JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS-2023
M.Sc. II Semester (Biotechnology)

COURSE CODE (CREDITS): **20MS1BT215 (2)** MAX. MARKS: **35**

COURSE NAME: **Molecular Diagnostics**

COURSE INSTRUCTORS: **Jitendraa Vashistt** MAX. TIME: **2 Hour**

Note: All questions are compulsory. Marks are indicated against each question in brackets.

Q1. A bacterial organism has an unusual cell envelope structure with high amount of mycolic acids and other sugars, which makes it resistant to desiccation as well as potent bacterial pathogen, responsible for tuberculosis. Identify the bacterial pathogen and also elucidate the two methods of its molecular identification in human host. **(5 marks)**

Q2. A boy had been suffering from a prolong headache and decreased in vision in both the eyes. During clinical diagnostics, CT scan of head revealed the multiple cystic lesions in cerebellum and hemangioblastoma. Clinician suspected a genetic disorder of deletion of a specific gene. Identify this gene and also explain the role of its gene product with its protective function in cell. Also explain the pathophysiology if this protein get mutated. **(5 marks)**

Q3. Explain the distinct features of a cancer cell which makes it different from normal cell in an individual. Explain the molecular diagnostic method of identification of cancer in a specific tissue with suitable examples. **(5 mark)**

Q4. How do you differentiate between Hepatitis 'A' virus and Hepatitis 'B' virus on the basis of genetic makeup? Which of these above mentioned viruses is more problematic in terms of infection caused? Justify your answer. **(5 marks)**

Q5. Define the following molecular techniques in brief with suitable example. **(5 marks)**

a) Fluorescent *in-situ* hybridization

b) Real time PCR and viral detection

Q6. A person was suffering from typhoid and clinician recommends him a class of antibiotic which can inhibit bacterial replication. You need to identify the causative organism, the antibiotic prescribed and its molecular target. Also explain the phenomenon of antibiotic resistance which may be developed by bacteria, if course/dosage of antibiotic is not fully completed. **(5 mark)**

Q7. Repetitive sequences are usually present in the human genome, however when the repeats are increased from their threshold, it may chances of disease such as neurological disorders. Explain an example of a disease in which specific sequences get increased. Also define the molecular method of its identification. **(5 mark)**