

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
DEPARTMENT OF ELECTRICAL/ELECTRONIC ENGINEERING
HARMATTAN SEMESTER EXAMINATION: 2019/2020 SESSION
COE 407: MODERN TELEPHONY.

INSTRUCTION: ANSWER FIVE (5) QUESTIONS ONLY. TIME: 3 HRS

QUESTION 1:

- (a) What do you understand by transmission impairments? (1mark)
(b) Use a table where necessary and show the important types of transmission impairments which affect the signal severely. (7marks)
(c) Write out the equation of balance return loss in terms of power and voltage. (3marks)
Calculate the balance return loss, given that incoming power on the 4-wire circuit is 40watts and the power reaching the 2-wire circuit is 20watts. (5marks)
(d) Define the following acronyms (i) GOS (ii) CCR (iii) BII (iv) BHCA (4marks)

QUESTION 2:

- (a) With a suitable diagram write an informative note on the two mechanisms that transmit the identity of the called subscriber in a switching system. (8marks)
(b) What is the purpose of telecommunication system? (2marks)
(c) Mention the possible elements that make up telecommunication system. (4marks)
(d) If the input power is $23\mu\text{W}$ and output power is 34mW , find the power ratio and express it in decibel and nepers. (6marks)

QUESTION 3:

- (a) What is traffic? (2marks)
(b) Define the following terms (i) Traffic Intensity (ii) Total Traffic (iii) Holding Time (6marks)
(c) What is the main objective of Trunking? (2marks)
(d) During a 3-hour busy period, 2400 calls arrived at an exchange, average holding time per call is 2 minutes. What is the traffic in Erlang and CCS? (10marks)

QUESTION 4:

- 1(a) Draw the neat diagram of GSM system architecture and outline the four basic network entities that make up GSM/mobile network (16mks) (b) Explain the basic functions of BTS (4mks)

QUESTION 5:

- 2(a) Explain the three basic principles of resource or channel allocation in GSM (9mks)
(b) What value is the carrier separation or radio channel bandwidth in GSM, and determine the number of carriers and channels/GSM users in the following uplink frequency bands (i) GSM 900 (890-915MHZ) (ii) GSM 1800 (1710-1785MHZ) and (iii) GSM 1900 (1850-1910MHZ) (11mks)

QUESTION 6:

- 3 (a) What do you understand by multiple access techniques and briefly explain the three basic techniques used in GSM network? (12mks). (b) What is the number of radio channels and users in a 25MHz bandwidth GSM network with FDMA used as multiple access techniques? Hint: 8 users are allowed per a radio channel (8mks)

QUESTION 7:

- 4(a) Explain the terms (i) mobile communication (ii) GSM (iii) SIM Card (iv) Bandwidth (v) signalling (vi) simplex communication (vii) SDMA. (b) Name two types of traffic channels and their rate in GSM (6mks)

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