

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- December 2021

M. Sc. Biotechnology, 3rd Semester

COURSE CODE: 20MS1BT312

MAX. MARKS: 35

COURSE NAME: Emerging Technologies

COURSE CREDITS: 2

MAX. TIME: 2 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Section I

Very short answer types questions. Each question is carrying one mark only.

Q 1 Answer the following questions

- Why it is necessary to used deuterated solvents for NMR experiments? **(Marks 1)**
- What are single molecule microscopy techniques? Explain with an example. **(Marks 1)**
- Name the microscopic technique used to visualize the conformational changes in proteins and monitoring DNA synthesis in real time. **(Marks 1)**
- Among SiO_2 or Si_3N_4 , which material is used for the fabrication of AFM tips and cantilevers? **(Marks 1)**
- Describe the analytical techniques which utilize the sample and completely destroy it during analysis. **(Marks 1)**

Section II

Short answer types questions. Each question carrying two marks only.

Q 2 Calculate the spin multiplicity for the excited singlet & triplet state? **(Marks 2)**

Q 3 Single domain antibodies are much smaller than common antibodies and production follows many of the same protocols as used in traditional antibody production. However, it also has distinct advantages not available with traditional antibodies, list out all the advantages of single domain antibodies. **(Marks 2)**

Q 4 The integration ratio of doublets is 1:1, and of triplets is 1:2:1. What will be the integration ratio of the proton quartet in ethyl acetate? **(Marks 2)**

Q 5 For Covid-19, which model organism is best suited for target validation? Explain with the help of example. **(Marks 2)**

Section III

Q 6 What kind of splitting pattern is observed in the proton NMR spectrum for the underline hydrogen's? $\text{CH}_3\text{CH}_2\text{-O-CH}_3$ and explain why does the methine proton of 1,1,2-trichloroethane appear as triplet? **(Marks 3)**

Q 7 Give your insights for the latest emerging technologies available for High throughput screening. **(Marks 3)**

Q 8 Describe the various strategies for drug target identification in the cellular system. **(Marks 3)**

Q 9 Realize model and systems classification for biological entities. Explain how stages of modeling could be streamlined to improve systems performance. **(Marks 3)**

Section IV

Q 10 What would be the chemical shift of a peak that occurs 655.2 Hz downfield of TMS on a spectrum recorded using a 90 MHz spectrometer? And at what frequency would the chemical shift of chloroform (CHCl_3 , $\delta = 7.28$ ppm) occur relative to TMS on a spectrum recorded on a 300 MHz spectrometer? **(Marks 5)**

Q 11 Diagrammatically illustrate the working principle of mass spectroscopy and discuss the various types of analyzers used in the protein analysis **(Marks 5)**

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