JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION - 2026
B.Tech - VIII Semester (BT)

COURSE CODE (CREDITS): 18B1WBT833 (3) MAX. MARKS: 15
COURSE NAME: DIAGNOSTICS AND VACCINE MANUFACTURE
COURSE INSTRUCTORS: Dr. Rahul Shrivastava MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory. (b) Calculator are not allowed*

Q.No	Question	CO	Marks
Q1	**<u>Case Study:</u>** A blood sample from a donor is tested for Hepatitis B surface antigen (HBsAg) using Radial Immunodiffusion (RID). Agarose gel contains Anti-HBs antibody. Observations after 24 hours on the gel: ▪ Positive control → Precipitin ring present ▪ Negative control → No ring ▪ Patient sample → Faint precipitin ring visible Answer the following related to the diagnostic test done: a) What does the presence of a precipitin ring in the patient well indicate? b) Why is the ring faint compared to positive control? c) Write one limitation of RID in screening blood donors. d) Write one advantage of RID for serum protein estimation.	II	**[1 X 4 = 4]**
Q2	Analyze the following pair of antibody and antigen types, and draw labelled Precipitin curve that would be obtained in each case: i. Polyclonal antibodies and monovalent antigens ii. Polyclonal antibodies and polyvalent antigens	II	**[1.5 X 2 = 3]**
Q3	***Experimental Analysis***: A polyclonal antibody was raised against **Antigen A** (Virus A surface protein). Epitope mapping shows the dominant epitope sequence as below: **Antigen A** epitope sequence: **ARGTYKLP** The antibody was also tested against two other viral proteins: **Antigen B** with dominant epitope having sequence: **ARGTYKMP** **Antigen C** with dominant epitope having sequence: **VRGMGWMG** **Questions:** a) Which antigen (B or C) will show higher cross-reactivity with the antibody raised and why? b) Explain the role of **epitope similarity** in cross-reactivity. c) Suggest one way to reduce false positives due to cross-reactivity.	II	**[1+2+1=4]**
Q4	A. Differentiate between Monoclonal and Polyclonal antibodies, providing a comparative table. B. Draw a well – labelled detailed structure of an antibody molecule.	II	**[2+2=4]**

(4)