

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE BIOCHEMISTRY

**SCH 3302: BIOMEMBRANES AND CELLULAR SIGNALLING**

**DATE: NOVEMBER, 2015 TIME: HOURS**

**INSTRUCTIONS:** *Answer question* ***one COMPULSORY*** *and any other* ***two*** *questions.*

**QUESTION ONE – (30 MARKS)**

1. Describe the role of the following organelles in the cell. (12 Marks)
2. Smooth endoplasmic reticulum
3. Lysosome
4. Golgi apparatus
5. Plasma membrane
6. Mitochondria
7. Peroxisomes
8. Describe briefly the classes of membrane receptors present on the plasma membrane

(5 Marks)

1. Describe briefly how the below processes occur; (10 Marks)
2. Disulphide bond formation
3. Retention of ER proteins
4. Targeting proteins to chloroplasts
5. Active transport
6. Glycosyl phosphatidyl inositol anchoring
7. Highlight on the process by which active transport occurs. (3 Marks)

**QUESTION TWO (20 MARKS)**

1. Describe the classes of lipids found in membranes and their functions. (7 Marks)
2. Describe the essential features of the fluid mosaic model of membranes. How does asymmetrical orientation of lipids and proteins help such a model. (8 Marks)
3. Explain the process of formation of transport vesicles from the golgi, (5 Marks)

**QUESTION THREE (20 MARKS)**

1. Discuss the electron transfer components of the chloroplast and explain the synthesis of energy during electron flow. (15 Marks)
2. Explain the following processes occurring in the peroxisomes. (5 Marks)
3. Oxidation of fatty acids
4. Photorespiration

**QUESTION FOUR (20 MARKS)**

1. Describe the processes involved in lysosomal cellular digestion. (7 Marks)
2. Explain the formation of clathrin coated pits and describe their use in uptake of cholesterol into the cell. (8 Marks)
3. Discuss briefly lysosomal storage diseases. (5 Marks)

**QUESTION FIVE (20 MARKS)**

1. Explain how insulin regulates blood glucose when it binds to its receptor. (6 Marks)
2. Describe using diagrams the structure of the epidermal growth factor receptor and explain how ras proteins transduce signals from this receptor. (14 Marks)