CBCS SCHEME

USN | | | | | | | | | | |

21ELN14

First Semester B.E./B.Tech. Degree Examination, Feb./Mar. 2022
Basic Electronics and Communication Engineering

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. With a neat circuit diagram and waveforms, explain the working of Bridge rectifier without filter. **(08 Marks)**

b. A 6V Zener diode has a maximum rated power dissipation of 500 mw. If the diode is to be used in a simple regulator circuit to supply a regulated 6V to a load of 500Ω. Determine a suitable value of series resistor for a supply of 12V. **(06 Marks)**

c. With a neat block diagram, derive the expression for overall gain of a negative feedback amplifier. **(06 Marks)**

OR

2 a. Define the following with respect to Operational Amplifiers and write their typical values : i) Open loop voltage gain ii) Input offset voltage iii) Full power bandwidth and iv) Slew rate. **(08 Marks)**

b. With a neat circuit diagram, explain the working of Integrator using Op-Amp. **(06 Marks)**

c. With a neat circuit diagram, explain the working of Wein bridge Oscillator using Op-Amp. **(06 Marks)**

Module-2

3 a. With the help of truth table, explain full adder using logic gates. **(08 Marks)**

b. Realize 8 - to – 1 multiplexer using basic gates. **(06 Marks)**

c. With the help of logic diagram, explain the working of R – S bistable circuit. **(06 Marks)**

OR

4 a. With the help of neat block diagram, explain the working of Microcontroller System. **(08 Marks)**

b. With a neat block diagram, explain the 4 – bit shift register using JK Flip – flop. **(06 Marks)**

c. With a neat block diagram, waveforms and truth table, explain 3 – bit Asynchronous counter using JK Flip - flop. **(06 Marks)**

Module-3

5 a. What is an Embedded System? List any 7 comparison between Embedded system and General purpose computing system. **(08 Marks)**

b. Explain the classification of Embedded system, based on Generation. **(06 Marks)**

c. List the comparison between Microprocessor and Microcontroller. **(06 Marks)**

OR

6 a. With a neat block diagram, explain an Instrumentation System. **(08 Marks)**

b. With a neat circuit diagram, explain Common Cathode and Common Anode 7 Segment LED display. **(06 Marks)**

c. Write short notes on : i) I 2 C Bus and ii) S P I Bus. **(06 Marks)**

Module-4

7 a. Describe the blocks of the Basic Communication System. **(08 Marks)**

b. Explain the types of Communication System. **(06 Marks)**

c. Define Amplitude Modulation. With the help of waveforms, explain Amplitude Modulation. **(06 Marks)**

OR

8 a. Explain three different modes of propagation of Electromagnetic waves, with a neat diagram. **(08 Marks)**

b. With a neat block diagram, explain Transmitter and Receiver using Automatic Repeat Request. **(06 Marks)**

c. Define an Antenna. Explain Yagi Antenna model with 3D Radiation pattern. **(06 Marks)**

Module-5

9 a. With a neat block diagram, explain Cellular Telephone System. **(08 Marks)**

b. With a neat block diagram, explain GSM System Architecture. **(06 Marks)**

c. Write a short note on WLAN. **(06 Marks)**

OR

10 a. With a neat block diagram, explain Satellite Communication. **(08 Marks)**

b. With a neat block diagram, explain Analog link of an Optical Fiber Communication System. **(06 Marks)**

c. Write a short note on Frequency Bands of Microwave Communication. **(06 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

21ELN14/24

First/Second Semester B.E. Degree Examination, June/July 2023
Basic Electronics and Communication Engineering

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. With neat block diagram, explain the working of a DC power supply. Also mention the principal components used in each block. **(08 Marks)**

b. Mention advantages of negative feedback in amplifiers circuits. With relevant equations and diagram, explain the concept of negative feedback. **(06 Marks)**

c. With circuit diagram and waveform show how operational amplifier work as inverting amplifier. **(06 Marks)**

OR

2 a. Explain the working of Bi-phase Full wave rectifier circuit with neat diagram. **(08 Marks)**

b. Explain the operation of a simple Zener voltage regulator. **(06 Marks)**

c. With the circuit diagram, explain the voltage doubler. **(06 Marks)**

Module-2

3 a. With the help of truth table, explain full adder using logic gates. **(08 Marks)**

b. Design a 3 to 8 Decoder and show its implementation using basic gates. **(06 Marks)**

c. Write a note on different data types mentioning the bit size and range of values supported. **(06 Marks)**

