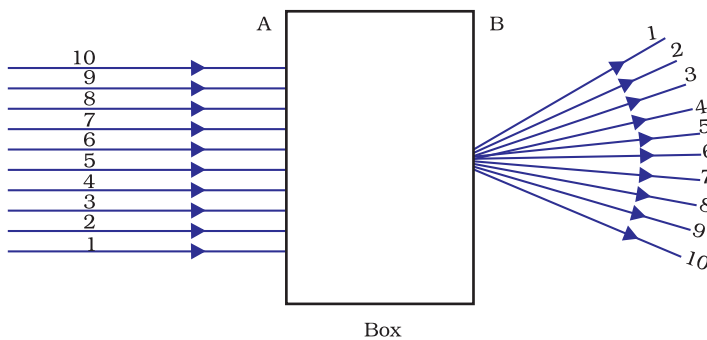
Fig. 10.3

7. A beam of light is incident through the holes on side A and emerges out of the holes on the other face of the box as shown in the Figure 10.4. Which of the following could be inside the box?

(a) Concave lens

(b) Rectangular glass slab

(c) Prism

(d) Convex lens

Box

Fig. 10.4

8. Which of the following statements is true?

(a) A convex lens has 4 dioptre power having a focal length 0.25 m

(b) A convex lens has −4 dioptre power having a focal length 0.25 m

(c) A concave lens has 4 dioptre power having a focal length 0.25 m

(d) A concave lens has −4 dioptre power having a focal length 0.25 m

9. Magnification produced by a rear view mirror fitted in vehicles

   (a) is less than one

   (b) is more than one

   (c) is equal to one

   (d) can be more than or less than one depending upon the position of the object in front of it

10. Rays from Sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that size of its image is equal to the size of the object?

   (a) 15 cm in front of the mirror

   (b) 30 cm in front of the mirror

   (c) between 15 cm and 30 cm in front of the mirror

   (d) more than 30 cm in front of the mirror

11. A full length image of a distant tall building can definitely be seen by using

   (a) a concave mirror

   (b) a convex mirror

   (c) a plane mirror

   (d) both concave as well as plane mirror

12. In torches, search lights and headlights of vehicles the bulb is placed

   (a) between the pole and the focus of the reflector

   (b) very near to the focus of the reflector

   (c) between the focus and centre of curvature of the reflector

   (d) at the centre of curvature of the reflector

13. The laws of reflection hold good for

   (a) plane mirror only

   (b) concave mirror only

   (c) convex mirror only

   (d) all mirrors irrespective of their shape

14. The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in Figure 10.5. Which one of them is correct?

   (a) A

   (b) B

   (c) C

   (d) D
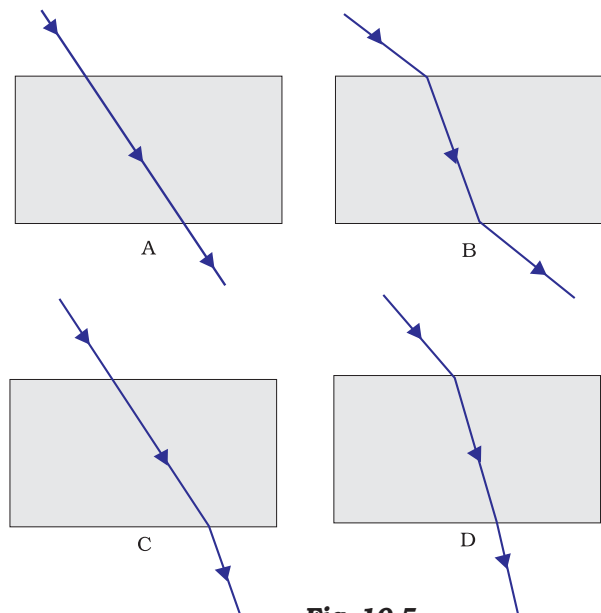
Fig. 10.5

15. You are given water, mustard oil, glycerine and kerosene. In which of these media a ray of light incident obliquely at same angle would bend the most?

(a) Kerosene

(b) Water

(c) Mustard oil

(d) Glycerine

16. Which of the following ray diagrams is correct for the ray of light incident on a concave mirror as shown in Figure 10.6?
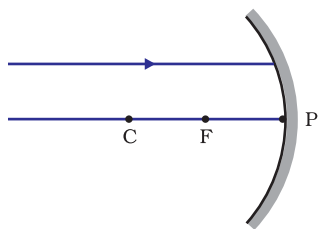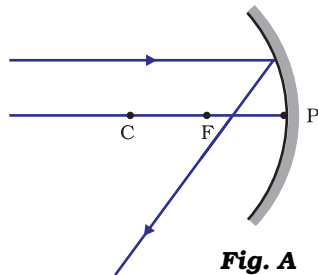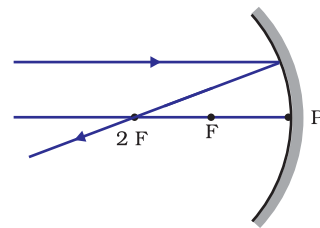

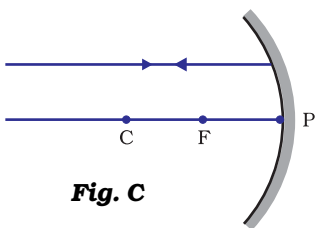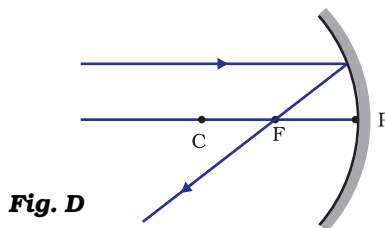**Fig. 10.6**

Fig. A

Fig. B

Fig. C

Fig. D

(a) Fig. A

(b) Fig. B

(c) Fig. C

(d) Fig. D

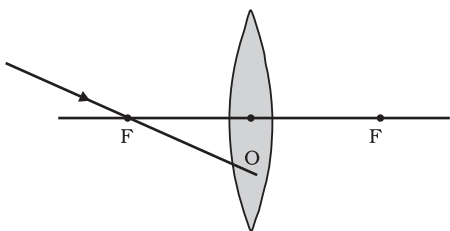**17.** Which of the following ray diagrams is correct for the ray of light incident on a lens shown in Fig. 10.7?
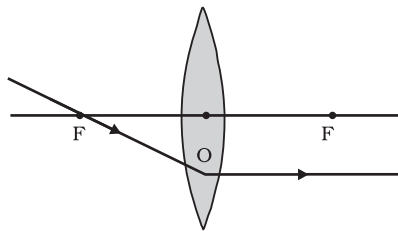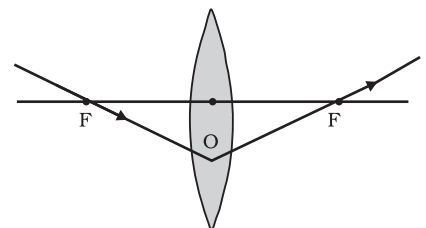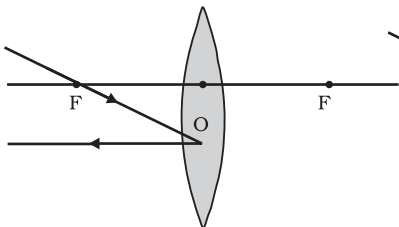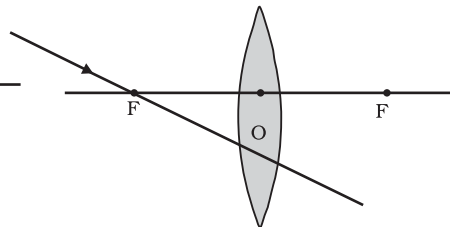

