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53 (EC 402) AGCM

2016

**ANALOG COMMUNICATION**

Paper : EC 402

Full Marks : 100

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

Answer **any five** questions.

1. (a) Show that it is not possible to amplitude modulate a signal by adding the message signal to the carrier. 10
- (b) What is meant by modulation index of an amplitude modulated system? How can you differentiate a DSB-SC signal and a DSB-FC signal in the time domain? 5+5
2. (a) Show that the Hilbert transformation of a signal changes the phase of the signal by  $\pm 90^\circ$ . 10

Contd.

- (b) Describe the filter method for the generation of SSB-SC signal. 10
3. Derive the condition on the filter transfer function necessary to demodulate a VSB-SC signal. Hence draw the filter transfer function. 20
4. (a) Discuss the generation of WBFM using a reactance modulator. 12
- (b) Prove that a narrowband PM is similar to AM signal. 8
5. Discuss the working principle of a phase lock loop. Show that a linearised PLL can demodulate an FM signal. 20
6. Write short notes on : **(any two)** 10×2=20
- (i) Carson's rule for bandwidth
- (ii) Foster-Seeley discriminator
- (iii) Figure of merit (FOM) for an AM system with envelope detector.