OR

4 a. Design a 4 × 1 multiplexer using basic gates. **(08 Marks)**

b. Discuss the design of a 3-bit asynchronous up-counter. **(06 Marks)**

c. Design a 4-stage shift register using J-K bistables. **(06 Marks)**

Module-3

5 a. Compare Embedded systems and general computing systems. Also provide major application areas of Embedded systems. **(08 Marks)**

b. Define sensors and give its classification with examples. **(06 Marks)**

c. Explain the following external communication interfaces : USB, Wi-Fi **(06 Marks)**

OR

6 a. Explain the working principle of operation and applications of stepper motor. **(08 Marks)**

b. Bringout the differences between RISC and CISC, Harvard and Neumann. **(06 Marks)**

c. Write a note on classification of embedded systems. **(06 Marks)**

Module-4

7 a. Describe the blocks of the basic communication systems. **(08 Marks)**

b. Describe the classification of RF (Radio Frequency) spectrum with applications in communication systems. **(06 Marks)**

c. Discus the various Multiple Access Techniques used in cellular network. **(06 Marks)**

OR

8 a. Define and explain SNR, Noise Figure channel types, amplitude modulation. **(08 Marks)**

b. Explain different types of radio wave propagation with a neat diagram. **(06 Marks)**

c. Present the architecture of a wireless communication transmitter and its modulation scheme QPSK with waveforms. **(06 Marks)**

Module-5

9 a. Bring out the features of FM transmitter FM receiver and repeaters in microwave communication. **(08 Marks)**

b. Draw the schematic diagram of a cellular telephone system and define its basic components. **(06 Marks)**

c. List the requirement identified for the 4G technology. **(06 Marks)**

OR

10 a. With the help of diagram, discuss the following types of network topologies. Ad – Hoc network Topology, Infrastructure Network Topology. **(08 Marks)**

b. Draw the block diagram, showing the basic elements of a satellite communication system and briefly explain them. **(06 Marks)**

c. Explain the optical fiber communication system with a block diagram. **(06 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

BPOPS103/203

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2023

Principles of Programming Using C

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Computer. Describe the characteristics of computer in detail.	10	L2	CO1
	b.	Explain various Input devices.	10	L2	CO1
		OR			
Q.2	a.	Explain the following programming paradigms. i) Procedural Programming ii) Structured Programming iii) Object Oriented Programming.	10	L2	CO2
	b.	Explain printf( ) and scanf( ) functions with their syntax. Give the illustrative examples.	10	L2	CO2
		Module – 2			
Q.3	a.	Explain any five types of operators in C language with the illustrative examples.	10	L2	CO2
	b.	Write a C program to find the roots of quadratic equation by accepting the coefficients. Print appropriate messages.	10	L3	CO2
		OR			
Q.4	a.	What are iterative statements? Explain three types of iterative statements with their syntax.	10	L2	CO2

	b.	Write a program to print the following pattern.
		`      1`
		`    1 2`
		`  1 2 3`
		`1 2 3 4`
			10	L3	CO2

		Module – 3			
Q.5	a.	Explain the syntax of function declaration and function definition with example.	06	L2	CO2, CO5
	b.	Write a C program to swap two numbers using call by reference method.	06	L3	CO2, CO5
	c.	Describe different types of storage classes with examples.	08	L2	CO2
		OR			
Q.6	a.	What is an array? Explain how arrays are declared and initialized with example.	08	L2	CO3
	b.	Write a C program to transpose a 3×3 matrix.	08	L3	CO3
	c.	List applications of arrays.	04	L3	CO3

Module – 4					
Q.7	**a.**	Write a C program to convert characters of a string into upper case without using built-in function.	**10**	**L3**	**CO3**
	b.	Discuss the working of the following string manipulation functions with suitable examples. i) strcmp ii) strlen iii) strcpy iv) strcat v) strcmp	**10**	**L2**	**CO3**
OR					
Q.8	**a.**	Define Pointer. Explain the declaration of a pointer variable with an example.	**05**	**L2**	**CO2, CO4**
	b.	Mention the applications of pointers.	**05**	**L2**	**CO4**
	c.	Develop a C program to compute the sum, mean and standard deviation of all elements of an array using pointers.	**10**	**L3**	**CO3, CO4**
Module – 5					
Q.9	**a.**	What is structure? Explain the declaration of a structure with an example.	**06**	**L2**	**CO4**
	b.	Differentiate between Structures and Unions.	**06**	**L3**	**CO4**
	c.	Develop a C program to read and display the information of all the students in the class.	**08**	**L3**	**CO4**
OR					
Q.10	**a.**	Define Enumerated datatype. Explain the declaration and access of enumerated datatypes with a code in C.	**06**	**L2**	**CO2**
	b.	Explain the process of opening a file in C.	**06**	**L2**	**CO2**
	c.	Write a C program to demonstrate fwrite( ) function.	**08**	**L3**	**CO2**