Fig. 10.7

Fig. A

Fig. B

Fig. C

Fig. D

(a) Fig. A.

(b) Fig. B.

(c) Fig. C.

(d) Fig. D.

18. A child is standing in front of a magic mirror. She finds the image of her head bigger, the middle portion of her body of the same size and that of the legs smaller. The following is the order of combinations for the magic mirror from the top.

(a) Plane, convex and concave

(b) Convex, concave and plane

(c) Concave, plane and convex

(d) Convex, plane and concave

19. In which of the following, the image of an object placed at infinity will be highly diminished and point sized?

(a) Concave mirror only

(b) Convex mirror only

(c) Convex lens only

(d) Concave mirror, convex mirror, concave lens and convex lens

Short Answer Questions

20. Identify the device used as a spherical mirror or lens in following cases, when the image formed is virtual and erect in each case.

(a) Object is placed between device and its focus, image formed is enlarged and behind it.

(b) Object is placed between the focus and device, image formed is enlarged and on the same side as that of the object.

(c) Object is placed between infinity and device, image formed is diminished and between focus and optical centre on the same side as that of the object.

(d) Object is placed between infinity and device, image formed is diminished and between pole and focus, behind it.

21. Why does a light ray incident on a rectangular glass slab immersed in any medium emerges parallel to itself? Explain using a diagram.

22. A pencil when dipped in water in a glass tumbler appears to be bent at the interface of air and water. Will the pencil appear to be bent to the same extent, if instead of water we use liquids like, kerosene or turpentine. Support your answer with reason.

23. How is the refractive index of a medium related to the speed of light? Obtain an expression for refractive index of a medium with respect to another in terms of speed of light in these two media?

24. Refractive index of diamond with respect to glass is 1.6 and absolute refractive index of glass is 1.5. Find out the absolute refractive index of diamond.

25. A convex lens of focal length 20 cm can produce a magnified virtual as well as real image. Is this a correct statement? If yes, where shall the object be placed in each case for obtaining these images?

26. Sudha finds out that the sharp image of the window pane of her science laboratory is formed at a distance of 15 cm from the lens. She now tries to focus the building visible to her outside the window instead of the window pane without disturbing the lens. In which direction will she move the screen to obtain a sharp image of the building? What is the approximate focal length of this lens?

27. How are power and focal length of a lens related? You are provided with two lenses of focal length 20 cm and 40 cm respectively. Which lens will you use to obtain more convergent light?

28. Under what condition in an arrangement of two plane mirrors, incident ray and reflected ray will always be parallel to each other, whatever may be angle of incidence. Show the same with the help of diagram.

29. Draw a ray diagram showing the path of rays of light when it enters with oblique incidence (i) from air into water; (ii) from water into air.

Long Answer Questions

30. Draw ray diagrams showing the image formation by a concave mirror when an object is placed

    (a) between pole and focus of the mirror
    (b) between focus and centre of curvature of the mirror
    (c) at centre of curvature of the mirror
    (d) a little beyond centre of curvature of the mirror
    (e) at infinity

31. Draw ray diagrams showing the image formation by a convex lens when an object is placed

    (a) between optical centre and focus of the lens
    (b) between focus and twice the focal length of the lens
    (c) at twice the focal length of the lens
    (d) at infinity
    (e) at the focus of the lens

32. Write laws of refraction. Explain the same with the help of ray diagram, when a ray of light passes through a rectangular glass slab.

33. Draw ray diagrams showing the image formation by a concave lens when an object is placed

   (a) at the focus of the lens
   (b) between focus and twice the focal length of the lens
   (c) beyond twice the focal length of the lens

34. Draw ray diagrams showing the image formation by a convex mirror when an object is placed

   (a) at infinity
   (b) at finite distance from the mirror

35. The image of a candle flame formed by a lens is obtained on a screen placed on the other side of the lens. If the image is three times the size of the flame and the distance between lens and image is 80 cm, at what distance should the candle be placed from the lens? What is the nature of the image at a distance of 80 cm and the lens?

36. Size of image of an object by a mirror having a focal length of 20 cm is observed to be reduced to 1/3rd of its size. At what distance the object has been placed from the mirror? What is the nature of the image and the mirror?

37. Define power of a lens. What is its unit? One student uses a lens of focal length 50 cm and another of –50 cm. What is the nature of the lens and its power used by each of them?

38. A student focussed the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle screen and the lens as under

   Position of candle   = 12.0 cm

   Position of convex lens = 50.0 cm

   Position of the screen   = 88.0 cm

   (i) What is the focal length of the convex lens?
   (ii) Where will the image be formed if he shifts the candle towards the lens at a position of 31.0 cm?
   (iii) What will be the nature of the image formed if he further shifts the candle towards the lens?
   (iv) Draw a ray diagram to show the formation of the image in case (iii) as said above.

