Transmitter and Receiver Techniques

079

Thursday, 03 Nov 2011 8.30-11.30AM

WORKFORCE DEVELOPMENT AUTHORITY

P.O. BOX 2707 KIGALI Tel: (+250) 255113365

ADVANCED LEVEL NATIONAL EXAMINATIONS 2011
PROFESSIONAL AND TECHNICAL OPTIONS

SUBJECT: TRANSMITTER AND RECEIVER TECHNIQUES

OPTION: ELECTRONICS&TELECOMMUNICATION (ETL)

DURATION: 3HOURS

INSTRUCTIONS:

This paper consists of three sections: **A, B** and **C.**

Section A: Answer **all** the questions. **(55marks)**

Section B: Answer **three** questions of your choice. **(30marks)**

Section C: Answer **only one** question of your choice. **(15marks)**

Section A: Answer all the questions. **(55marks)**

01. What is a passive reflector? **(1mark)**

02. What is fading? When a signal is received over long distance path a periodic increase and decrease of received signal strength may result **(2marks)**

03. What is image frequency? **(2marks)**

04. What are the components of the signal in case of line-of-sight reception? **(2marks)**

05. What is the range of frequencies used for line-of-sight communication in ionosphere layer? **(2marks)**

06. Identify separate main parts involved in antenna system. **(3marks)**

07. Identify two (2) reference signals the color television system PAL needs. **(2marks)**

08. Identify the types of transmission lines in antenna system. **(3marks)**
- balanced transmission line
- unbalanced transmission lin

09. Find the far-field distance for an antenna with maximum dimension of 1meter and operating frequency of 900MHz. **(3marks)**

10. What are the different factors affecting choice of modulation type? **(6marks)**

11. Identify the parameters of a radio receiver. **(5marks)**

12. Identify four (4) types of an antenna. **(4marks)**

13. How can you enhance communication parameters between emitter and receiver? **(5marks)**

14. What are properties of an antenna? **(5marks)**

15. Identify the types of analog and binary modulation schemes. **(7marks)**

16. Identify different types of charge coupled devices (CCD). **(3marks)**

Section B: Answer three questions of your choice. (30marks)

17. If a transmitter produces 100W of power, express the transmitted power in unit of (a) dBm, (b) dBW. **(10marks)**

18. List in order (from input to output) the components of a super heterodyne receiver (AM). **(10marks)**

19. Identify the advantages of digital television system. **(10marks)**

20. (a) Identify the signals that you get on output of synhropulse generator in color TV system PAL. **(8marks)**

    (b) What is video luminance? **(2marks)**

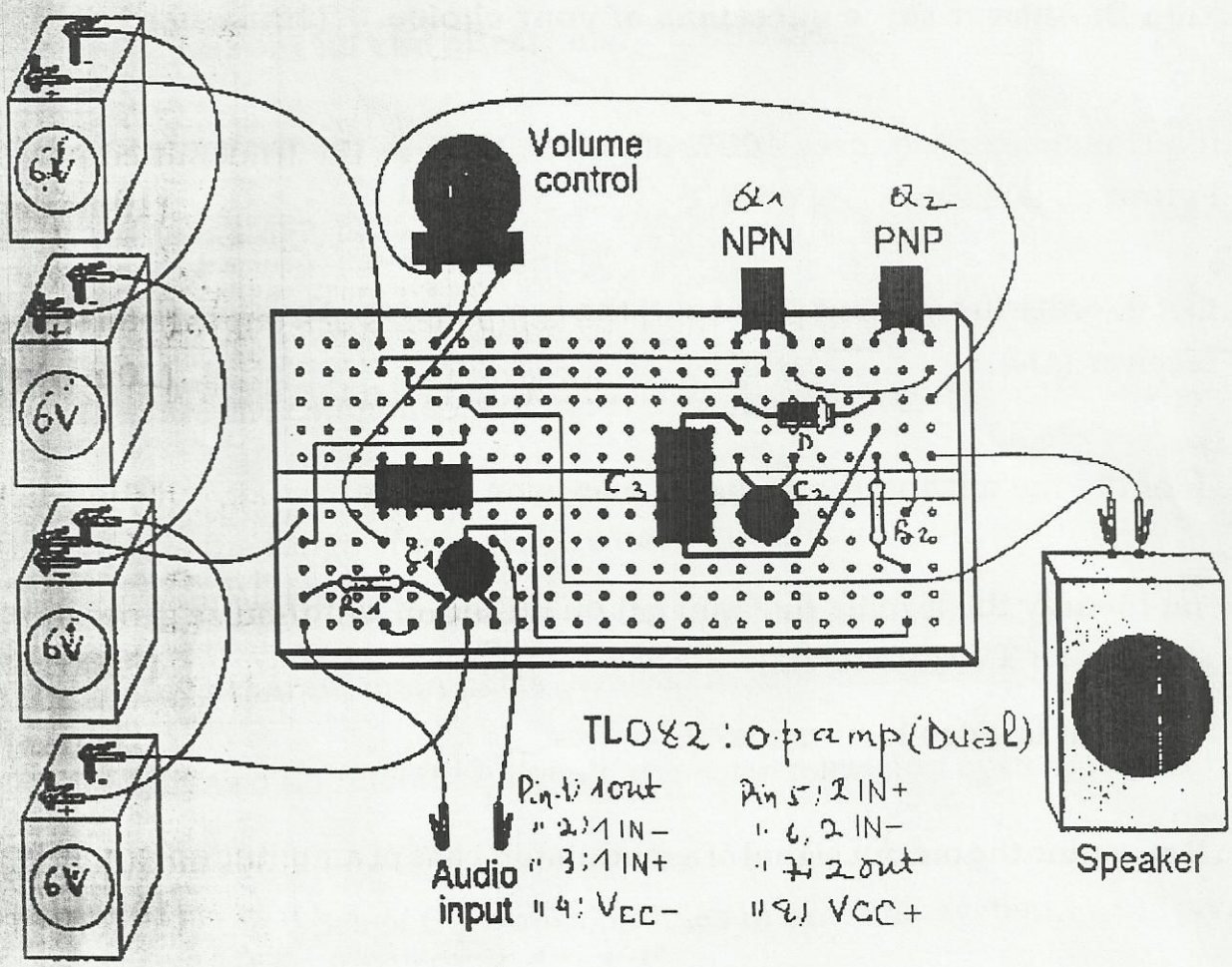
21. Determine the output signal of a modulator; case of amplitude modulation. **(10marks)**

Section C: Answer only one question of your choice. (15marks)

22. Design a yagi type antenna which contains four (4) elements and must receive a signal of 200MHz. **(15marks)**

    (NB: Dimension of elements in mm)

23. The following (page 4 of 4) assembly is a project for class B audio amplifier. It used to amplify the output signal from small radio, tape player, CD player or any other source of audio signal. Establish a corresponding electrical schematic diagram. **(15marks)**


Volume control
Q1 NPN
Q2 PNP
6V
6V
6V
6V
C3
C2
C1
R1
R2
D
TL082 : Opamp (Dual)
Pin 1: 1 out
" 2: 1 IN−
" 3: 1 IN+
" 4: VEE−
Pin 5: 2 IN+
" 6, 2 IN−
" 7: 2 out
" 8: VCC+
Audio input
Speaker