

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

ELECTRICAL TECHNOLOGY

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define impedance.
2. Write the primary emf equation of a single phase transformer.
3. What are the different types of D C motor ?
4. Write any 2 applications of stepper motor.
5. State superposition Theorem

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Explain the working of Megger.
2. State and explain Kirchhoff's Laws.
3. Derive the emf equation of transformer.
4. Explain the armature reaction and it's effects.
5. Explain the working principle of stepper motor.
6. Draw and explain the DC servo motor.
7. Define the terms cycle, time period, frequency, amplitude.

(5 × 6 = 30)

## PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

## UNIT — I

- III (a) Describe effect of AC through a RLC circuit. 8
- (b) An inductor coil of 0.2H with a resistance of  $20\Omega$  and a capacitance of  $160\ \mu\text{F}$  are connected in series and fed by a 230V, 50Hz supply. Find impedance, pf, active power and reactive power. 7

OR

- IV (a) A resistance of  $10\Omega$ , an inductance of 20mH and a capacitance of  $47\ \mu\text{F}$  are connected in series 220V, 50Hz supply. Determine (i) the voltage across R, L and C (ii) power in watts. 7
- (b) Explain the plate earthing method with neat sketch. 8

## UNIT — II

- V (a) State and prove Thevenin's Theorem. 7
- (b) Explain the construction of a transformer. 8

OR

- VI (a) Illustrate the elementary theory of an ideal transformer. 7
- (b) State and prove maximum power transfer theorem. 8

## UNIT — III

- VII (a) Explain the working principle of DC generator. 8
- (b) Explain the necessity of starter in a DC motor and working of a 3 point starter. 7

OR

- VIII (a) Derive emf equation of a DC generator. 7
- (b) Draw the electrical and mechanical characteristics of a DC series motor and explain it. 8

## UNIT — IV

- IX (a) What is the relation between the speed and frequency of an alternator ? 7
- (b) With the help of relevant figures explain how a single phase induction motor is made self starting. 8

OR

- X (a) What is the principle of operation of a  $3\Phi$  Induction motor. 7
- (b) Explain the working principle of an alternator. 8

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

DIGITAL ELECTRONICS

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Give the 1's and 2's complements of 1101 1100.
2. Give the symbol and truth table of an XOR gate.
3. Define the term fan-in of a gate.
4. What do you mean by a sequential logic circuit ?
5. List the different types of ADC.

(5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. What are the advantages and disadvantages of K-map ?
2. Explain a half subtractor circuit with truth table and logic diagram.
3. Draw and explain a serial in parallel out shift register.
4. Explain the working of a Johnson counter with diagram.
5. What is 'modulus' of a counter ? Give the truth table of a mod-8 counter.
6. Explain the operation of a 1 to 4 De-multiplexer.
7. Explain a flash type ADC.

(5×6 = 30)

## PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

## UNIT — I

- III (a) Perform the following operations.
- (i)  $1000 \times 1001$
- (ii)  $110111 + 11010$
- (iii)  $1101101 \div 101$
- (iv)  $(+15) + (-9)$  using 2's complement method. 12
- (b) What are universal gates ? Give examples. 3

OR

- IV (a) Simplify the Boolean function using K-map.
- $F = \sum m(0, 3, 7, 10, 14) + d(2, 4, 6, 9, 11, 13)$  9
- (b) State and explain De-Morgan's theorems. 6

## UNIT — II

- V (a) Explain the working of a 3 bit encoder with truth table and logic diagram. 9
- (b) Define the terms Noise margin, Noise immunity and propagation delay. 6

OR

- VI (a) Design a full adder circuit. 9
- (b) Draw and explain a TTL inverter. 6

## UNIT — III

- VII (a) Explain the working of master slave JK flip-flop with diagram. 10
- (b) Draw the truth tables of D and T flip-flops. 5

OR

- VIII (a) Explain the different types of shift registers with diagrams. 10
- (b) What is race around condition ? How it can be eliminated ? 5

## UNIT — IV

- IX (a) Implement a mod-10 asynchronous counter using JK flip-flops. 10
- (b) Define resolution and accuracy of a DAC. 5

OR

- X (a) Explain the working of R-2R ladder type DAC with diagram. 10
- (b) Differentiate between asynchronous and synchronous counters. 5

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

**ELECTRONIC DEVICES AND CIRCUITS**

[Time : 3 hours

(Maximum marks : 100)

**PART — A**

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. State the need of multistage amplifier.
2. Define Q factor.
3. Define the term cross over distortion in power amplifier.
4. Define pinch off voltage of a FET.
5. List the merits of crystal oscillator.

