

Date - 22/11/2016.

Seat No. _____

GANPAT UNIVERSITY

B. TECH SEM- V (EC) CBCS REGULAR EXAMINATION - NOV-DEC 2016

2EC504: Communication Engineering

TIME: 3 HOURS

TOTAL MARKS: 60

INSTRUCTIONS: -

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

- 1 (A) Derive the expression for sinusoidal frequency modulated signal. Explain what is meant by narrowband FM and wideband FM using the expression? **5**
- (B) List out all methods for generation of SSB modulated signals. Explain Phasing method in detail for the same. **5**

OR

- 1 (A) In a FM system a 25 MHz carrier is frequency modulated by a sinusoidal information signal of amplitude 2.5 volt and frequency 500 Hz. Frequency deviations is 5KHz. If amplitude of information signal is raised to 7.5 volt then what will be new value of deviation? If amplitude of information signal is raised to 10 Volt while frequency is dropped to 250 Hz. Find values of modulation index in each case. **5**
- (B) What is the importance of synchronic carrier in demodulation of SSB wave? Discuss SSB wave reception process in detail. **5**
- 2 (A) Draw the time domain view of AM wave with $V_{max}=80V$ and $V_{min}=20V$. Assume that $F_c=10F_m$ for this case. Form it calculate value of modulation index. Also comment on magnitude of carrier signal and sideband components of envelope. **5**
- (B) What do you mean by AFC in receiver terminology? Discuss the working of AGC in radio receiver circuits. **5**

OR

- 2 (A) As related to AM, what is over modulation, under modulation and 100% modulation? Compare DSB technology with SSB technology. **5**
- (B) Draw the frequency spectrum of FM and explain. Explain how Varactor diode can be used for generation of frequency modulated wave. **5**
- 3 (A) Draw block diagram of Super heterodyne receiver circuit and explain functionality of its each block. **4**
- (B) Write the difference between singly and doubly balanced modulator circuit and explain In detail about working of FET singly balanced modulator circuit **4**
- (C) Explain working of Diode ring as doubly balanced modulator circuit. **2**

SECTION-II

- 4 (A) Define term Satellite Orbit. Describe out various types of orbits in detail .An inductor has series resistance of 7Ω , and inductance of $75\mu\text{H}$. it forms part of series tuned circuit that has Q of 95. Determine resonant frequency. 5
- (B) List out all Internal noises. With equational proof prove that thermal power does not depend on resistance values. 5
- OR**
- 4 (A) Calculate the output SNR in dB for three identical links, given that the SNR for any link is 60 dB. Write Kepler's three laws in detail given for Orbiting earth for satellites. 5
- (B) Define term Noise Factor. Derive equation of Noise Factor of for four stage cascaded amplifiers circuit. 5
- 5 (A) Briefly discuss the importance of the parallel tuned circuit in communication systems .Prove that D dynamic impedance for parallel tuned circuit is $R_d=Q^2 *r$. 5
- (B) Discuss Series tuned circuit working in terms of Q factor, 3 dB bandwidth, Impedance and relative response. 5
- OR**
- 5 (A) What is station keeping process in satellite communication working? Explain the following terms with respect to satellite communication process: 1. Apogee 2. Perigee 3. Inclination angle 4. Eccentricity 5
- (B) What is Image frequency in Super heterodyne receiver circuit working? What is importance of section of IF value in design of Super heterodyne receiver circuit? 5
- 6 (A) Derive equation for Geostationary orbit height for Geostationary satellite. 3
- (B) Write short note on Mutual inductance. 3
- (C) Define Carson's rule. Write the applications of FM process. Prove that FM is constant bandwidth system. 4

END OF PAPER