MULTIPLE CHOICE QUESTIONS

1. Autotrophic organisms include
   (a) bacteria and virus
   (b) green plants and all bacteria
   (c) bacteria and fungi
   (d) green plants and some bacteria

2. Which gland is not associated with human alimentary canal?
   (a) salivary glands
   (b) adrenal gland
   (c) liver
   (d) pancreas

3. In humans, bile juice is secreted by
   (a) pancreas
   (b) small intestine
   (c) esophagus
   (d) liver

4. An enzyme which can only act in acidic medium is
   (a) pepsin
   (b) trypsin
   (c) renin
   (d) amylase

5. Which is the first part of the small intestine in humans?
   (a) duodenum
   (b) jejunum
   (c) ileum
   (d) caecum

6. The part of digestive system where no digestion occurs
   (a) duodenum
   (b) esophagus
   (c) stomach
   (d) mouth

7. Large intestine in man mainly carries out
   (a) absorption
   (b) adsorption
   (c) assimilation
   (d) acidification

8. Which of the following are chiefly digested in the stomach?
   (a) protein
   (b) carbohydrate
   (c) lipids
   (d) fats

9. Digestion is
   (a) conversion of large food particles into small food particles
   (b) conversion of small food particles into large food particles
   (c) conversion of food into protoplasm
   (d) conversion of non-diffusible food particles into diffusible food

10. Digestion in a *Hydra* takes place within its
    (a) mouth
    (b) gastrovascular cavity
    (c) coelom
    (d) gut

11. Digestion within a digestive tract is
    (a) incomplete
    (b) extracellular
    (c) the same as absorption
    (d) an irreversible process

12. The main function of prolonged chewing is to rupture
    (a) membranes
    (b) cell wall
    (c) connective
    (d) muscle bundle

13. Muscular contractions of alimentary canal are
    (a) circulation
    (b) deglutition
    (c) peristalsis
    (d) churning

14. With regards to natural eating habits, a human is
    (a) an herbivore
    (b) a carnivore
    (c) an omnivore
    (d) a granivore

15. Which of the following animals has no need for a gall bladder?
    (a) horse
    (b) lion
    (c) dog
    (d) human

16. Which of the following regions of the alimentary canal of man does not secrete a digestive enzyme?

(a) oesophagus
(b) stomach
(c) duodenum
(d) mouth

17. Germs entering the body through food are mainly killed in the region of alimentary canal where pH may reach the level
   (a) 2
   (b) 7
   (c) 10
   (d) zero

18. Which teeth are different in shape, size and function then these are called
   (a) acrodont
   (b) pleurodont
   (c) homodont
   (d) heterodont

19. Number of teeth, which are replaced in man
   (a) 20
   (b) 28
   (c) 32
   (d) 12

20. Bulk of the tooth in mammals is made up of
   (a) dentine
   (b) enamel
   (c) pulp cavity
   (d) root

21. The layer of cells that secretes enamel of tooth is
   (a) dentoblast
   (b) osteoblast
   (c) ameloblasts
   (d) odontoblast

22. The hardest part of a tooth is the
   (a) dentine
   (b) enamel
   (c) pulp
   (d) dental tubules

23. The incisor tooth is meant for
   (a) biting and cutting
   (b) chewing
   (c) munching and chewing
   (d) munching

24. Diastema is associated with
   (a) presence of certain teeth
   (b) absence of certain teeth

(c) absence of tongue
(d) presence of tongue

25. Among mammals, an herbivore has
   (a) more teeth than carnivore
   (b) flatter teeth than carnivore
   (c) teeth that are more pointed than carnivore
   (d) fever teeth than a carnivore

26. A dental disease characterised by mottling of teeth is due to the presence of an ingredient in drinking water, namely
   (a) fluorine
   (b) mercury
   (c) boron
   (d) chlorine

27. About how much saliva does a person produce each day?
   (a) 100 ml
   (b) 250 ml
   (c) 500 ml
   (d) 1500 ml

28. A digestive enzyme, salivary amylase, in the saliva begin digestion of
   (a) protein
   (b) nucleic acids
   (c) facts
   (d) carbohydrates

29. A lubricant, mucin, in saliva is made up of
   (a) polyunsaturated facts
   (b) actin and myosin
   (c) glycoproteins
   (d) phospholipids

30. A bolus is
   (a) a mass of crushed food moistened with saliva
   (b) the semisolid material resulting from partial digestion in the stomach
   (c) the milky emulsified fat absorbed from small intestine
   (d) indigestible materials that helps in movement and absorption

31. If you chew on a piece of bread long enough, it will begin to taste sweet because
   (a) maltase is breaking down maltose
   (b) lipases are forming fatty acids

MULTIPLE CHOICE QUESTIONS

Tick (✓) the correct choice amongst the following:

1. A proton is identical to
   - (a) the nucleus of helium
   - (b) the nucleus of a hydrogen atom
   - (c) a molecule of a hydrogen
   - (d) an atom of hydrogen

2. An α particle is
   - (a) a hydrogen molecule
   - (b) a helium nucleus
   - (c) an electron
   - (d) a proton

3. The atomic number of an element is determined by
   - (a) the number of electrons in one atom
   - (b) the number of neutrons in one atom
   - (c) the valency of the element
   - (d) the number of protons in one atom

4. The value of e/m of an electron was measured by:
   - (a) Millikan
   - (b) J.J. Thomson
   - (c) Dalton
   - (d) Rutherford

5. The atomic number of an element is 11 and its mass number is 23. The respective number of electrons, protons and neutrons in this atom will be
   - (a) 11, 11, 12
   - (b) 11, 12, 11
   - (c) 12, 11, 11
   - (d) 23, 11, 23

6. The number of electrons in the outer shell of the most stable or inert atoms is
   - (a) 1
   - (b) 4
   - (c) 6
   - (d) 8

7. Which of the following pairs are isotopes?
   - (a) oxygen and ozone
   - (b) ice and steam
   - (c) nitric oxide and nitrogen dioxide
   - (d) hydrogen and deuterium

8. An atom which has a mass number of 14 and has 8 neutrons is an:
   - (a) isotope of oxygen
   - (b) isobar of oxygen
   - (c) isotope of carbon
   - (d) isobar of carbon

9. Which of the following has an equal number of neutrons and protons?
   (a) hydrogen
   (b) deuterium
   (c) fluorine
   (d) chlorine

10. Members of which of the following have similar chemical properties?
    (a) isotope
    (b) isobars
    (c) allotropes
    (d) both isotopes and allotropes

11. An atom of an element has 26 electrons and has a mass number 56. The nucleus of this atom contains _____ neutrons.
    (a) 26
    (b) 36
    (c) 30
    (d) 56

12. For an element with atomic number 19, the 19th electron will occupy
    (a) L-shell
    (b) M-shell
    (c) N-shell
    (d) K-shell

13. The number of electrons in an element with atomic number X and mass number Y will be
    (a) $X - Y$
    (b) $Y - X$
    (c) $X + Y$
    (d) X

14. A natural phenomenon that supports the experimental conclusion that atoms are divisible is
    (a) allotropy
    (b) radioactivity
    (c) cracking
    (d) none of these

15. The relative atomic masses of many elements are not whole numbers because
    (a) they cannot be determined very accurately
    (b) the atoms ionize during the determinations
    (c) of the existence of isotopes
    (d) of the presence of impurities

16. The valency of an element is
    (a) the mass of the element displacing 1 part by the mass of hydrogen
    (b) the mass of the element combining with 8 parts by mass of oxygen
    (c) the number of atoms of hydrogen combining with 1 atom of the given element
    (d) the number of atoms in 1 molecule of the given element

