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Question Paper Code: UC306

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Professional Elective

Biotechnology

21BTV306- MOLECULAR THERAPEUTICS AND DIAGNOSIS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1. What is the genetic basis of cystic fibrosis, and how is it inherited? CO1- U
2. A newborn is diagnosed with phenylketonuria (PKU). How does a metabolic enzyme deficiency contribute to this inherited disorder? CO2-App
3. A patient with severe diarrhea is suspected of having a *Salmonella* infection. How would you differentiate it from a *Shigella* infection in a clinical laboratory? CO2-App
4. Name two diagnostic tests used for detecting hepatitis viruses. CO1- U
5. A patient with central obesity, high blood pressure, and elevated blood glucose is diagnosed with metabolic syndrome. Explain the possible risk factors contributing to this condition. CO2-App
6. A patient is diagnosed with Crohn's disease and experiences abdominal pain, weight loss, and diarrhea. How does Crohn's disease differ from ulcerative colitis in terms of affected areas and disease progression? CO2-App
7. Describe how immunotherapy works as a targeted cancer therapy. CO1- U
8. Why do angiogenesis inhibitors specifically target tumor blood vessels while sparing normal ones? CO1- U
9. How is fluorescence in situ hybridization (FISH) used in clinical diagnostics? CO1- U
10. What is the working principle of flow cytometry, and what type of data does it provide? CO1- U

PART – B (5 x 16= 80 Marks)

11. (a) Explain the process of sample collection, transport and processing for the diagnosis of diseases. CO1- U (16)
Or
(b) What do mean by inherited disorders. Explain in detail about any 2 disorders CO1- U (16)
12. (a) Describe the illness effects of cholera, focusing on its impact on fluid balance and organ function. Discuss how real-time diagnostics can assist in timely intervention and reduce mortality rates. CO3-Ana (16)
Or
(b) Discuss the challenges in diagnosing protozoan diseases in resource-limited settings. Propose cost-effective diagnostic strategies for diseases like amoebiosis, malaria, and Trypanosomiasis, emphasizing scalability and accuracy. CO3-Ana (16)
13. (a) Explain the mechanism of asthma, its triggers, and treatment options. CO1- U (16)
Or
(b) Interpret the detail outline about the effect of the ischemic heart disease in the human system CO1- U (16)
14. (a) A patient with HER2-positive breast cancer is being considered for targeted therapy. Explain how monoclonal antibody therapy (e.g., trastuzumab) works in treating HER2-positive tumors. CO2- App (16)
Or
(b) A doctor prescribes hormone therapy for an advanced case of breast cancer. Discuss the mechanism, expected benefits, and potential side effects of this treatment. CO2- App (16)
15. (a) Describe immunohistochemistry and explain its applications in detecting protein markers for disease diagnosis. CO2- App (16)
Or
(b) Explain the microarray approach for gene expression analysis, including its working principle, types, and applications in disease studies. CO2- App (16)