JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech.-VI Semester (BT&BI)

COURSE CODE (CREDITS):18B1WBT632 (3) MAX. MARKS: 35

COURSE NAME: INFECTIOUS DISEASES

COURSE INSTRUCTORS: Dr. Gopal Singh Bisht MAX. TIME: 2 Hour

Note: (a) All questions are compulsory.
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	Identify an RNA virus responsible for a contagious respiratory illness that ranges in severity from mild to fatal. Describe the virus, explain its life cycle within the human host, and outline available treatments or preventive measures.	I	[5]
Q2	A 28-year-old woman in the UK develops psychiatric symptoms including anxiety and depression, followed by painful sensations and memory loss. After 6 months, she progresses to ataxia and dementia. A tonsil biopsy shows the presence of abnormal prion protein. a) Explain why prions are considered unique infectious agents compared to viruses and bacteria. b) What precautions should be taken when handling instruments or tissues potentially exposed to prions? c) Analyze the molecular mechanisms underlying prion infections and evaluate their modes of transmission. Discuss the implications of prion diseases on public health and propose strategies for prevention.	IV	[1] [1] [4]
Q3	Answer the following questions. a) Explain the roles of Hemagglutinin (HA) and Neuraminidase (NA) in the life cycle and pathogenicity of the Influenza virus. b) What is the difference between latent tuberculosis (TB) and active tuberculosis? Explain their characteristics, symptoms, diagnosis, and treatment c) Why does a second dengue infection often lead to more severe disease compared to the first infection? Explain the immunological basis behind this phenomenon. d) Design an experiment to evaluate the antimicrobial activity of test compounds A and B. Explain the significance of	V	[3x6=18]

	Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) in determining the appropriate antimicrobial dosage. e) Evaluate the reliability of ELISA in detecting early-stage viral infections. What factors may affect test sensitivity and specificity? f) Analyze the structural and genomic characteristics of Hepatitis B virus (HBV) and evaluate its lifecycle. Discuss the mechanisms by which HBV induces liver disease.		
Q4.	A 50-year-old man undergoing chemotherapy for leukemia develops fever, cough, and chest pain. A chest CT reveals nodular lesions with a halo sign (a specific finding on a CT scan where a zone of ground-glass opacity surrounds a pulmonary nodule or mass). Sputum culture grows septate hyphae branching at acute angles. Serum galactomannan is positive.	III	[6]
	Identify the fungal pathogen. What antifungal therapy is appropriate for initial treatment? Why are immunocompromised patients more susceptible to invasive fungal infections? Explain briefly the mechanism of action of main classes of antifungal drugs.		