* * * * *

MAKE-UP EXAM

USN | | | | | | | | | | |

BESCK204C/BESCKC204

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec.2023
Introduction to Electronics and Communication

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Assume missing data.

		Module – 1	M	L	C
Q.1	a.	With a neat block diagram explain DC power supply.	8	L2	CO1
	b.	With appropriate circuit diagram explain the working of Half-wave rectifier.	8	L2	CO1
	c.	A mains transformer having a turns ratio of 44:1 is connected to 220V r.m.s. main supply. If the secondary output is applied to half wave rectifier, determine the peak voltage that will appear across the load.	4	L3	CO1
		OR			
Q.2	a.	With appropriate circuit diagram, explain the working of Full-wave rectifier. Draw the input and output waveforms.	12	L2	CO1
	b.	With neat block diagram of an amplifier showing the input and output current and voltages provide the formula for voltage gain, current and power gain.	4	L2	CO1
	c.	An amplifier provides an output voltage of 5V for a input of 100mV. If the input and output currents are 4mA and 200mA, find voltage, current and power gain.	4	L3	CO1
		Module – 2			
Q.3	a.	With a neat diagram, explain Wein bridge oscillator.	8	L2	CO2
	b.	What are multivibrators? Mention the different types of it.	8	L2	CO2
	c.	Write a note on crystal controlled oscillators.	4	L2	CO2
		OR			
Q.4	a.	Explain the following operational amplifier parameters: i) Open loop voltage gain ii) Closed loop voltage gain iii) Input offset voltage iv) Sleeve rate.	16	L2	CO2
	b.	Write a note on voltage follower using operational amplifier.	4	L2	CO2

		Module – 3			
Q.5	**a.**	Convert the following binary numbers to decimal i) 101110 ii) 1110101.11 iii) 110110100	**12**	**L3**	**CO3**
	b.	Write a note on Gray code and ASCII code.	**8**	**L2**	**CO3**
		OR			
Q.6		What are logic gates? Write the graphic symbol, algebraic function and truth table of all 8 logic gates.	**20**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Differentiate between a general purpose computing system and embedded system.	**12**	**L2**	**CO4**
	b.	Differentiate between a microcontroller and microprocessor.	**8**	**L2**	**CO4**
		OR			
Q.8	**a.**	Write a note on 7-segment display. Write the two configurations in 7-segment display.	**8**	**L2**	**CO4**
	b.	What is a stepper motor? Mention its classification based on coil winding arrangements and explain in detail.	**12**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	With a neat block diagram of a basic communication system explain modern communication system scheme.	**12**	**L2**	**CO5**
	b.	Explain Amplitude Modulation with Relevant waveforms.	**8**	**L2**	**CO5**
		OR			
Q.10	**a.**	With a neat diagram indicating the 3 different mode of propagation of the waves (Radio waves).	**12**	**L2**	**CO5**
	b.	Write a note on multiple access techniques.	**8**	**L2**	**CO5**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

BESCK104C/BESCKC104

First Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Introduction to Electronics and Communication