17. The absolute charge of the electron is.
    (a) $1.1 \times 10^{11} C$
    (b) $1.6 \times 10^{14} C$
    (c) 1.6×10^{19}
    (d) $6.0 \times 10^{-21} C$

18. The fundamental particles not present in the nucleus of hydrogen atom is
    (a) electron
    (b) proton
    (c) neutron
    (d) none of these

19. The number of valence electrons present in Ca atom
    (a) 3
    (b) 2
    (c) 8
    (d) 6

20. The maximum number of electrons that can be accommodated in M Shell of an atom are
    (a) 8
    (b) 32
    (c) 18
    (d) 25

21. An atom has 16 neutrons in its nucleus. The Atomic no. of the element is 15 the mass number of the element is
    (a) 15
    (b) 16
    (c) 31
    (d) None of these

22. The oil drop experiment by R.A. Mullikan was performed to find
    (a) charge on the neutron
    (b) charge on the electron
    (c) charge on the Proton
    (d) none of these

23. The particle used by Rutherford in α-ray scattering experiment was
    (a) neutron
    (b) electron
    (c) helium nuclei
    (d) X rays

24. The experiment which led to the discovery of nucleus was performed by
    (a) Goldstein
    (b) J.J. Thomson
    (c) Dalton
    (d) Rutherford

25. The size of the nucleus is approximately
    (a) $10^{-18} m$
    (b) $10^{-10} m$
    (c) $10^{-8} m$
    (d) none of these

26. The electronic configuration of the element with Atomic number 19 is
    (a) 2,8,7
    (b) 2,9,8
    (c) 2,8,8,1
    (d) 2,10,7

27. The valence electrons of an element are responsible for

(a) physical properties of an element
(b) chemical properties of an element
(c) both the properties
(d) none of these

28. An element has electronic configuration 2,8,4. It will be classified as
(a) metal
(b) non metat
(c) metalloid
(d) none of these

29. Isotopes of an element do not have
(a) same number of electrons
(b) same physical properties
(c) same chemical properties
(d) same electrical charge on the nucleus

30. Amongst element X (2,8,6) and Y (2,8,8) which is more reactive and why?
(a) X because it is a metal
(b) Y because it is non metal
(c) X because it has 6 valence electrons
(d) Y because it is gas

31. Cathode rays have
(a) mass only
(b) charge only
(c) both mass and charge
(d) neither mass nor charge

32. Which of these is a pairs of isobar?
(a) $_6C^{12}$, $_8O^{16}$
(b) $_6C^{13}$, $_6C^{14}$
(c) $_{20}Ca^{40}$, $_{18}Ar^{40}$
(d) None of these

33. $_7N^{15}$ and $_8O^{16}$ are a pair of
(a) isotopes
(b) isobars
(c) isotones
(d) none of them

34. The nucleus of the hydrogen atom is called as
(a) neutron
(b) electron
(c) proton
(d) nucleons

35. The e/m value for cathode rays
(a) varies with the nature of the gas
(b) does not vary with the nature of gas
(c) could not be determined by J.J. Thomson
(d) both (b) and (c) are correct

36. Cathode rays get deflected in an electric field towards
(a) positive Plate
(b) negative plate
(c) no deflection takes place
(d) first towards negative plate and then towards positive plate

37. Isotopes differ in
(a) no. of electrons
(b) no. of protons
(c) no. of neutrons
(d) chemical reactivity

38. The atomic number of an element 'y' is 20. The electronic configuration of the ion having inert gas configuration is
(a) 2,8,10
(b) 2,18
(c) 2,10,8
(d) 2,8,8

39. Which amongst the following statement is true?
(a) α rays are cathode rays
(b) Electrons make up the cathode rays
(c) Protons make up the cathode rays
(d) Electro magnetic radiations make up the cathode rays

40. The isotope of hydrogen that contains the same number of protons and neutrons in its nucleus is called
(a) protium
(b) deutrium
(c) tritium
(d) none of these

41. C-14 has a half life of
(a) 11520 yrs
(b) 2880 yrs
(c) 5760 yrs
(d) 17280 yrs

42. α particle is emitted by $_{92}X^{238}$ during radioactivity. The new specie y should be:
(a) $_{90}Y^{234}$
(b) $_{90}Y^{238}$
(c) $_{92}Y^{234}$
(b) $_{94}Y^{234}$

43. When an α-particle is emitted
(a) element moves 2 places to the right in the periodic table
(b) element moves one place to the left
(c) element moves 2 places to the left in the periodic table
(d) elements maintains its position

44. If the nuclide of actinium $_{89}Ac^{228}$, emits β particle, the daughter nuclide will be
(a) $_{88}Ra^{228}$
(b) $_{90}Th^{228}$
(c) $_{87}Fr^{224}$
(d) $_{90}Th^{229}$

45. The relative atomic masses of many elements are not whole numbers because
(a) they can't be determined very accurately
(b) the atoms ionize during the determination
(c) of the existence of isotopes
(d) of the presence of impurities

NTSE PREVIOUS YEAR QUESTIONS

1. H.C.F. and L.C.M. of expressions $(x^3 - 1)$ and A are $(x - 1)$ and $(x^6 - 1)$ respectively. Then the value of A is :

   [Raj. NTSE Stage -1 2005]

   (A) $x^3 + 1$ (B) $x^4 - x^3 + x - 1$

   (C) $(x - 1)(x^2 - x + 1)$ (D) $(x - 1)(x^2 + x + 1)$

2. H.C.F. of $x^2 + 5x + 6$ and $x^3 + 27$ is :

   [Raj. NTSE Stage-1 2006]

   (A) $x + 2$ (B) $x - 2$

   (C) $x - 3$ (D) $x + 3$

3. The value of x in the equation $\dfrac{x-1}{x+1} = \dfrac{x+5}{2x+5}$ is:

   [Raj. NTSE Stage-1 2007]

   (A) -1 (B) -5

   (C) 1   (D) 5

4. One of the factors of the expression $(2x - 3y)^2 - 7(2x - 3y) - 30$ is :

   [Raj. NTSE Stage-1 2007]

   (A) $2x - 3y - 10$ (B) $2x - 3y + 10$

   (C) $3x - 2y + 5$ (D) $6x - 4y - 15$

5. L.C.M. of $x^3 + x^2 + x + 1$ and $x^3 - x^2 + x - 1$ is :

   [Raj. NTSE Stage-1 2007]

   (A) $x^4 + 1$ (B) $x^4 - 1$

   (C) $x^2 + 1$ (D) $x^2 - 1$

6. If $a^2 + 2b = 7$, $b^2 + 4c = -7$ and $c^2 + 6a = -14$, then the value of $(a^2 + b^2 + c^2)$ is :   **[IJSO-2009]**

   (A) 14   (B) 25

   (C) 36   (D) 47

7. If $\sqrt{\dfrac{x}{y}} + \sqrt{\dfrac{y}{x}} = \dfrac{10}{3}$ and $x + y = 10$, then the value of xy will be :   **[NSTSE 2010]**

