PSM/KW/23/1191-C

Bachelor of Science (B.Sc.) Semester–V (New) Examination

ELECTRONICS

(Modern Communication Systems)

Optional Paper–1

Time : Three Hours] [Maximum Marks : 50

Note :—(1) All questions are compulsory and carry equal marks.

(2) Draw neat diagrams wherever necessary.

EITHER

1. (A) What is attenuation in optical fiber. Explain the reasons for attenuation in optical fiber. 1+4

(B) The optical power at the output of 20 km cable is 4μw while the input power is 100mw. Calculate attenuation/km of the cable in dB. 3

(C) Give two advantages and disadvantages of optical fiber over metal wire. 2

OR

(D) Explain the types of optical fiber. Explain the advantages and disadvantages of single mode step index Vs multimode graded index fiber. 4+2

(E) The refractive index of core is $\eta_1 = 1.54$ and that of cladding is $\eta_2 = 1.5$ of an optical cable. Calculate the acceptance angle and numerical aperture. 4

EITHER

2. (A) What is pulse modulation ? Explain PAM, PWM, PPM and PDM ? 5

(B) Explain sampling theorem. If signal frequencies varies from 10KHz to 100KHz. what is the minimum sampling rate required to sample signal ? 2

(C) Explain synchronous and asynchronous data transmission. 3

OR

(D) Explain sampling, quantization, encoding process in pulse code modulation. Explain Delta modulation techniques of PCM generation. 3+3

(E) Give two advantages and disadvantages of digital modulation techniques. 2

(F) Explain the serial and parallel system of data transmission. 2

EITHER

3. (A) Explain the types of satellite orbits based on the satellite distance from earth. 4

(B) Draw the block diagram of satellite communication system and explain each block. 4

(C) Give two applications of satellite. 2

OR

(D) What is satellite ? What is the need of satellite communication. 4

(E) Explain LEO and MEO satellites. 4

(F) Give two advantages and disadvantages of satellite. 2

EITHER

4. (A) Explain the concept of cellular telephone system. What is frequency reuse and cluster ? 3+2

(B) An area is comprised of 10 clusters with 10 cells in each cluster and 50 channels in each cell. Determine the total number of channels. 2

(C) Explain the types of interference in cellular system. 3

OR

(D) Explain cell splitting and cell sectoring. 5

(E) Explain multiple access scheme used in mobile telephone system. 5

5. Solve any **ten** : 1×10

(A) What are the conditions required for total internal reflection ?

(B) Calculate the refractive index of material if speed of light in that material is 1.8×10^8 m/s.

(C) Name two types of detectors used in detection of light in optical fiber.

(D) What is quantization error ?

(E) What is full duplex system ?

(F) What is start bit and stop bit digital data communication ?

(G) What is the distance of geostationary satellite from earth ?

(H) What is apogee and perigee ?

(I) Explain ecentricity in satellite orbit.

(J) Explain Hands-off in mobile telephone system.

(K) What is frequency reuse factor ?

(L) What is umbrella cell ?

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