Government College of Engineering, Amravati
(An Autonomous Institute of Government of Maharashtra)

Fifth Semester B. Tech.
(Electronics and Telecommunication Engineering)

Winter – 2016

Course Code: ETU502

Course Name: Analog Communication

Time: 2 hr. 30min. **Max. Marks: 60**

Instructions to Candidate

1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.

1 **Solve any two of the following questions**

(a) Draw the block diagram of a communication system and explain. **6m**

(b) Derive the expression for Amplitude modulated wave. Also draw an AM wave. **6m**

(c) A 400 W carrier is amplitude modulated to a depth of 100%. Calculate the total power in case of AM and DSBSC techniques.How much power saving (in W) is achieved for DSBSC? If the depth of modulation is changed to 75%,then how much power (in W) is required for transmitting **6m**

Cont.

the DSBSC wave? Compare the powers required for DSBSC in both the cases and comment on the reason for change in power levels.

2 **Solve the following questions**

(a) What do you mean by angle modulation. Explain the two types of angle modulation in detail. **6m**

(b) What is Narrowband FM and Wideband FM. Explain. **6m**

3 **Solve the following questions**

(a) Write short note on **6m**
1) Thermal Agitation noise
2) Shot noise
3) Avalanche noise

(b) Derive the expression for equivalent Noise figure. A receiver is connected to an antenna whose resistance is 50Ω has an equivalent noise resistance of 30Ω.Calculate the receiver's noise figure in decibels. **6m**

4 **Solve any two of the following questions**

(a) Define characteristics impedence .Derive the expression for characteristics impedence of the transmission line. **6m**

(b) What are the different types of antenna? Explain any one. **6m**

(c) Explain fundamentals of Electromagnetic waves in detail. **6m**

5 **Solve any two of the following questions**

(a) What do you mean by radiation pattern.Draw different radiation patterns of various resonant dipoles. **6m**

(b) What do you mean by radiation resistance.Derive the expression for antenna efficiency in terms of Radiation resistance. **6m**

(c) Explain with proper diagram sky wave propagation. **6m**

Government College of Engineering, Amravati
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Fifth Semester B. Tech.
(Electronics and Telecommunication)

Winter – 2014

35

Course Code: ETU502

Course Name: Analog Communication

Time: 2 Hrs. 30 Min. **Max. Marks: 60**

Instructions to Candidate

1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.
6) Smith chart will be provided.

1. Solve the Following.

a) Explain the Electromagnetic frequency spectrum used in communication system using the parameter frequency band, wavelength and application. **06**

4

b) i) Define signal-to-noise ratio and noise figure of the receiver. **02**

2

ii) A receiver connected to an antenna whose resistance is 50Ω has an equivalent noise resistance of 30Ω. Calculate the receiver's noise figure in decibels and its equivalent noise temperature. **04**

(F-1) KTBw

3

$T_e = (F-1)T$

$F = 1 + \frac{R_{eq}}{R_{src}}$

R_{eq}: Req. Rin

2. Solve any TWO

a) What is single-sideband suppressed-carrier (J3E) modulation? What are its advantages and applications with respect to "ordinary" AM (A3E) **06**

b) i) Define amplitude modulation and modulation index. **02**

ii) The antenna current of an AM broadcast transmitter, modulated to a depth of 40% by an audio sine wave, is 11 A. it increases to 12 A as a result of simultaneous modulation by another audio sine wave. What is the modulation index due to this second wave? **04**

c) What is pre-emphasis? Why is it used? Sketch a typical pre-emphasis and de-emphasis circuit and explain why de-emphasis must be used also. **06**

3. Solve any TWO

(a) Draw the complete diagram of the balance modulator in the Armstrong frequency modulation system and explain the function of each block. **06**

b) Explain fully the difference between frequency modulation and phase modulation. **06**

c) Discuss the types, causes and effects of various forms of Internal noise which may be created within a receiver or an amplifier. **06**

4. Solve any TWO

(a) i) Define and explain the meaning of the term standing –wave ratio. **03**

ii) Write a short note on Quarter-wave transformer and impedance matching. **03**

b) A 50Ω transmission line is connected to a parallel combination of 100Ω resistance and 1 nf of capacitance. Find the position and length of single stub using smith chart to match the load to the line at frequency 1MHz. **06**

(c) Describe ground-wave propagation. What is the angle of tilt? How thus it affect field strength at a distance from the transmitter? **06**

5. Solve the Following.

a) Sketch the Log-Periodic antenna and briefly explain its operation. For what application it is suitable. **06**

(b) Describe briefly the strata of the ionosphere and their effects on sky-wave propagation. Why is this propagation generally better at night then during the day? **06**

Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

Fifth Semester
B. Tech. (Electronics and Telecommunication)

Winter – 2015

Course Code: ETU502

Course Name: Analog Communication

Time: 2 Hrs. 30 Min. Max. Marks: 60

Instructions to Candidate

1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.
6) Smith chart will be provided.

1. Solve the Following 12

a) What are the basic components of any communication system? Draw and explain the block diagram of the typical communication system..

b) Explain what is meant by Vestigial Sideband (VSB) transmission. What are its advantages and usage?

2. **Solve any TWO** 12

a) Explain with the help of block schematic the "third" method of generation of Single Sideband (SSB) transmission. List its advantages.

b) A carrier wave with amplitude 12V and frequency 10MHz is amplitude modulated to 50% level with a modulating frequency 1kHz, write down equation of the above wave and sketch the waveform in frequency domain.

c) Draw the complete block diagram of the Armstrong frequency modulation system and explain the functions of the mixer and multipliers shown. In what circumstances can we dispense with the mixer.

3. **Solve any TWO** 12

a) In an Frequency Modulation (FM) system, the audio frequency is 1kHz and audio voltage is 2 volts. The deviation is 4kHz. If the AF voltage is now increased to 8 volts and its frequency dropped to 500Hz, find the modulation index in each case and the corresponding bandwidth using carson's rule.

b) Explain the difference between Narrow band Frequency Modulation (FM) and Wideband FM.

c) Describe ground-wave propagation. What is the angle of tilt? How does it affect field strength at a distance from the transmitter?

4. **Solve any TWO** 12

a) Describe fully the Cassegrain method of feeding a paraboloid reflector, including a sketch of the geometry of this feeding arrangement.

b) What is a smith chart? List its applications.

c) Describe Briefly the Strata of the ionosphere and their effects on skywave propagation. Why is this propagation generally better at night than during the day?

5. **Solve the Following** 12

a) Define and explain the meaning of the term standing-wave ratio (SWR). What is the formula for it if the load is purely resistive? Why is a high value of SWR often undesirable?

b) What is a horn antenna? How it is fed? What are its applications?