JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

B.Tech- VI Semester (CSE/IT/ECE/CE/BT/BI)

COURSE CODE (CREDITS): 23B1WHS631 (3)   MAX. MARKS: 15

COURSE NAME: Engineering Economics

COURSE INSTRUCTORS: Dr. Bilal Khan (BLK)   MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) Use of calculators is allowed.

Q. No	Question	CO	Marks
1	What is the meaning of 'Preference' based approach of identifying individual choice behaviour. Explain the three properties which must be fulfilled if preference relations ($\geq$), by an individual are to be 'Normal'.	CO1	5
2	The utility function of a consumer is given as: $$U=f(x, y) = xy+x+2y+2$$ which is subject to the constraint function: $4x+6y=130$. Using the Lagrange method, find: (a) The optimal quantities of x and y that will maximize the consumer's utility. (b) The optimal level of utility. (c) Check for the second order condition using the Bordered-Hessian Matrix to prove that whether the U function is maximum.	CO1	5
3	(a) Give the mathematical derivation to prove that marginal rate of substitution (MRS) is the slope of ratio of marginal utilities of two goods (x and y). (b) Explain diagrammatically how consumer equilibrium is attained through ordinal or IC approach. **OR** Determine whether the following utility functions obey the assumption of diminishing MRS. Take any random utility value and graph the typical IC for each utility function: (a) $U= \sqrt{xy}$ (b) $U= X^{1/5} Y^{4/5}$ (c) $U= x^3 + 2y^2$	CO1	2+3 5