(Model Paper) **C –23, EC -302**

State Board of Technical Education and Training, A. P

Diploma in Electronics and Communication Engineering (DECE)

III Semester

Subject Name: Electronic Circuits-I

Sub Code: EC - 302

Time: 90 minutes **Unit Test I** **Max.Marks:40**

Part-A **16Marks**

Instructions: (1) Answer **all** questions.
(2) First question carries **four** marks, each question of remaining carries **three** marks

1. Fill the following blanks with one word
   a) Bridge rectifier is a Half wave rectifier (TRUE/FALSE) (CO1)
   b) Ripple factor of half wave rectifier is ------ (CO1)
   c) What is heat sink (CO2)
   d) Define h_{11} (CO3)
2. Compare HWR and FWR (CO1)
3. Define voltage regulation (CO1)
4. List the types of biasing circuits. (CO2)
5. Define the terms gain and bandwidth of an amplifier (CO3)

Part-B **3×8=24**

Instructions: (1) Answer **all** questions.
(2) Each question carries **eight** marks
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. (a) Explain the working of full wave bridge rectifier with wave forms (CO1)

   (or)

   (b) Explain the operation of adjustable voltage regulator (CO1)

7. (a)Explain fixed bias circuit (CO2)

   (or)

   (b) Explain Self Bias circuit and analyse the stability of self bias (CO2)

8. (a) Explain the working of two-stage transformer coupled amplifier with circuit diagram and explain its frequency response characteristics (CO3)

   (or)

   (b) Explain the operation of Darlington pair with the help of circuit diagram (CO3)

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III Semester

Subject Name: Electronic Circuits-I

Sub Code: EC-302

Time: 90 minutes **Unit Test II** **Max.Marks:40**

Part-A **16Marks**

Instructions: (1) Answer **all** questions.
(2) First question carries **four** marks, each question of remaining carries **three** marks

1. Fill the following blanks with one word
   a) What is the efficiency of Class B amplifier (CO4)
   b) Negative feedback is used in oscillators **(State True/False)** (CO5)
   c) How many degrees phase shift is produced by feedback network of RC phase shift oscillator (CO5)
   d) With the introduction of negative feedback, the gain of an amplifier is decreases **(State True/False)** (CO5)
2. Compare Voltage and Power amplifier (CO4)
3. List any three applications of Class C Amplifiers (CO4)
4. State the concept of feedback in amplifiers (CO5)
5. State the conditions (Barkhausen's criteria) for an amplifier to work as an oscillator (CO5)

Part-B **3×8=24**

Instructions: (1) Answer **all** questions. (2) Each question carries **eight** marks
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. (a) Explain the working of Class-B Push-pull amplifier with circuit diagram and waveforms (CO4)

   (or)

   (b) Explain the working of complementary symmetry Push-pull power amplifier with circuit diagram (CO4)
7. (a) Explain negative feedback amplifier with block diagram and derive the expression for the gain of negative feedback amplifier (CO5)

   (or)

   (b) Explain the effect of negative feedback on gain, bandwidth, input and output impedances of an amplifier (CO5)
8. (a) Explain the working of a Wein bridge oscillator with a circuit diagram and write the expressions for frequency of oscillations and mention the conditions required for sustained oscillations (CO5)

   (or)

   (b) Explain the working of Colpitts oscillator with a circuit diagram and write the expressions for frequency of oscillations and mention the conditions required for sustained oscillations (CO5)

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MODEL PAPER
BOARD DIPLOMA EXAMINATIONS
C-23, EC-302, ELECTRONIC CIRCUITS –I
III SEMESTER
SEMESTER END EXAMINATION

TIME:3 HOURS **MAX MARKS:80**

Part-A **10×3=30**

Instructions: (1) Answer **all** questions. (2) Each question carries **three** marks
(3) Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. Compare Half wave, Full wave Centre tapped, Bridge rectifiers in any 3 aspects (CO1)
2. Define ripple factor and efficiency of a rectifier. (CO1)
3. List the factors affecting the operating point (CO2)
4. Define h-parameters of BJT (CO3)
5. State the need for Multistage amplifier (CO3)
6. List the applications of Darlington pair (CO3)
7. State the need for Power Amplifier (CO4)
8. Compare positive and negative feedback (CO5)
9. Advantages of crystal oscillator over other oscillators (CO5)
10. State the conditions (Barkhausen's criteria) for an amplifier to work as an oscillator (CO5)

