2014

B.E. (Biotechnology) Second Semester

ESBT-202: Fundamentals of Bio-Technology and Bio-Engineering

Time allowed: 3 Hours   Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.*

x-x-x

1. Answer the following: (1x10=10)

   a) Define molarity.

   b) What is the purpose of a lyophilizer in biotechnology?

   c) Name the main principle behind a UV-visible spectrophotometer.

   d) What is the role of agitator in a bioreactor?

   e) Write one application of ECG instrument?

   f) _____ is commonly used bioinformatics database which stores protein sequences.

   g) A _____ is a component in a spectrophotometer that separates the incoming light into different wavelengths.

   h) Autoclaves create _____ for sterilization.

   i) What is a biochip?

   j) In centrifugation, the denser particles sediment towards the bottom of the tube during spinning. (True/False)

SECTION-A

2. a) What is an autoclave and how does it function to sterilize equipment? Discuss the advantages and limitations of autoclaves in sterilization process.

   b) What are the different types of spectrophotometers?

   c) Write any two applications of radionuclides.   (5+3+2)

P.T.O.

3. a) Explain the principle of centrifugation and how it separates components based on density.

b) Discuss the main steps involved in agarose gel electrophoresis with a suitable diagram. Write its main applications. (5x2)

4. a) Define the International System of Units and explain its significance in scientific measurements.

b) Calculate the no. of moles present in 20 g of glucose ($C_6H_{12}O_6$).

c) If one mole of carbon atoms weighs 12 grams, what is the mass (in milligrams) of 1 atom of carbon? (3+3+4)

SECTION-B

5. a) Explain the operation of a bioreactor with a suitable diagram showing its major components.

b) Discuss the role and types of biological recognition elements and transducers in a biosensor. (5x2)

6. Write a note on principle and applications of following techniques (Any two):

a) MRI

b) EEG

c) Ultrasound (5x2)

7. a) Discuss the primary and secondary databases for storing biological information. Give two examples each.

b) Write a note on the applications of nano-biotechnology in clinical diagnosis and healthcare. (5x2)

x-x-x