

Cont...

2	12.a.	Inspect the statement and proof of division algorithm for polynomials.	K4	CO2
	(OR)			
	12.b.	Test for the nature of product of two primitive polynomials.		
3	13.a.	If L is an algebraic extension of K and K is an algebraic extension of F , then prove that L is an algebraic extension of F .	K5	CO3
	(OR)			
	13.b.	State and prove the remainder theorem.		
4	14.a.	The polynomial $f(x) \in F[x]$ has a multiple root if and only if $f(x)$ and $f'(x)$ have a non-trivial common factor.-Examine.	K4	CO4
	(OR)			
	14.b.	If K is a finite extension of F , then analyze whether $G(K, F)$ is a finite group and its order $o(G(K, F))$ satisfies $o(G(K, F)) \leq [K: F]$.		
5	15.a.	If V is n -dimensional over F and if $T \in A(V)$ has the matrix $m_1(T)$ in the basis $v_1, v_2, \dots, v_n$ and the matrix $m_2(T)$ in the basis $w_1, w_2, \dots, w_n$ of V over F , then identify an element $C \in F_n$ such that $m_2(T) = C m_1(T) C^{-1}$.	K3	CO5
	(OR)			
	15.b.	Apply the necessary concepts to prove that the linear transformation T on V is unitary if and only if it takes an orthonormal basis of V into an orthonormal basis of V .		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyze the statement and proof of the third part of Sylow's theorem.	K4	CO1
2	17	Explain Eisenstein Criterion theorem.	K5	CO2
3	18	Examine that a polynomial of degree n over a field can have at most n roots in any extension field.	K4	CO3
4	19	Prove that K is a normal extension of F if and only if K is the splitting field of some polynomial over F .	K4	CO4
5	20	If V is n -dimensional over F and if $T \in A(V)$ has all its characteristic roots in F , then justify that T satisfies a polynomial of degree n over F .	K5	CO5

Z-Z-Z

END