   (A) 16   (B) 9

   (C) 2   (D) 10

8. If $x + \dfrac{1}{x} = 3$, then the value of $x^6 + \dfrac{1}{x^6}$ is :

[Raj. NTSE Stage-1 2013]

(A) 927   (B) 114

(C) 364   (D) 322

9. If the zero of the polynomial $f(x) = k^2x^2 - 17x + k + 2 (k > 0)$ are reciprocal of each other, then the value of k is :

[Delhi NTSE Stage-1 2013]

(A) 2   (B) – 1

(C) – 2   (D) 1

10. If $(a-5)^2 + (b-c)^2 + (c-d)^2 + (b+c+d-9)^2 = 0$, then the value of $(a+b+c)(b+c+d)$ is :

[Harayana NTSE Stage-1 2013]

(A) 0   (B) 11

(C) 33   (D) 99

11. A cubic polynomial p(x) is such that p(1)=1, p(2)=2, p(3)= 3 and p(4) = 5, then the value of p(6) is :

[Harayana NTSE Stage-1 2013]

(A) 16   (B) 13

(C) 10   (D) 7

12. If $x + y + z = 1$, then $1-3x^2 -3y^2-3z^2 + 2x^3 + 2y^3 +2z^3$ is equal to : **[Harayana NTSE Stage-1 2013]**

(A) 6xyz   (B) 3xyz

(C) 2xyz   (D) xyz

13. The sum of real values of y satisfying the equations $x^2 +x^2y^2 + x^2y^4 = 525$ and $x + xy + xy^2 = 35$ is :

[Harayana NTSE Stage-1 2013]

(A) 15   (B) 10

(C) 5/2   (D) 3/2

14. If a, b, c and d are natural numbers such that $a^5 = b^6$, $c^3 = d^4$, and $d-a = 61$, then the smallest value of c–b is :

[Harayana NTSE Stage-1 2013]

(A) 61   (B) 122

(C) 239   (D) 593

15. If x, y, z are positive real numbers and a, b, c are rational numbers, then the value of

$$\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} +$$

$$\frac{1}{1+x^{b-c}+x^{a-c}} \text{ is}$$

[Raj. NTSE Stage-1 2014]

(A) – 1   (B) 0

(C) 1   (D) None of these

16. If $x^2 - x - 1 = 0$, then the value of $x^3 - 2x +1$ is -

[Harayana NTSE Stage-1 2014]

(A) 0   (B) 2

(C) $\dfrac{1+\sqrt{5}}{2}$ (D) $\dfrac{1-\sqrt{5}}{2}$

17. If x% of y is equal to 1% of z, y% of z is equal to 1% of x and z% of x is equal to 1% of y, then the value of xy + yz + zx is -

[Harayana NTSE Stage-1 2014]

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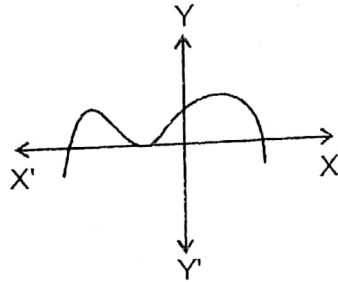
(C) 3   (D) 4

18. If $(x + a)^2 + (y + b)^2 = 4 (ax + by)$, where x, a, y, b are real, the value of $xy - ab$ is :

(A) a

(B) 0

(C) b

(D) None of these

19. The graph of $y = p(x)$ is given below. The number of zeroes of polynomial p(x), is

(A) 3

(B) 2

(C) 1

(D) 0

20. If the zeros of the polynomial $64x^3 - 144 x^2 + 92x - 15$ are in AP, then the difference between the largest and the smallest zeroes of the polynomial is

(A) 1

(B) $\dfrac{7}{8}$

(C) $\dfrac{3}{4}$

(D) $4\dfrac{1}{2}$

21. The number of integral solution of the equation

$$7\left(y + \dfrac{1}{y}\right) - 2\left(y^2 + \dfrac{1}{y^2}\right) = 9$$

(A) 0

(B) 1

(C) 2

(D) 3

22. The square root of $x^{b^2} x^{b^2 + 2ab} x^{a^2 - b^2}$ is

(A) $x^{2(a+b)}$

(B) $x^{\frac{a+b}{2}}$

(C) $x^{\frac{(a+b)^2}{2}}$

(D) X^{a+b}

23. If $a + b + c = 0$, then the value of

$$\dfrac{(a+b)^2}{ab} + \dfrac{(b+c)^2}{bc} + \dfrac{(c+a)^2}{ca} \text{ is}$$

(A) 1

(B) 2

(C) 3

(D) – 3

24. If α, β and γ are the three zeroes of the polynomial $p(x) = x^3 - 64x - 14$, what is the value of $\alpha^3 + \beta^3 + \gamma^3$?

(A) 36

(B) 40

(C) 42

(D) 64

25. What is the remainder when the polynomial $p(x) = x^{200} - 2x^{199} + x^{50} - 2x^{49} + x^2 + x + 1$ is divided by $(x - 1) (x - 2)$?

(A) 1

(B) 7

(C) 2x + 1

(D) 6x – 5

26. If $|x - y| = 1$ and $\dfrac{x}{y} = xy$, then the number of different pairs (x, y), which satisfy both the equations simultaneously is : **[Haryana NTSE Stage-1 2016]**
   (A) 2
   (B) 3
   (C) 4
   (D) 5

27. One of the factors of $81a^4 + (x - 2a)(x - 5a)(x - 8a)(x - 11a)$ is : **[Haryana NTSE Stage-1 2016]**
   (A) $x^2 - 13ax + 31a^2$
   (B) $x^2 + 13ax + 31a^2$
   (C) $x^2 + 18ax - 31a^2$
   (D) $x^2 - 18ax + 31a^2$

28. If $f\left(2x + \dfrac{1}{x}\right) = x^2 + \dfrac{1}{4x^2} + 1 (x \neq 0)$, the value of f(x) is **[West Bengal NTSE Stage-1 2016]**

   (A) $4x^2$
   (B) $\dfrac{1}{4}\left(2x + \dfrac{1}{x}\right)^2$

   (C) $\dfrac{1}{4}x^2$
   (D) $4\left(2x + \dfrac{1}{x}\right)^2$

29. The least value of $2x^2 - 4x + 3y^2 - 18y + 31$ is **[West Bengal NTSE Stage-1 2016]**
   (A) 3
   (B) – 1
   (C) 0
   (D) 2

