

IMPORTANT—DEFINITIONS

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**** P A P E R - A ******Chapter # 02**

1: State Binomial Theorem for positive integer 'n'.

(IIA-2020)

Ans. The rule for expansion of $(a+b)^n$, where 'n' is any positive integral power, is called binomial theorem, and defined as:

$$(a+b)^n = \binom{n}{0} a^n b^0 + \binom{n}{1} a^{n-1} b^1 + \binom{n}{2} a^{n-2} b^2 + \dots + \binom{n}{n} a^0 b^n$$

Chapter # 03

2: Define degree and radian measures.

Ans.

Degree: If a circle is divided into 360° equal parts, then angle subtended by one part at the center of the circle is called a degree.

Radian: Radian is the measure of the angle subtended at the center of the circle by an arc, whose length is equal to the radius of the circle.

Chapter # 05

3: Define the law of sines.

(IIA-2018), (IIA-2019)

Ans. In any triangle ABC, with usual notations.

$$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta} = \frac{c}{\sin \gamma}$$

4: Define the law of cosines.

(IA-2017), (IIA-2017), (IIA-2020)

Ans. In any triangle ABC, with usual notations.

i. $a^2 = b^2 + c^2 - 2bc \cos \alpha$

ii. $b^2 = c^2 + a^2 - 2ca \cos \beta$

iii. $c^2 = a^2 + b^2 - 2ab \cos \gamma$

5: Define angles of Elevation and Depression.

(IA-2016), (IIA-2016)

Ans.

Angle of elevation: If the line of sight is upward from the horizontal, the angle is called angle of Elevation.

Angle of depression: If the line of sight is downward from the horizontal, the angle is called angle of Depression.

Chapter # 06

6: What is a scalar? Give examples.

Ans. A scalar is a quantity having magnitude only but no direction.

Examples: Length, Mass, Time, Volume, etc.

7: What is a vector? Give examples.

Ans. A vector is a quantity having both magnitude and direction.

Examples: Force, Velocity, Acceleration, etc.

8: What is a unit vector?

Ans. A vector whose magnitude is unity is called a unit vector.

9: What are parallel vectors?

(IIA-2016), (IA-2019)

Ans. Two vectors \vec{a} and \vec{b} are parallel if there exist a non-zero $k \in \mathbb{R}$, such that $\vec{a} = k\vec{b}$.

10: Define scalar product of two vectors.

Ans. The scalar product of two vectors \vec{a} & \vec{b} is denoted by $\vec{a} \cdot \vec{b}$ and defined as $\vec{a} \cdot \vec{b} = |\vec{a}| |\vec{b}| \cos \theta$

11: Define vector product.

(IIA-2018)

Ans. The vector product of two vectors \vec{a} & \vec{b} is denoted by $\vec{a} \times \vec{b}$ and is defined as $\vec{a} \times \vec{b} = |\vec{a}| |\vec{b}| \sin \theta \hat{n}$.

** P A P E R - B **

Chapter # 09

1: What is partial fractions?

(IIA-2017), (IA-2019), (IIA-2020)

Ans. The process, which convert a single rational fraction, into the sum of two or more single rational fractions is called partial fractions.

2: Define proper fraction and give one example.

(IA-2018)

Ans. A fraction in which the degree of the numerator is less than the degree of the denominator is called proper fraction.

Example:
$$\frac{2x}{(x-2)(x+5)}$$

3: Define improper fraction and give one example.

(IA-2016), (IA-2017), (IIA-2018)

Ans. A fraction in which the degree of the numerator is greater then or equal to the degree of denominator is called improper fraction.

Example:
$$\frac{x^2+1}{(x+1)(x-1)}$$

Chapter # 10

4: Define Binary Numbers system.

(IIA-2018)

Ans. The Binary number system is a number system of base equal to 2.

5: Define octal numbers system.

(IIA-2019)

Ans. The Octal number system is a number system of base equal to 8.

6: Define Decimal numbers system.

(IA-2016), (IA-2019)

Ans. The Decimal number system is a number system of base equal to 10.

Chapter # 11

7: Define Logic Gates.

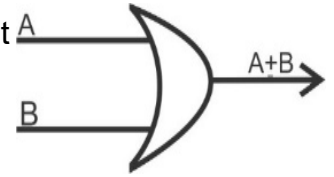
(IIA-2017)

Ans. A logic gate is defined as an electronics circuit with two or more input signals and one output signal.

8: Define OR Gate and draw logic circuit diagram.

(IIA-2019)

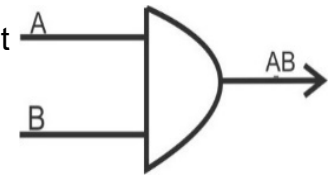
Ans. The OR gate is an electronic circuit that gives a high output (1) if **one or more** of its inputs are 1.



9: Define AND Gate and draw logic circuit diagram.

(IA-2018), (IIA-2019), (IIA-2020)

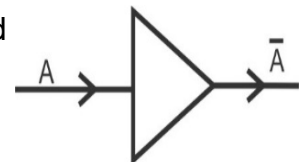
Ans. The AND gate is an electronic circuit that gives a high output (1) when all of its inputs are 1.



10: Define NOT Gate and draw logic circuit diagram.

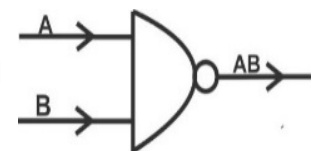
(IA-2019)

Ans. The NOT gate is an electronic circuit that produces an inverted version of the input at its output.



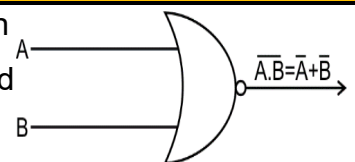
11: Define NAND Gate and draw logic circuit diagram.

Ans. The inverse of an AND-Gate is called NAND-Gate.



12: Define NOR Gate and draw logic circuit diagram.

Ans. The inverse of an OR-Gate is called NOR-Gate.



Chapter # 13

13: Define the circle.

(IIA-2017), (IIA-2019)

Ans. A circle is the set of all points in a plane that are equally distance from a fixed point.