

MATHEMATICS ಗಣಿತ

II PUC

PART - E

- (i) Questions in Part - E, should be selected from the following topics only, which are included in assignments / projects, confined to II PU Syllabus, and do not require any extra teaching hours.

- Algebra : (a) Problems on scalar product of the type
- (i) Show that: $\left| \vec{a} + \vec{b} \right| = \left| \vec{a} - \vec{b} \right| \Rightarrow \vec{a}$
is perpendicular \vec{b}
- (ii) Given $\vec{a} + \vec{b} + \vec{c} = 0, \left| \vec{a} \right|, \left| \vec{b} \right|, \left| \vec{c} \right|$, to find the angle between any two vectors etc.
- (b) To find the least +ve remainder, and the digit in the unit place of a given number using congruence, and to find the incongruent solutions of a linear congruence.
- Analytical Geometry : (a) To find the length of the common chord of two intersecting circles.
- Trigonometry : (a) To find the cube roots and fourth roots of a complex number and their representation in argand plane and to find their continued product.
- (b) Problems related to the cube roots of unity, 1, ω , ω^2 , using the properties of.
- Calculus : (a) Finding the derivative of functions of the following type only
- (i) $\text{Log}_a f(x), a \neq c$.
- (ii) $\text{Sin}(3x)^0, \tan^2\left(\frac{x}{2}\right)^0$ etc.
- (b) Application of derivative in finding the maxima and minima of functions involving two dimensions only.

- (c) Indefinite integrals of the type $\sec(ax), \tan(ax)$ etc.
(Problems confined to power 3 and 4 only of any trigonometric functions)
- (d) Integrals of the type $\int_0^a \frac{\sqrt{x}}{\sqrt{a-x} + \sqrt{x}} dx$ etc.
- (e) Finding the order and degree of a differential equations having terms with fractional powers.
- (f) Finding the particular solution of a differential equation of first order and first degree only.

- (ii) There will be two questions of 10 marks each. Each question will have three subdivisions. The first and second questions carry 4 marks each and the third question carries 2 marks.
- (iii) Students will have to answer only one of the two questions.

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Example - 1

PART-E

Answer any one question :

10 × 1 = 10

39. (a) Find all the fourth roots of $\sqrt{3} - i$. 4
- (b) Find the length of the common chord of the intersecting circles $x^2 + y^2 - 4x - 5 = 0$ and $x^2 + y^2 - 2x + 8y + 9 = 0$. 4
- (c) Find the sum of all positive divisors of 360. 2
40. (a) If \vec{a}, \vec{b} and $\frac{\vec{a} + \vec{b}}{|\vec{a} + \vec{b}|}$ are unit vectors, find $|\vec{a} - \vec{b}|$, 4
- (b) Find $\int \sec(2x) dx$. 4
- (c) If $y = \log_5 \sqrt{\sin x}$, find $\frac{dy}{dx}$, 2

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Example - 2

PART-E

Answer any one question :

$10 \times 1 = 10$

39. (a) If $\vec{a} + \vec{b} + \vec{c} = 0$, $|\vec{a}| = 5$, $|\vec{b}| = 7$ and $|\vec{c}| = 9$ then find the angle between the vectors \vec{a} and \vec{b} 4
- (b) Find $\int \operatorname{cosec} 2x \cdot dx$ 4
- (c) Find all the incongruent solutions of the linear congruence $2x = 4 \pmod{10}$. 2
40. (a) Show that the rectangle of maximum area that can be inscribed in a circle of given radius is a square. 4
- (b) Find the inverse of the matrix $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ using Cayley Hamilton theorem. 4
- (c) If $1, \omega, \omega^2$ are the cube roots of unity then show that $(1 + \omega - 2\omega^2)(1 + \omega^2 - 2\omega)(\omega + \omega^2 - 2) + 27 = 0$. 2