30. If $2r = h + \sqrt{r^2 + h^2}$, the value of r : h is (r, h ≠ 0) **[West Bengal NTSE Stage-1 2016]**
   (A) 4 : 3
   (B) 3 : 4
   (C) 1 : 2
   (D) 2 : 1

31. If $x = cy + bz$, $y = cx + az$, $z = bx + ay$, the value of $a^2 + b^2 + c^2 - 1$ is **[West Bengal NTSE Stage-1 2016]**
   (A) abc
   (B) – abc
   (C) 2abc
   (D) – 2abc

32. The cube root of $x + y + 3x^{1/3}y^{1/3}(x^{1/3} + y^{1/3})$ is **[Raj. NTSE Stage-1 2017]**
   (A) x + y
   (B) $x^{1/3} + y^{1/3}$
   (C) $(x + y)^{1/3}$
   (D) $(x + y)^3$

33. If $(x + \sqrt{2})$ is a factor of $kx^2 - \sqrt{2}x + 1$, then the value of k is : **[Raj. NTSE Stage-1 2017]**
   (A) $-\dfrac{3}{2}$
   (B) $-\dfrac{2}{3}$
   (C) $\dfrac{3}{2}$
   (D) $\dfrac{2}{3}$

34. If $a = x - y$, $b = y - z$ and $c = z - x$ then the value of $a^3 + b^3 + c^3$ is **[Raj. NTSE Stage-1 2017]**
   (A) $3(x - y)(y - z)(z - x)$
   (B) $(x - y)^3 (y - z)^3 (z - x)^3$
   (C) $(x + y + z)^3$
   (D) $x^3 + y^3 + z^3$

DAV PUBLIC SCHOOL IFFCO

NTSE QUESTION

> REFLECTION
> OF
> LIGHT

MULTIPLE CHOICE QUESTIONS

Tick (✓) the correct choice amongst the following:

1. An incident ray strikes a plane mirror at an angle of 15° with the mirror. The angle between the incident ray and reflected ray is
   - (a) 15°
   - (b) 30°
   - (c) 150°
   - (d) none of these

2. In the question above, the angle between the reflected ray and the mirror is
   - (a) 15°
   - (b) 30°
   - (c) 75°
   - (d) none of these

3. If a mirror has a focal length of +15 cm, it is a
   - (a) convex mirror
   - (b) concave mirror
   - (c) plane mirror
   - (d) none of these

4. If a mirror has a focal length of –20 cm, it is a
   - (a) convex mirror
   - (b) concave mirror
   - (c) plane mirror
   - (d) none of these

5. In case of a virtual and erect image, the magnification of a mirror is

   - (a) positive
   - (b) negative
   - (c) unity
   - (d) infinity

6. In case of a real and inverted image, the magnification of a mirror is
   - (a) positive
   - (b) negative
   - (c) zero
   - (d) infinity

7. The sum of the reciprocals of object distance and image distance is equal to the _____ of a mirror.
   - (a) focal length
   - (b) reciprocal of the focal length
   - (c) radius of curvature
   - (d) reciprocal of the radius of curvature

8. The focal length of a plane mirror is
   - (a) positive
   - (b) negative
   - (c) zero
   - (d) infinity

9. A virtual, erect and magnified image of an object is to be produced with a concave mirror of focal length 12 cm. Which of the following object distance should be chosen for this purpose?
   - (a) 10 cm
   - (b) 14 cm
   - (c) 18 cm
   - (d) 24 cm

10. For an object at infintiy, a concave mirror produces an image at its focus which is
    - (a) enlarged
    - (b) virtual
    - (c) erect
    - (d) real, inverted and diminished

11. The mirror used in automobiles to see the rear field of view is
    - (a) concave
    - (b) convex
    - (c) plane
    - (d) none of these

12. A mirror having a very wide field of view must be
    - (a) concave
    - (b) convex
    - (c) plane
    - (d) none of these

13. The mirror used in search lights is
    - (a) concave
    - (b) convex
    - (c) plane
    - (d) none of these

14. A real image, equal in size to the object, is obtained when the object is placed at the centre of curvature in front of a
    - (a) concave mirror
    - (b) plane mirror
    - (c) convex mirror
    - (d) none of these

15. The angle between the two refracting surfaces of a total reflecting prism is
    (a) 90°
    (b) 60°
    (c) 45°
    (d) 30°

16. Shaving mirrors are
    (a) convex mirrors
    (b) concave mirrors
    (c) plane mirrors
    (d) none of these

17. The relation between u, v and f for a mirror is given by:
    (a) $f = \dfrac{uv}{u-v}$
    (b) $f = \dfrac{2u \times v}{u+v}$
    (c) $f = \dfrac{u \times v}{u+v}$
    (d) none of these

18. If we say that the focal length of a spherical mirror is n times its radius of curvature, then n must be
    (a) 2.0
    (b) 1.5
    (c) 0.2
    (d) none of these

19. The magnification produced by a concave mirror
    (a) is always more than one
    (b) is always less than one
    (c) is always equal to one
    (d) may be less than or greater than one

20. Choose the correct relation between u, v and r for a spherical mirror:
    (a) $r = \dfrac{2uv}{u+v}$
    (b) $r = \dfrac{2}{u+v}$
    (c) $r = \dfrac{2(u+v)}{(uv)}$
    (d) none of these

21. Which is the wrong statement out of the following?
    (a) a concave mirror can give a virtual image.
    (b) a convex mirror can give a virtual image.
    (c) a concave mirror can give a diminished virtual image.
    (d) a convex mirror cannot give a real image.

22. An inverted image can be seen in a convex mirror,
    (a) under no circumstances
    (b) when the object is very far from the mirror
    (c) when the object is at a distance equal to the radius of curvarture of the mirror
    (d) when the distance of the object from the mirror is equal to the focal length of the mirror

23. The ratio of the size of the image to the size of the object is known as
    (a) the focal plane
    (b) the transformation ratio
    (c) the efficiency
    (d) none of these

24. The unit of magnification is
    (a) m
    (b) m^2
    (c) m^{-1}
    (d) none of these

25. The laws of reflection are true for
    (a) the plane mirror only
    (b) the concave mirror only
    (c) the convex mirror only
    (d) all reflecting surfaces

26. A virtual image is one which
    (a) can be taken on a screen
    (b) cannot be taken on a screen
    (c) sometimes can be and sometimes cannot be taken on a screen
    (d) is formed only by a concave mirror

27. When an object is placed between the focus and the pole of a concave mirror, the image formed is
    (a) real, inverted and small
    (b) real, inverted and same size
    (c) real, inverted and enlarged
    (d) virtual, erect and enlarged

28. The line joining the pole and the centre of curvature of a mirror is called the
    (a) aperture
    (b) principal section
    (c) principal axis
    (d) pole

