



**QUESTION 1 [30 Marks]**

- a) A MIMO system can be used for different purposes.
  - i) Describe your understanding of the term MIMO 4Marks
  - ii) List the various techniques/methods that MIMO uses to achieve improved throughputs. 4Marks
  - iii) Briefly explain the 2X2 MIMO System 4Marks
- b) More research in advancing space satellites speeds is currently underway, namely In Terabit Internet Satellites.
  - i) Discuss how New 1-Terabit internet satellites will deliver high-speed Internet 4Marks
  - ii) What will be the advantages of this service compared to traditional basedSatellites? 3Marks
  - iii) What services are anticipated to be offered by this service and to which groups or regions? 2Marks
  - iv) list the companies involved, researching or planning to invest and provide the service 2Marks
- c) Google is planning to provide 5G service, Discuss how it plans to achieve this 3Marks

**QUESTION 2 [20 Marks]**

- a) i) Discuss Ad Hoc Networking 5Marks
- ii) Discuss how the above technology can be used as an Internet Access Technology 5Marks
- iii) List limitations of the above Technology 3Marks
- b) i) Briefly Discuss, the 4G mobile technology and how it is different from Previous mobile generations, in your explanation list the companies, Services offered and areas that have 4G in in Kenya. 7Marks

**QUESTION 3 [20 Marks]**

- a) There has been increased research to develop self-adaptable and high-speed next generation mobile Technology, towards this end 5G is being developed,
  - i) In your own words describe 5G 5Marks
  - ii) According to the GroupeSpeciale Mobile Association (GSMA), to Qualify for a 5G, a connection should meet most of the eight criteria: List five(5) of this criteria's 5Marks
  - iii) List the advantages and disadvantages of 5G 5Marks
  - iv) List and describe probable applications of 5G 5Marks

**QUESTION 4 [20 Marks]**

- a) Describe IoT 5Marks
- b) What is the difference between the Internet of Everything and The Internet of Things 5Marks
- c) List and describe possible applications of Internet of things (IoT) 10Marks

**QUESTION 5 [20 Marks]**

Describe your understanding of the following emerging Technologies

- a) Optical wireless communication 5Marks
- b) Molecular communication 5Marks
- c) Fixed location LTE 5Marks
- d) Passive WIFI 5Marks