

**U.G. 6th Semester Examination-2022****PHYSICS****[HONOURS]****Discipline Specific Elective (DSE)****Course Code : PHY-H-DSE-T-03****(Communication Electronics)**

Full Marks : 40

Time :  $2\frac{1}{2}$  Hours*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer any **five** questions :  $2 \times 5 = 10$
- What is SIM number? Mention its significance.
  - What do you understand by the Amplitude Shift Keying (ASK) in digital pulse modulation?
  - What are the GSM and CDMA technologies?
  - Write the differences between 3G and 4G network system.
  - Define Noise and signal-to-noise (S/N) ratio.
  - What is Multiplexing?
  - What is Binary Phase Shift Keying (BPSK) in digital pulse modulation?
  - Write the advantages of geostationary satellites.

*[Turn Over]*

2. Answer any **two** questions:  $5 \times 2 = 10$
- What is sampling theorem in analog pulse modulation? Write the basic principles of PAM, PWM, PPM modulation.  $2+3$
  - Write a short note on Satellite communication by drawing a simplified block diagram of satellite system. Why is the downlink frequency less than uplink frequency?  $4+1$
  - Draw the block diagram of an electronic communication system and explain each element. Give an idea of frequency allocation for radio communication system in India (TRAI).  $3+2$
  - What is amplitude modulation? Obtain an expression for an AM wave with sinusoidal modulation? Define modulation index. What are the upper side frequency and lower side frequency of an AM wave?  $1+2+1+1$
3. Answer any **two** questions:  $10 \times 2 = 20$
- What are the basic needs of digital transmission? What are the different techniques involved in digital Carrier Modulation? Explain each technique briefly. What is pulse code modulation? Derive an expression for SNR for linear quantization.  $2+3+2+3$

- b) Draw a simplified block diagram of mobile phone handset. What is IMEI number? Mention its significance. What are the uses of GPS navigation system? What are the differences between TDMA and FDMA technologies?

3+2+2+3

- c) What is frequency modulation? Derive an expression for an FM wave with sinusoidal modulation. Explain with circuit diagram how an FM waveform can be generated using a VCO. How can a slope detector be employed to detect FM waves? What are its disadvantages?

1+2+3+3+1

- d) What is demodulation? How an AM wave can be detected by using a diode detector circuit?—explain. Draw the basic block diagram of Super-heterodyne receiver and explain the function of each block. Why is the super-heterodyne receiver so named?

2+3+4+1

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