Exam.Code:0906
Sub. Code: 33268

2055
B.E., Second Semester
BTBS-201: Fundamentals of Bioengineering

Time allowed: 3 Hours **Max. Marks: 50**

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

x-x-x

I. Answer the following in 3 - 4 sentences only:-

i. What is RCF?
ii. What is colorimetry?
iii. Define the term 'specific radioactivity'.
iv. What is void volume of a gel-filtration column?
v. What is an amperometric biosensor?
vi. What is nanobiotechnology?
vii. What is SDS-PAGE?
viii. What are major limitations of ultrasonography?
ix. What is PBD and its application?
x. What is the use of a draught tube in a bioreactor? 1 X 10 =10

Section-A

IIa. Define the terms: mole, IU, molarity, specific enzyme activity and pH.
b. What is UV-Vis spectroscopy? Describe its principle, draw a schematic diagram of a double-beam spectrophotometer, label its parts and describe their functioning in brief. 5, 5
IIIa. What is sterilization and its objective? Describe the working of an autoclave in detail with the help of a schematic diagram.
b. What is a centrifuge? Describe the relationship between RCF and RPM for a centrifuge. 5, 5
IVa. What is the difference between the Native-PAGE and SDS-PAGE? Describe the technique of SDS-PAGE in detail.
b. What is a radioisotope? How half-life of a radioisotope is determined? 5, 5

Section-B

Va. What is a biosensor? Enlist various types of biosensors and describe their applications in brief.
b. What is a CSTR? Draw a schematic diagram of a bead-bed reactor, label its parts and describe their functioning in detail. 5, 5
VIa. What is a nanoparticle? Describe major applications of nano-biotechnology in bio-engineering for human welfare.
b. What is MRI? Describe its functioning with the help of schematic diagram(s) in brief. 5, 5
VIIa. What is bioinformatics? How it is used in identifying various types/ strains of microorganisms and their enzymatic functions?
b. What is an electrocardiogram and its use(s)? Describe the principle and functioning of ECG machine. 5, 5

x-x-x