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OR

[Communication Electronics]

Group - A

Answer any *five* questions :  $2 \times 5 = 10$

1. What is the necessity of modulation? 2
2. Why frequency modulation is considered to be superior than amplitude modulation? 2
3. What is a vocoder? 2
4. What types of modulation methods are used with 4G cell phones? 2
5. Define Pulse Width Modulation (PWM). 2
6. Write down the advantages and disadvantages of geosynchronous satellites. 2
7. What do you mean by noise? Define signal-to-noise ratio. 2
8. What is the necessity of digital communication? 2

Group - B

Answer any *four* questions :  $5 \times 4 = 20$

9. What is the bandwidth of a GSM channel? How many users can share a channel in GSM? Differentiate between GSM and CDMA. 1+1+3

10. What is the basic function and purpose of a communication satellite? 5
11. What do you mean by frequency shift keying? Determine the peak frequency deviation, minimum bandwidth and baud for a binary FSK signal with a mark frequency of 49 kHz, a space frequency of 51 kHz and an input bit rate of 2 kbps. 2+3
12. What do you mean by information capacity? What is Shanon limit for information capacity? For a standard telephone circuit with a signal to noise power ratio of 1000 and a bandwidth of 2.7 kHz, determine the Shanon limit for information capacity. 5
13. What do you mean by thermal noise? How is the noise power related to different parameters for the noise generated by resistor? An amplifier operating in the frequency range from 18 to 20 MHz has a  $10K\Omega$  input resistor. What is the rms noise voltage at the input to this amplifier if the ambient temperature is  $27^{\circ}\text{C}$ ? 2+1+2
14. Derive the formula for the instantaneous value of an AM voltage and define modulation index. Sketch roughly the waveforms of carrier wave, modulating wave and amplitude modulated wave. 3+2



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**Group - C**

Answer any *one* question :  $10 \times 1 = 10$

15. (a) List four major applications of FM.
- (b) State the four main benefits of single sideband (SSB) signal over conventional amplitude modulated (AM) signal.
- (c) What do you mean by transponder? What are the basic functions of transponder? Draw the block diagram of satellite transponder.  $2+4+(1+1+2)$
16. (a) Derive the relation between the output power of an amplitude modulated wave and depth of modulation.
- (b) A 400-watt carrier is modulated to a depth of 75%. Calculate the total power in the modulated wave.
- (c) Draw the circuit diagram using transistor for generation of amplitude modulated wave and explain its operation.  $4+2+(2+2)$
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