B.E. Electronics & Telecommunication / Communication Engineering / Electronics Engineering
Sem-VI

EN601 - Principles of Communication Engineering

P. Pages : 2 **GUG/S/19/1687**

Time : Three Hours * 1 3 1 1 * Max. Marks : 80

Notes : 1. All questions carry marks. as indicated.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain Duct propagation? Calculate the maximum wavelength λ_{max} for which duct propagation is possible given that duct height is 10 meter and modified refractive index=30. **8**

b) Explain the following terms. **8**
i) Virtual height ii) Skip distance
iii) Maximum usable frequency iv) Rayleigh fading

OR

2. a) In tropospheric propagation by using geometry Derive the equation for path difference between direct ray and indirect reflected ray. Show that reflected ray lags by phase $\phi_s = \frac{4\pi h_t h_r}{\lambda d}$ as compared to direct ray. **8**

b) Derive the expression for equivalent noise resistance for several amplifiers in cascade. What is the effect of cascade connection on S/N Ratio. **8**

3. a) Explain trapezoidal method for measurement of modulation index in AM. Calculate modulation index by this method given that $L_1 = 6cm$ and $L_2 = 1cm$. **8**

b) Draw balanced modulator using FET. Derive the output expression of the BM using FET. **8**

OR

4. a) Derive the expression for a modulated signal in which the carrier is AM modulated by several sine wave. Calculate the total modulation index if carrier is amplitude modulated by three modulating signal having modulation index 0.6, 0.3 and 0.4. **8**

b) Compare SSB, DSB, ISB and VSB **8**

5. a) What is Carson's rule in FM? Why FM is sometimes referred to as a constant bandwidth system. **4**

b) Determine the frequency deviation and carrier swing required to provide 80% modulation in the FM broadcast band and for an FM signal serving as the audio portion of a TV broadcast. **6**

c) Explain a basic reactance modulator. **6**

OR

6. a) Explain Foster-Seeley discriminator. State its advantage & disadvantage. **8**

b) In FM system, when audio frequency is 500 Hz and Audio frequency voltage is 2.4 V, the deviation is 4.8 kHz. If audio frequency voltage is raised to 10 V and audio frequency is dropped to 200 Hz what is the new deviation. Find the modulation index in each case. **8**

7. a) State and explain the difference between simple AGC and delayed AGC. Give suitable circuit to obtain delayed AGC. **6**

b) What do you mean by "Tracking" in Superheterodyne receiver? What is "Tracking error"? Explain the "Three point tracking" in MW band receiver. **6**

c) In a broadcast superheterodyne receiver having no RF stage, the loaded Q of the antenna coupling circuit is 100. If IF used is 455 KHz. Calculate **4**
i) Image frequency ii) It's rejection ratio at 1000 kHz.

OR

8. a) Explain the following terms:- **8**
i) Double spotting.
ii) Image frequency and its rejection
iii) Adjacent channel selectivity.

b) Find the value of trimmer capacitor and oscillator inductor to give trimmer tracking for the receiver having tuning range of signal from 450 kHz to 1600 kHz and use an IF of 455 kHz. Assume the value of G_{max} is equal to 300pF. Also find the error in oscillator tracking frequency for a signal frequency of 1MHz. **8**

9. a) Explain generation of PCM with help of diagram showing waveform at output of each stage. **8**

b) A voice signal is sampled at Nyquist rate and each sample is quantified into one of 256 levels. Determine the output rate of PCM signal. **4**

c) Compare TDM and FDM. **4**

OR

10. Write short note on:- **16**
i) Demodulation of PWM
ii) Disadvantage of DM
iii) Generation of PPM.

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