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is Regulated power supply? With neat block diagram, explain the individual blocks.	8	L2	CO1
	b.	What is a rectifier? With neat circuit diagram and output waveforms, explain full wave bridge rectifier with capacitor filter.	8	L2	CO1
	c.	With circuit diagram brief out the operation of voltage doubler.	4	L2	CO1
		OR			
Q.2	a.	Draw the circuit diagram of voltage regulator and explain the operation.	7	L2	CO1
	b.	Explain the concept of negative feedback amplifier with relevant equations and diagrams.	5	L2	CO1
	c.	Explain Frequency response of RC coupled amplifier.	8	L2	CO1
		Module – 2			
Q.3	a.	Explain the Barkhausen criteria for oscillations. In wein bridge oscillator if $C_1 = C_2 = 200nF$ determine the frequency of oscillation when $R_1 = R_2 = 4k\Omega$.	7	L3	CO2
	b.	With neat circuit diagram, explain the operation of ladder network oscillator.	7	L2	CO2
	c.	Explain the operation of single stage Astable multivibrator with its circuit diagram.	6	L2	CO2
		OR			
Q.4	a.	List out the Ideal characteristics of an op-amp.	7	L2	CO2
	b.	Explain the following with respect to operational amplifier, i) Inverting amplifier ii) Integrator.	8	L2	CO2
	c.	An operational amplifier operating with negative feedback produces an output voltage of 2V when supplied with an input of 400μV. Determine the value of closed – loop voltage gain and express the answer in decibels.	5	L3	CO2
		Module – 3			
Q.5	a.	Convert the following : i) $(FACE)_{16} = (\quad)_{10}$ ii) $(65.45)_{10} = (\quad)_2$ iii) $(1111011011011.11011)_2 = (\quad)_8$ iv) $(2604.10546875)_{10} = (\quad)_{16}$	8	L3	CO3

	b.	Perform the following : i) $(1010100)_2 - (1000100)_2$ using 2's compliment. ii) $(4456)_{10} - (34324)_{10}$ using 10's compliment method.	**6**	**L3**	**CO3**
	c.	State and prove De – Morgan's theorems with its truth table.	**6**	**L2**	**CO3**
		OR			
Q.6	**a.**	Implement the Boolean functions using logic gates. i) $F_1 = x + y'z$ ii) $x'y'z + x'yz + xy'$	**6**	**L3**	**CO3**
	b.	Write the step by step procedure to design a combinational circuit.	**6**	**L2**	**CO3**
	c.	Implement full adder circuit with its truth table and draw the logic diagram of sum and carry.	**8**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	What is an embedded system? Compare embedded system and General computing systems.	**7**	**L2**	**CO4**
	b.	Explain classification of embedded systems.	**7**	**L2**	**CO4**
	c.	What is the difference between RISC and CISC processors?	**6**	**L2**	**CO4**
		OR			
Q.8	**a.**	Discuss major application areas of embedded systems with examples.	**7**	**L2**	**CO4**
	b.	Write short note on : i) Transducers ii) Sensors iii) Actuators.	**6**	**L2**	**CO4**
	c.	Write a short note on 7-segment LED display.	**7**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	With neat block diagram, explain modern communication system.	**8**	**L2**	**CO5**
	b.	Write a note on Hard wired channel and soft wired channel.	**6**	**L2**	**CO5**
	c.	Explain with a neat diagram, the concept of Radio wave propagation and its different types.	**6**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain Amplitude Modulation (AM) and Frequency Modulation (FM) with neat waveforms.	**8**	**L2**	**CO5**
	b.	List out the advantages of Digital communication over Analog communication.	**6**	**L2**	**CO5**
	c.	Explain different multiple Access Techniques.	**6**	**L2**	**CO5**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

BESCK104C/ BESCKC104

First Semester B.E./B.Tech. Degree Examination, Jan./Feb. 2023
Introduction to Electronics and Communication

Time: 3 hrs. Max. Marks: 100

Note: **1.** ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***VTU Formula Hand Book is permitted.***
3. ***M : Marks , L: Bloom's level , C: Course outcomes.***

		Module – 1	M	L	C
Q.1	a.	Draw the block diagram of DC power supply and explain the individual blocks.	8	L2	CO1
	b.	Draw the circuit diagram of voltage regulation and explain the operation.	6	L2	CO1
	c.	An amplifier produces an output voltage of 2V for an input of 50mV. If the input and output currents in this condition are 4mA and 200mA respectively. Find : i) The voltage gain ii) The current gain iii) The power gain.	6	L3	CO1
		OR			
Q.2	a.	With a neat circuit diagram and waveform. Explain the working operation of a full wave bridge rectifier.	8	L2	CO1
	b.	Draw the circuit diagram of voltage doubler and the working operation.	6	L2	CO1
	c.	Discuss briefly a Negative feedback amplifier with block diagram.	6	L1	CO1
		Module – 2			
Q.3	a.	With circuit diagram, explain the operation of an wien bridge oscillator.	8	L2	CO2
	b.	Define the following operational amplifier parameters value. i) Open loop voltage gain ii) Output Resistance iii) Slew Rate.	6	L1	CO2
	c.	Draw the circuit diagram and input and output waveform of the following operational amplifier circuits i) Differentiators ii) Integrator.	6	L1	CO2
		OR			
Q.4	a.	Explain the single state astable oscillator with circuit diagram.	8	L1	CO2
	b.	What is oscillator? And mention condition for oscillations.	6	L1	CO2
	c.	Explain the operation of summing amplifier using operational amplifier and write the output equation.	6	L2	CO2

