Previous M.Sc., Degree Examinations

December 2017

(Directorate of Distance Education)

PHYSICS

Paper– IV: DPA 540: ELECTRONICS

Time: 3 hrs] *[Max. Marks: 75/85*

Note:

Answer any FIVE questions from parts A, B and C without omitting any part (Common to All) Part – D is for the students whose max. marks is 85.

PART – A

1. a) State Thevenin's and Norton's theorem and apply them to the analysis of a circuit.

   b) Explain the terms: driving point impedance and transfer impedance of a multi mesh network. (9 + 6)

2. a) Obtain expressions for the characteristic impedance of π and T sections.

   b) With suitable example explain different types of active filters. What are the advantages of active filters over passive filters. (8 + 7)

3. a) Explain the attenuation mechanism of radio frequency signals in a transmission line.

   b) Obtain expression for reflection coefficient and standing wave ratio of a transmission line. Calculate the reflection coefficient and standing wave ratio of infinite, short circuited and open circuited lines. (6 + 9)

PART – B

4. a) Explain the construction and working of a Zener diode. Explain the characteristics of UJT and SCR.

   b) Discuss in detail the characteristics of a photo diode. (9 + 6)

5. a) With neat circuit diagrams explain briefly the design and working principles involved in the construction of multistage amplifier.

   b) Discuss the different biasing methods employed in transistor amplifiers. (9 + 6)

6. a) With a neat circuit diagram explain the working of Hartly and Colpitts oscillator.

   b) Explain the principle of working of astable, monostable and bistable multivibrators. (9 + 6)

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PART – C

7. a) Discuss the characteristics of an ideal operational amplifier. With suitable circuit diagrams explain the working of an inverting and non inverting amplifiers.

   b) Explain the working principles of first order low and high pass filters. (9 + 6)

8. a) With reference to digital electronics explain with examples the following terms: i) number systems and codes, ii) hexadecimal and octal, iii) BCD, grey codes and excess – 3 codes.

   b) Explain the working of i) adder and subtractor circuits, ii) differentiator and integrator. (10 + 5)

9. a) Convert the following numbers to hexa decimal numbers: 1832, 32284, 4386.

   b) Discuss the action of flip flops and counters. (6 + 9)

PART – D

10. ***Answer any TWO of the following:*** $2 \times 5 = 10$

    a) Laplace transformation techniques for network analysis.

    b) Opto isolators.

    c) Voltage followers

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