Reg. No. : ....

Name : ....

Third Semester M.Sc. Degree Examination, February 2021

Physics

Special Paper – 1

PH 233 E : ADVANCED ELECTRONICS – I

(2018 Admission Onwards)

Time : 3 Hours   Max. Marks : 75

SECTION – A

Answer **any five** questions. Each question carries **3** marks.

I.   (a)   What are the advantages and disadvantages of analogue communication?

     (b)   Write the applications of microwave radio communication.

     (c)   Define PAM, PWM and PCM.

     (d)   Give the features of ASK, PSK and MSK.

     (e)   What are the merits of coherent detection optical transmission over direct detection?

     (f)   Explain cell splitting and sectoring.

     (g)   How do we evaluate the inverse z-transform? Explain the methods briefly.

     (h)   Explain finite and infinite impulse response filters.

(5 × 3 = 15 Marks)

SECTION – B

Answer **all** questions. Each question carries **15** marks.

II. (A) Define z transform and discuss its six properties.

OR

(B) (a) Discuss frequency reuse, cell splitting in cellular telephone.

(b) Discuss about classification of cellular systems.

III. (A) What is optical solitons? Discuss soliton based optical communication systems.

OR

(B) (a) Explain frequency and time division multiplexing in detail.

(b) Explain the role of TDM in PCM telephone systems.

IV. (A) (a) Explain frequency modulated microwave radio systems.

(b) Explain about FM microwave repeater.

OR

(b) (a) What are the importance of Fourier transformation in signal system?

(b) Discuss in detail about discrete time fourier transformation and fast fourier transformation.

(3 × 15 = 45 Marks)

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SECTION – C

V. Answer **any three** of the following questions. Each question carries **5** marks.

(a) Find the complex Fourier series for the signal $x(t) = \cos w_0 t + \sin^2 w_0 t$.

(b) A modulating signal m(t) is applied to a DSB-suppressed carrier system modulator operating at f_c=50kHz. Determine and sketch the spectrum of the modulated signal if m(t) = 2 cos (4000 πt + 5 cos (6000 πt).

(c) The antenna current of an AM broadcasting transmitter modulated to a depth of 50% by an audio sine wave is 12A. It increases to 13 A as a result of simultaneous modulation by another audio sine wave. What is the modulation index due to second wave?

(d) In a double side- band (DSB) full carrier AM transmission system, if the modulation index is doubled, then by what factor the ratio of total sideband power to the carrier power increases?

(e) A lower SSB signal with carrier is expressed as $\varphi(t) = (A + f(t))\cos w_c t + f(t)$ sin $w_c t$. If the signal is received and demodulated by an envelope detector, find the output of the envelope detector. What assumptions should you make in order to demodulate the signal correctly?

(f) A finite duration signal is given as X(n)= {2,4,5,7,0,1}. Determine the z -transform X(z) of this signal.

(3 $\times$ 5 = 15 Marks)

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