

Code No: RT22045

**R13****SET - 1****II B. Tech II Semester Regular Examinations, April/May – 2016****ANALOG COMMUNICATIONS**

(Electronics and communication Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **THREE** Questions from **Part-B**
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**PART –A**

1. a) Define modulation. Why is modulation required? (3M)
- b) What are the Advantages of SSB systems? List Application of SSB? (4M)
- c) Define frequency deviation? What is wideband FM and Narrowband FM? (4M)
- d) Define (i) Average noise figure. (ii) Average Noise Temperature (4M)
- e) Define Sensitivity and Selectivity. (3M)
- f) Compare Continuous wave and pulse modulation technique. (4M)

**PART –B**

2. a) With necessary expressions, waveforms and spectrums, Explain AM for an arbitrary baseband signal  $m(t)$ . (10M)
- b) The output power of an AM transmitter is 1KW when sinusoidally modulated to a depth of 100%. Calculate the power in each side band when the modulation depth is reduced to 50%. (6M)
3. a) Derive the expression for SSB containing upper sideband in time domain. (10M)
- b) Explain the phase discrimination method for generating SSB. (6M)
4. a) Explain clearly about pre-emphasis and de-emphasis in FM wave. (8M)
- b) Explain different modes in a phase locked loop. (8M)
5. a) Define the following along the related equations (10M)
  - (i) noise equivalent bandwidth
  - (ii) narrow band noise
  - (iii) ideal band pass filtered noise.
- b) A mixer has a noise figure of 30db. It is preceded by an amplifier which has a noise figure of 10db and an available power gain of 12db. Calculate the overall noise figure with referred to the input. (6M)
6. a) Derive the expression for the figure of merit of DSBSC receiver that uses coherent detection. (10M)
- b) Write a short notes on amplitude limiting. (6M)
7. Mention and explain different methods for generation of PWM (16M)



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**R13****SET - 2****II B. Tech II Semester Regular Examinations, April/May – 2016****ANALOG COMMUNICATIONS**

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Time: 3 hours

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 2. Answer **ALL** the question in **Part-A**  
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**PART -A**

1. a) Define modulation index and mention the range of modulation index? (4M)
- b) Write the expression for SSB and VSB Waves. (4M)
- c) Compare AM and FM? (3M)
- d) Define White noise and Shot noise. (4M)
- e) State Sampling Theorem with suitable figure. (4M)
- f) Write Merits and Demerits of PAM. (3M)

**PART -B**

2. a) Define a standard form of amplitude modulation and explain the time and frequency domain expression of an AM wave. (8M)
- b) Explain with the help of a neat sketch, how a square law modulator is used to generate an AM. (8M)
3. a) With a neat diagram explain the balanced modulator method of generating DSBSC (8M)
- b) With block diagram and relevant equations explain the coherent detection of a DSB-SC wave. What is its disadvantage? Explain the synchronous receiving system. (8M)
4. a) Derive an expression for the spectrum of FM wave with sinusoidal modulation (10M)
- b) Compare narrow band and wide band FM (6M)
5. Explain the terms (16M)
 

(a) shot noise	(b) thermal noise
(c) white noise	(d) noise figure and
(e) transit time noise.	
6. a) Why are limiters and pre-emphasis filters used in FM radio. (10M)
- b) Write a notes on vestigial sideband modulation (6M)
7. a) With neat sketch explain the generation of PPM from PWM. (10M)
- b) Compare merits and demerits of TDM and FDM. (6M)

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**R13****SET - 3****II B. Tech II Semester Regular Examinations, April/May – 2016****ANALOG COMMUNICATIONS**

(Electronics and communication Engineering)

Time: 3 hours

Max. Marks: 70

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 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **THREE** Questions from **Part-B**

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**PART –A**

1. a) Compare Square law detector with envelope detector? (4M)
- b) Compare different AM systems? (3M)
- c) What are Advantages & Applications of FM? (4M)
- d) List out various noise sources. (4M)
- e) Write Merits and Demerits of PAM. (3M)
- f) List the Classification of receivers. (4M)

**PART –B**

2. a) Explain the generation technique of an AM wave using the square law modulator. (8M)
- b) Explain the working of an envelope detector (8M)
3. a) Draw the circuit diagram for balanced ring modulator and explain its operation indicating all the waveforms and spectrums. (10M)
- b) In an DSB-SC system, modulating signal is a single tone sinusoid  $6 \cos(2\pi 10^3 t)$  which modulates a carrier signal  $8 \cos(2\pi 10^6 t)$ . Write the equation of modulated wave. Plot the two sided spectrum of the modulated wave. Calculate the amount of power transmitted. (6M)
4. a) Derive an expression for the spectrum of FM wave with sinusoidal modulation. (8M)
- b) With a neat block diagram explain the Armstrong method of FM generation. (8M)
5. a) Explain the Threshold effect in angle modulation system. (8M)
- b) Explain the noise performance in DSB-SC system and obtain necessary expression for figure of merit (8M)
6. a) With the aid of the block diagram explain TRF receiver. Also explain the basic superheterodyne principle. (10M)
- b) List out the advantages and disadvantages of TRF receiver. (6M)
7. a) Describe the synchronization procedure for PAM, PWM and PPM signals. (8M)
- b) Discuss about the spectra of PWM and PPM signals. (8M)



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**R13****SET - 4****II B. Tech II Semester Regular Examinations, April/May – 2016****ANALOG COMMUNICATIONS**

(Electronics and communication Engineering)

Time: 3 hours

Max. Marks: 70

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 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **THREE** Questions from **Part-B**
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**PART –A**

1. a) Why frequency translation is required? (3M)
- b) List Application of different AM systems? (4M)
- c) Plot FM wave taking modulating wave  $m(t)$  as (i) Sine wave (ii) Square wave (4M)
- d) Define figure of merit? (3M)
- e) Define Image frequency and Image frequency rejection ratio. (4M)
- f) Compare PAM,PPM and PWM. (4M)

**PART –B**

2. a) Draw and explain switching modulator along with the related transfer characteristics and equation (8M)
- b) The efficiency of an AM wave is defined by  $\eta = (P_s/P_t) \times 100$ . Find the efficiency for  $\mu = 0.5$ . (8M)
3. a) What are DSBSC generation methods? Explain the generation of DSBSC using Ring modulator. (10M)
- b) Explain the phase discrimination method for generating SSB. (6M)
4. a) Explain the operation of the balanced slope detector using a circuit diagram and draw its response characteristics. Discuss in particular the method of combining the outputs of the individual diodes. In what way is this circuit, an improvement on the slope detector and in turn what are the advantages? (10M)
- b) Compute the bandwidth requirement for the transmission of FM signal having a frequency deviation 75 KHz and an audio bandwidth of 10KHz. (6M)
5. a) Define noise figure and explain its significance with derivation. (6M)
- b) What is significance of Pre-emphasis and De-emphasis explain with neat sketch. (10M)
6. a) With the aid of the block diagram explain TRF receiver. Also explain the basic superheterodyne principle. (10M)
- b) List out the advantages and disadvantages of TRF receiver. (6M)
7. a) With a block diagram approach explain the operation of FDM scheme. (10M)
- b) Compare PAM, PWM and PPM systems. (6M)