29. In order to get a *diminished virtual image*, the object can be placed anywhere in front of a
    (a) concave mirror
    (b) plane mirror
    (c) convex mirror
    (d) none of these

30. The mirror used by dentists to concentrate light on the tooth to be examined is a _____ mirror.
    (a) concave
    (b) plane or concave
    (c) convex
    (d) plane

31. When an object is at infinity from a concave mirror, the image formed is
    (a) at the focus
    (b) virtual and erect
    (c) highly enlarged
    (d) none of these

32. When the object is at focus of a concave mirror, the image is formed at
    (a) focus
    (b) centre of curvature
    (c) within focus
    (d) infinity
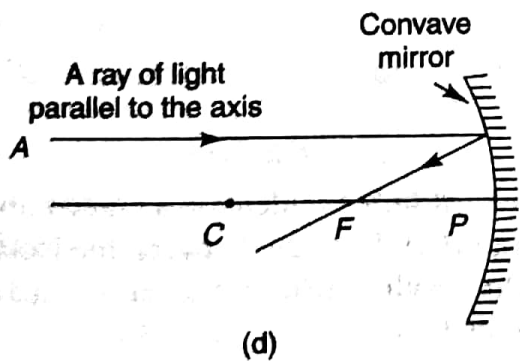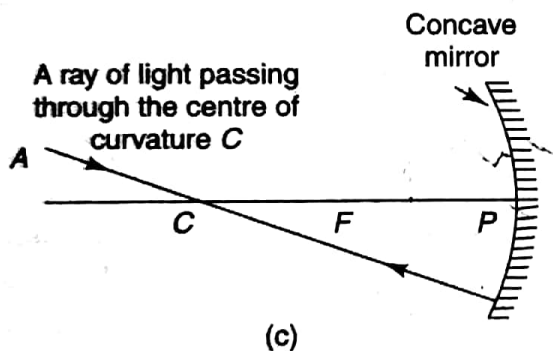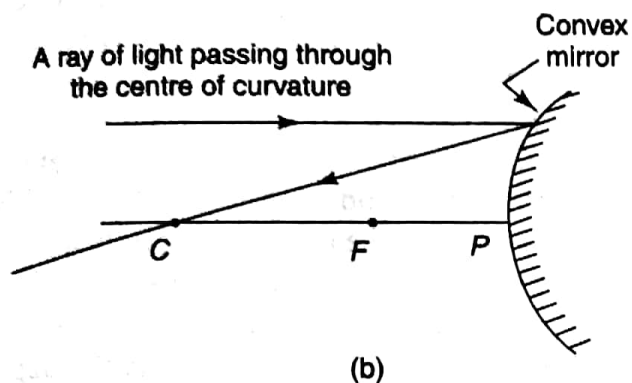
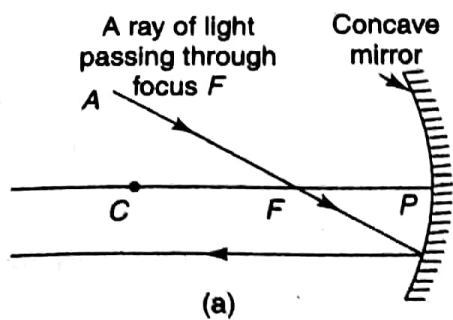33. Which of the following ray diagrams is not correct?

A ray of light passing through focus F — Concave mirror

(a)

A ray of light passing through the centre of curvature — Convex mirror

(b)

A ray of light passing through the centre of curvature C — Concave mirror

(c)

A ray of light parallel to the axis — Concave mirror

(d)

Fig. 9.2

34. When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. The nature of the image is
    (a) real
    (b) inverted
    (c) virtual and inverted
    (d) virtual and eract

35. Which of the following is a non-luminous body?
    (a) fire
    (b) sun
    (c) stars
    (d) earth

36. Which of the following is a luminous body?
    (a) fire
    (b) earth
    (c) moon
    (d) tree

37. A light year is the unit of
    (a) time
    (b) distance
    (c) intensity of light
    (d) none of these

38. A substance through which light can pass is called a/an
    (a) optical medium
    (b) transparent body
    (c) opaque body
    (d) translucent body

39. A body which allows most of the light to pass through it is called a
    (a) transparent body
    (b) opaque body
    (c) translucent body
    (d) none of these

40. Choose the only correct option in case of a concave mirror:

Object distance	Image distance	Image size	Nature of image
(a) At C	At C	Equal to object	Real and inverted
(b) Beyond C	Between F and C	Diminished	Virtual and erect
(c) Between F and C	At infinity	Enlarged	Real and inverted
(d) At F	At infinity	Highly diminished	Virtual and erect

41. When light falls on matter, it can produce
    (a) mechanical effect only
    (b) chemical effect only
    (c) heating effect only
    (d) all the above

42. The medium having same chemical properties in all directions is called
    (a) isotropic medium
    (b) anisotropic medium
    (c) optically denser medium
    (d) none of these

43. Which of the following body allows only a part of the light to pass through it?
    (a) oiled paper
    (b) brick
    (c) wood
    (d) air

44. The path along which light travels in a homogenous medium is called the
    (a) beam of light   (b) ray of light
    (c) pencil of light   (d) none of these

45. A thin layer of water is transparent but a very thick layer of water is
    (a) translucent   (b) opaque
    (c) most transparent (d) none of these

46. The amount of light reflected depends upon
    (a) the nature of material of the object only
    (b) the nature of the surface only
    (c) the smoothness of the surface only
    (d) all the above

47. Air is not visible because it
    (a) is nearly a perfectly transparent substance
    (b) neither absorbs nor reflects light
    (c) transmits whole of light
    (d) all the above are correct

48. A real image is formed when two or more
    (a) reflected rays meet
    (b) refracted rays meet
    (c) reflected rays appear to meet
    (d) none of these

49. The image of our face in a plane mirror is
    (a) real   (b) magnified
    (c) diminished   (d) none of these

50. The nature of the image formed by a plane mirror is
    (a) virtual and erect
    (b) of the same size as the object
    (c) laterally inverted
    (d) all the above are correct

51. The sideways reversal of the image by plane mirror is called
    (a) lateral inversion (b) parallax
    (c) optical illusion   (d) none of these

52. The middle point of the mirror is called
    (a) pole
    (b) centre of sphere
    (c) centre of curvature
    (d) none of these

53. A person looks into the mirror by placing it close to his face. The image of his face was erect, laterally inverted and of the same size. Then, the mirror must be
    (a) plane   (b) concave
    (c) convex   (d) plane or concave

54. In Question 53, if the image of the face was found *erect and magnified,* then the mirror must be
    (a) plane   (b) concave
    (c) convex   (d) none of these

