

B.Sc. 5th Semester (Honours) Examination, 2019 (CBCS)**Subject : Physics****Paper : DSE-1(2) (OR)****Time: 2 Hours****Full Marks: 40***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.***1. Answer any five of the following questions:**

2×5=10

- Why modulation is needed in communication?
- How many levels of encoding are required to represent samples by 4 bits?
- What is GSM technology?
- What is a SIM number?
- What are the advantages of FM over AM?
- What are the probable sources of path loss in radio communication?
- How does frequency reuse made in mobile communication?
- Why do downlink and uplink frequencies are different in satellite communication?

2. Answer any two of the following questions:

5×2=10

- Explain how an FM waveform can be generated using VCO.
- What do you mean by Pulse Code Modulation (PCM)? Explain the terms sampling and quantizing in pulse code modulation. Write one advantage of PCM. 1+3+1=5
- What is a geostationary satellite? What are the look angles? Mention the advantages and disadvantages of satellite communication over other types. 1+2+2=5
- What is diagonal clipping? A diode envelope detector uses a parallel RC network with $R = 220\text{ k}\Omega$ and $C = 200\text{ pF}$. If an AM wave with 40% modulation is fed to this detector, what is the highest modulation frequency that can be detected with tolerable distortion? 2+3=5

3. Answer any two of the following questions:

10×2=20

- What is amplitude modulation? Write down an expression for AM wave with sinusoidal modulation and draw the modulating signal, carrier wave and AM wave. Define the term modulation index. The total power content of an AM wave is 1.5kW at a depth of modulation of 80%. Calculate the power content of the carrier and each side band. 1+2+3+1+3=10

- (b) What is analog pulse modulation? Describe basic principles of modulation and detection technique for PAM with proper circuit diagrams.
- (c) Describe the method of generation and detection of Frequency Shift Keying (FSK) Signals with proper circuit diagram. 5+5=10
- (d) Define the following terms: Cell, Cell sectoring and Cell splitting. With simple block diagram representation describe in brief the mobile communication technology. 3+7=10
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