BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF ENGINEERING AND PHYSICS

PROGRAMME: BSc. Honours Degree in Electronic Engineering

COURSE CODE EEE5102/EEE4102(1) : MOBILE COMMUNICATION

DURATION: 3Hrs TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES

1. This examination paper consists of 6 Questions
2. Each question carries 25 marks
3. Answer any Four (4) questions
4. Start each question on a new page

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1. (a) Define the term mobile communication. [4]
   (b) Cellular mobile systems are advantageous over telephone systems. Discuss. [6]
   (c) Expand and describe these technologies in communication: GSM, GPRS AND UMTS. [9]
   (d) CDMA 2000 is more advantageous than 3G GSM standards, Justify. [6]
   (25 Marks)

2. (a) Describe the types of data services provided by GSM and their applications. [8]
   (b) Compare the data transfer speeds of UMTS Release 99 and UMTS with HSDPA. [4]
   (c) Explain the significance of the WCDMA technology in UMTS and its benefits compared to GSM. [8]
   (d) Highlight the maximum theoretical data transfer rates for GPRS, and how they compare to those of earlier GSM data services. [5]
   (25 Marks)

3. (a) Describe the architecture of LTE using a diagram. [10]
   (b) An electronic engineer can best distinguish a communication technology from another referring to its features. Discuss any five of such features for GPRS. [10]
   (c) Elucidate on some of the deliverables of GSM that have made it undesirable over GPRS. [5]
   (25 Marks)

4. (a) Make a short a presentation on the goals of GPRS. [10]
   (b) The working principle behind a mobile phone unit is best presented via a block diagram. Make such a presentation [6]
   (c) A trainee engineer intends to design a communication gadget for an upcoming small factory based on the UMTS technology but is not sure of the basic elements that should be incorporated in such a gadgets. Highlight to him the basic elements which define a UMTS gadget. [9]
   (25 Marks)

5. (a) Analyze the potential future developments of WiMAX technology in the context of competing technologies such as LTE and 5G. [8]
   (b) Briefly describe the IEEE 802.16 standard and its significance in wireless communication. [5]
   (c) Expound on the basic design Principles of LTE. [12]
   (25 Marks)

6. (a) Discuss the technical challenges faced by WiMAX in terms of interference, security, and coverage. How can these challenges be addressed? [10]
   (b) Security issues are of uttermost importance in mobile communication technologies. Present on any three features of GSM security. [6]
   (c) Narrate on the benefits of LTE technology to the world. [9]
   (25 Marks)

END OF PAPER