55. The angle between the original path of the incident ray and the emergent ray coming out of a prism is called angle of
    (a) incidence   (b) reflection
    (c) prism   (d) deviation

56. Which of the following is employed to clearly view objects which cannot be seen directly due to obstruction?
    (a) Laser   (b) Periscope
    (c) Kaleidoscope   (d) None of these

57. A device for producing intense and coherent (waves in step) beam of light is called
    (a) laser   (b) maser
    (c) search light   (d) none of these

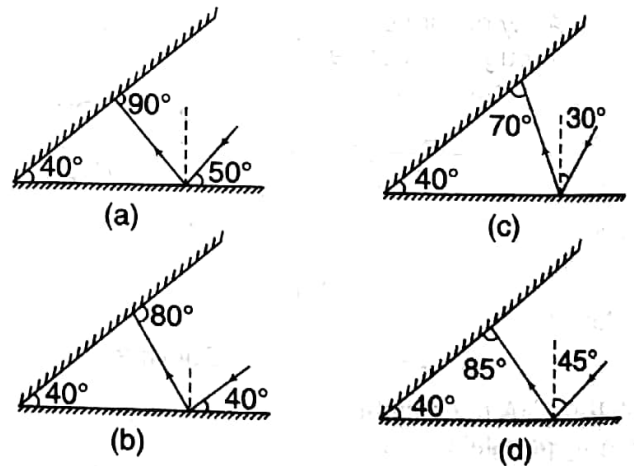58. Which of the following correctly depicts reflections in case of plane mirrors inclined at 40°?

Fig. 9.3

59. A ray of light incident on a plane mirror at an angle θ. If the angle between the incident and reflected rays is 80°, what is the value of θ?
    (a) 40°   (b) 50°
    (c) 45°   (d) 55°

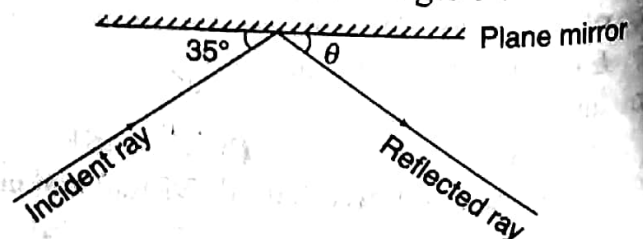60. A ray of light is incident at an angle of 35° on a plane mirror. What is angle θ?

Fig. 9.4

(a) 35°   (b) 45°
(c) 55°   (d) none of these

61. In Question 60 above, what is the angle between the incident and the reflected rays?
  (a) 90°   (b) 100°
  (c) 110°   (d) none of these

62. If a ray of light incident on a plane mirror is such that it makes an angle of *30° with the mirror,* then the angle of reflection is
  (a) 30°   (b) 45°
  (c) 55°   (d) 60°

63. In question 62 above, the angle made by the reflected ray with the mirror is
  (a) 30°   (b) 45°
  (c) 55°   (d) 60°

64. When a ray of light strikes a plane mirror at an angle of 15° with the mirror, what will be the angle through which the ray gets deviated?
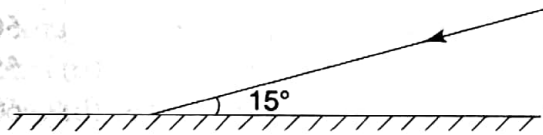

Fig. 9.5

  (a) 15°   (b) 30°
  (c) 75°   (d) none of these

65. A boy is standing in front of a plane mirror at a distance of 3 m from it. What is the distance between the boy and his image?
  (a) 3 m   (b) 4.5 m
  (c) 6 m   (d) none of these

66. In the Question above, if the boy moves 1 m backward, the distance between the image and the boy is
  (a) 2 m   (b) 4 m
  (c) 8 m   (d) none of these

67. The distance between the extreme points on the periphery of the mirror is called
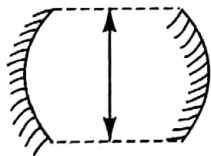

Fig. 9.6

  (a) focal length   (b) radius of curvature
  (c) principal section   (d) none of these

68. The centre of curvature of a _____ mirror is in front of it.
  (a) convex   (b) concave
  (c) convex or concave (d) none of these

69. The centre of curvature of a _____ mirror is behind it.
  (a) convex   (b) concave
  (c) convex or concave (d) none of these

70. Which of the following correctly depicts the reflection of a ray of light on a spherical mirror?
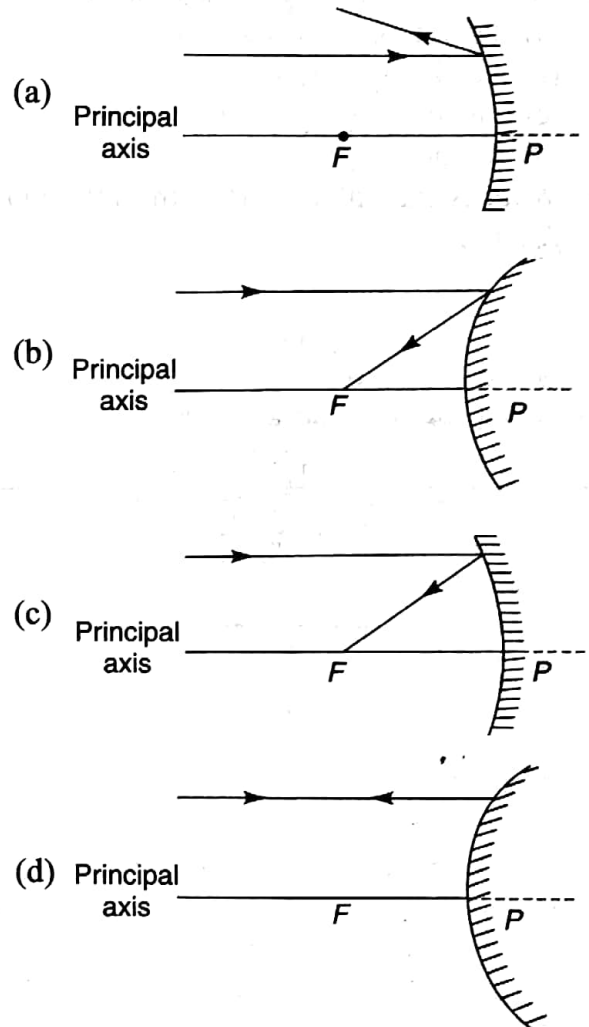

Fig. 9.7

71. A ray, emerging from a point on the object, passing through the centre of curvature C strikes the mirror normally i.e. at 90°. Then, the angle of incidence is equal to
  (a) 0°   (b) 45°
  (c) 90°   (d) 180°

Fig. 9.8