SOUTH EASTERN KENYA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

SECOND SEMESTER EXAMINATION FOR DEGREES OF BACHELOR OF SCIENCE IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

BCH 402: BIOCHEMICAL TECHNIQUES AND INSTRUMENTATION III

DATE: 11TH APRIL, 2017 TIME:1.30-3.30 P.M

INSTRUCTIONS TO CANDIDATES

(a) Answer ALL the Questions in Section A
(b) Answer ANY TWO Questions in Section B
(c) Illustrate your answers with well labeled diagrams where appropriate

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SECTION A (30 MARKS)

1. Define organelle permeabilisation technique outlying its benefits. (**3 marks**)

2. Explain **three** ways in which sedimentation velocity experiments can also be used to study reversible chemical equilibria between macromolecular species.(**3 marks**)

3. a) State the rationale of protein characterisation processes. (**1 mark**)

   b) Outline**three**parametersapplicable to proteins for general characterization. (**3 marks**)

4. Ca^{45} has a half-life of 163 days. Calculate

   a) the decay constant (λ) in terms of (i) day^{-1} and (ii) sec^{-1} (**2 marks**)

   b) the residual percentage of the initial radioactivity remaining in a sample after

90 days. (**2 marks**)

5. a) Explain thebasis of immunoassays. (**1 mark**)

   b) Outline **two** labelling techniques used in immunoassays (**2 marks**)

6. Outline **two** methods of *in vitro* labelling of DNA and RNA probes. (**4 marks**)

7. List **four** applications of filter hybridisation techniques. (**4 marks**)

8. Brieflyexplain the **two** main principle applications of microarray techniques.(**2 marks**)

9. Describe how a 50 µl restriction digest can be prepared for 50 DNA samples of average concentration 250ng/µl using *Mse*I - 50 U/µl. 1 unit of *Mse*I is required to digest 50 ng – 500 ng of total Genomic DNA. BSA is supplied as 100X concentration (10mg/ml) and is required in *Mse*I restriction. (**3 marks)**

SECTION B (40 MARKS)

10. Describe the continuous centrifugation gradient techniques. (**20 marks**)

11. Describe how the N terminal amino acid analysis is undertaken. (**20 marks**)

12. Discuss immunassay techniques. (**20 marks**)

13. Discuss the experimental factors to be considered in orderto obtain intact Chromosomal DNA. (**20 marks**)