

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION - 2025

B.Tech - VIII Semester (BT)

COURSE CODE (CREDITS): 18B1WBT833 (3)

MAX. MARKS: 25

COURSE NAME: DIAGNOSTICS AND VACCINE MANUFACTURE

COURSE INSTRUCTORS: Dr. Rahul Shrivastava

MAX. TIME: 1 Hour 30 min

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	<p>Case Study: Molecular Diagnostics for Detecting Respiratory Infections in a Pandemic Outbreak:</p> <p>During a new viral outbreak, health authorities need a fast and reliable method to diagnose multiple respiratory pathogens, including influenza, COVID-19, and respiratory syncytial virus (RSV), in patients presenting with flu-like symptoms.</p> <ol style="list-style-type: none"> Suggest with justification a PCR-based diagnostic tool to simultaneously test for all three pathogens in a single test, enabling quicker diagnosis and appropriate treatment. Draw a flowchart and detail all the steps required in designing of the test. Provide suitable precautions to be taken while designing such tests. 	I	<p>[1.5]</p> <p>[3]</p> <p>[1.5]</p>
Q2	<p>Case Study: You have been provided with antibody samples from patients produced against <i>Treponema pallidum</i>, the bacterium causing syphilis. Purified soluble antigen of the bacterium is available with you. Evaluate all precipitation and agglutination based diagnostic methods to detect the presence of the antibody in the patient sample, and suggest the most appropriate diagnostic method you will choose for diagnosis of the disease with reasons for your choice, providing details of protocol to be used.</p>	II	[5]

Q3	<p>With respect to Sandwich ELISA answer the following:</p> <ol style="list-style-type: none"> Example and role of blocking buffer used. Requirement of washing steps after addition of each reagent (antigen/antibody). Utility of PBST (Phosphate Buffered Saline with Tween) as washing agent. Advantage of tagging enzyme label to secondary antibody instead of primary antibody. Utility of polyclonal antibody as capture antibody, instead of using monoclonal antibody. Advantage of Sandwich ELISA over other ELISA types. 	II, IV	[1 X 6 = 6]
Q4	What is Radioimmunoassay (RIA)? Briefly describe the procedure used for identification of antigen using RIA, along with advantages and limitations of the technique.	II	[5]
Q5	Why are Positive and Negative controls required while performing PCR-based diagnostics? Demonstrate their significance taking a suitable example.	I, IV	[3]