Part-B **5×10=50**

Instructions: (1) Answer **any five questions**. (2) Each question carries **10** marks
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Explain the working of centre tapped full wave rectifier with wave forms (CO1)
12. (a) Explain the working of Zener regulator (CO1)- 5M
    (b)Explain the concept of DC and AC load lines (CO2) -5M
13 Explain fixed bias circuit and list its draw backs (CO2)
14 Explain the working of two-stage RC coupled amplifier with circuit diagram and explain its frequency response characteristics (CO3)
15. Explain the working of Class-B Push-pull amplifier with circuit diagram and waveforms (CO4)
16. Explain the working of double tuned amplifier with circuit diagram (CO4)
17. Explain the working of an RC phase shift oscillator with a circuit diagram and write the expressions for frequency of oscillations and mention the conditions required for sustained oscillations (CO5)
18 Explain the working of crystal oscillator with a circuit diagram and list its advantages (CO5)

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EC-303, DIGITAL ELECTRONICS

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
EC-303	Digital Electronics	4	60	20	80

S No	Unit Title	No. of Periods	Weightage of Marks	No. of Short Answer Questions	No. of Essay Questions	COs Mapped
1	Basics of Digital Electronics.	15	26	2	2	CO1
2	Logic Families	7	16	2	1	CO2
3	Combinational Logic circuits.	15	26	2	2	CO3
4	Sequential Logic Circuits.	15	26	2	2	CO4
5	Semiconductor memories.	8	16	2	1	CO5
	Total Periods/Marks	**60**	110	30	80	

Course Objectives	1. To familiarize with various number systems, postulates of Boolean algebra, logic gates and logic circuits
	2. To analyse the working of logic gates, combinational and sequential circuits and memories
	3. To learn the practical importance and applications of digital electronic circuits

CO No		COURSE OUTCOMES
CO1	**EC-303.1**	Convert a number from one system to another system, implement logic circuits and analyse logic expressions.
CO2	**EC-303.2**	Describe different logic families
CO3	**EC-303.3**	Design combinational logic circuits
CO4	**EC-303.4**	Construct different sequential logic circuits
CO5	**EC-303.5**	Describe different semiconductor memories

CO-PO/PSO MATRIX

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
EC-303.1	3	3	1	1	1			3	1	
EC-303.2	3	3			1		1	3		
EC-303.3	3	3	3	1	1			3	1	1
EC-303.4	3	3	3	1	1			3	1	1
EC-303.5	3	3			1		1	3	1	1
Average	3	3	2.3	1	1		1	3	1	1

3=strongly mapped 2=moderately mapped 1=slightly mapped

LEARNING OUTCOMES:

1.0 Basics of Digital Electronics

1.1 i) Explain Binary, Octal, Hexadecimal number systems.
ii) Convert a given decimal number into Binary, Octal, and Hexadecimal number and vice versa
iii) Convert a given binary number into octal and hexadecimal number and vice versa

1.2 Perform binary addition, subtraction, multiplication and division.

1.3 i) Write 1's complement and 2's complement numbers for a given binary number.
ii) Perform subtraction of binary numbers in 2's complement method.

1.4 Compare weighted and Un-weighted codes.

1.5 Write Binary equivalent number for a number in 8421, Excess-3 and Gray Code and vice-versa.

1.6 Mention the use of alphanumeric codes (ASCII & EBCDIC)

1.7 State different postulates in Boolean algebra

1.8 Explain the basic logic gates AND, OR, NOT gates with their truth tables

1.9 Explain the working of universal logic gates (NAND, NOR gates) with truth tables

1.10 Explain the working of an Exclusive–OR gate with truth table

1.11 i) State De-Morgan's theorems
ii) Apply De-Morgan's theorems and other postulates to simplify Boolean expressions (up to three variables only)

1.12 Realize AND, OR, NOT operations using NAND, NOR gates

1.13 Explain standard representations for logical functions (SOP and POS form)

1.14 Write Boolean expressions from the given truth table

1.15 Write Boolean expressions for real life examples

1.16 Simplify Boolean Expression using Karnaugh map (up to 3 variables only)

2.0 Logic families

2.1 Classify logic families

2.2 List the important characteristics of Digital ICs of different logic families.

2.3 Define the terms: propagation delay, Noise margin, Fan-in, Fan-out and Power dissipation of digital ICs.

2.4 State the voltage and current logic levels of TTL and CMOS ICs.

2.5 Explain the working of Totem-pole output TTL NAND gate with circuit diagram.

2.6 Explain the working of open collector TTL NAND gate with circuit diagram.

2.7 Explain the working principle of CMOS Technology with diagram

2.8 Explain the working of CMOS NAND and CMOS NOR Gates with circuit diagram.

2.9 Compare the TTL, CMOS and ECL logic families.

2.10 List IC numbers of two input TTL Logic gates.

3.0 Combinational logic circuits

3.1 State the concept of combinational logic circuit.

3.2 i) Explain Half adder circuit using Ex-OR, AND gates
ii) Realize Half-adder using i) NAND gates only and ii) NOR gates only.

3.3 i) Explain the operation of Full adder circuit with truth table using Ex-OR gate and basic gates.
ii)Realize full-adder using two Half-adders and an OR gate

3.4 Explain the working of 4 Bit parallel adder using full adders.