(5 × 2 = 10)

**PART — B**

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Explain ac and dc load line with graph.
2. List the advantage and disadvantage of direct coupled amplifier.
3. A parallel tuned circuit is resonant at 455 KHz and has 20KHz band width and  $X_L = 1500\text{Kohm}$ . Find Q factor.
4. List the advantage of negative feedback.
5. Explain the working of Unijunction transistor.
6. Prove that the output of RC differentiator circuit is proportional to the derivative of the input.
7. Explain the principle of L C oscillator.

(5 × 6 = 30)

## PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

## UNIT — I

- III (a) Draw and explain the emitter follower and its application. 8  
 (b) Distinguish between different coupling schemes used in multistage amplifiers. 7

OR

- IV (a) Draw the frequency response of Common Emitter RC coupled amplifier and explain why bandwidth decreases at low frequencies and high frequencies. 10  
 (b) List the application of transformer coupled amplifier. 5

## UNIT — II

- V (a) Explain the classification of power amplifier with transfer characteristics curve. 8  
 (b) Compare between series and parallel resonance circuit. 7

OR

- VI (a) Draw and Explain the operation of complementary symmetry push pull power amplifier. 9  
 (b) Why heat sinks are necessary to use with power transistors. 6

## UNIT — III

- VII (a) Describe construction of N-Channel deflection type MOSFET. 8  
 (b) Distinguish the properties of positive and negative feedback circuits. 7

OR

- VIII (a) What are parameters of FET ? Explain. 7  
 (b) Distinguish between JFET and MOSFET. 8

## UNIT — IV

- IX (a) Draw and explain the working of Astable Multivibrator with waveforms. 7  
 (b) Draw and explain the working of wein bridge oscillator. 8

OR

- X (a) Draw and explain working of collpits oscillator. 7  
 (b) Explain the working of crystal oscillator, with neat circuit diagram. 8

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
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COMMUNICATION ENGINEERING

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Explain phase modulation.
2. Define Skip Distance.
3. Explain Critical Frequency.
4. Define signal - to - noise ratio.
5. Define Selectivity.

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Explain Space wave propagation.
2. Explain Pulse amplitude modulation.
3. Describe simple AGC with circuit diagram.
4. Explain the need of Limiter circuit in FM.
5. Describe the Need for modulation.
6. Explain Refraction and Diffraction.
7. Explain AFC with block diagram.

(5 × 6 = 30)

## PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

## UNIT — I

- III (a) Explain Ground wave propagation. 8  
 (b) Explain the working of parabolic Antenna. 7

OR

- IV (a) Draw different layers of ionosphere and explain it. 9  
 (b) Explain Folded dipole antenna. 6

## UNIT — II

- V (a) Derive the expression for modulating index in AM. 6  
 (b) Explain the working of balanced modulator with circuit. 9

OR

- VI (a) Derive the expression for an AM wave. 7  
 (b) Explain pulse code modulation Technique. 8

## UNIT — III

- VII (a) Draw the block diagram of Direct FM transmitter and explain the function of each block. 9  
 (b) Explain De-emphasis and Pre-emphasis with necessary diagrams. 6

OR

- VIII (a) Explain the working of AM transmitter with block diagram. 9  
 (b) Explain types of internal noise. 6

## UNIT — IV

- IX (a) Explain the factors influencing the Choice of IF. 6  
 (b) Explain the working of Super heterodyne receiver with block diagram. 9

OR

- X (a) Explain the working of diode detector with circuit diagram. 6  
 (b) Explain FM receiver with Block diagram. 9