		Module – 3			
Q.5	**a.**	Implement full adder using two half adders and one OR gate. Write the equations for Sum and C_{out}.	**8**	**L3**	**CO3**
	b.	Convert the following numbers to its equivalent numbers and show the steps. i) $(10110001101011.111100000)_2 = (?)_8$ ii) $(10110001101011.11110010)_2 = (?)_{16}$ iii) $(1010.011)_2 = (?)_{10}$	**6**	**L2**	**CO3**
	c.	Using basic Boolean theorems prove i) $(x + y)(x + z) = x + yz$ ii) $xy + x\bar{z} + y\bar{z} = xz + y\bar{z}$	**6**	**L3**	**CO3**
		OR			
Q.6	**a.**	Express the Boolean function i) $F = A + \bar{B}C$ in a sum of minterms form ii) $F = xy + \bar{x}z$ in a product of maxterms form.	**8**	**L2**	**CO3**
	b.	Subtract the following using 10's complement i) $(72532 - 3250)_{10}$ ii) $(3250 - 72532)_{10}$	**6**	**L2**	**CO3**
	c.	Write the step by step procedure to design a combinational circuit.	**6**	**L1**	**CO3**
		Module – 4			
Q.7	**a.**	What is an Embedded system? Compare Embedded systems with general computer systems.	**8**	**L2**	**CO4**
	b.	Mention the classification of Embedded system based on complexity and performance.	**6**	**L1**	**CO4**
	c.	Write a short note on – 7-segment LED display.	**6**	**L2**	**CO4**
		OR			
Q.8	**a.**	Discuss the typical embedded system elements.	**8**	**L2**	**CO4**
	b.	What is the difference between RISC and CISC processors?	**6**	**L1**	**CO4**
	c.	Write a short note on : i) Transducers ii) Sensors.	**6**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Draw the block diagram of basic communication system and briefly explain the individual blocks.	**10**	**L2**	**CO5**
	b.	Discuss the types of communication systems.	**5**	**L2**	**CO5**
	c.	List the advantages of digital communication over analog communication.	**5**	**L1**	**CO5**
		OR			
Q.10	**a.**	Define Amplitude and Frequency modulation. Sketch AM and FM waveform.	**10**	**L1**	**CO5**
	b.	Write a short note on : Amplitude Shift Keying (ASK) modulator and demodulator.	**10**	**L2**	**CO5**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

21ELN14/24

First/Second Semester B.E. Degree Examination, Jan./Feb. 2023
Basic Electronics and Communication Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Suggest a circuit that converts ac to dc in which two diodes conducts in the positive half cycle as well as negative half cycle and reduces the ripples. Show all the relevant waveforms. **(07 Marks)**

b. A wideband operational amplifier has a slew rate of 20V/μs. If the amplifier is used in a circuit with a voltage gain of 30 and input of 50mV is applied to its input, determine the time taken for the output to change level. **(06 Marks)**

c. Write the circuit of a sinewave oscillator in which 180° phase shift provided by RC ladder network and another 180° by the transistor. Determine the frequency of oscillations of the above circuit in which C = 5nF and R = 25KΩ. **(07 Marks)**

OR

2 a. Write a circuit which regulates the output voltage using zener. If a 10V zener diode has a maximum rated power dissipatation of 6.00mw. If the diode is to be used in a simple regulator circuit having a resistance of 600Ω. Determine a suitable value of series resistor for operation in conjunction with a supply voltage of 20V. **(08 Marks)**

b. An amplifier with a negative feedback applied has an open-loop voltage gain of 100 and one-twentieth of its output is feedback to the input. Determine the overall voltage gain with negative feedback applied. **(06 Marks)**

c. Write the operational amplifier circuit in which the output is differentiation of the input signal. If the input in sine signal, write the resulting output waveform. **(06 Marks)**

Module-2

3 a. Write the 5 stage binary counter using JK bistable circuits. **(07 Marks)**

b. Illustrate the input and output states of JK bistable circuit under the following conditions: i) Preset and clear input ii) Clocked operation. **(06 Marks)**

c. Implement a 3 to 8 decoder circuit using basic gates. **(07 Marks)**

OR

4 a. Describe the microcontroller system with typical inputs and outputs. **(06 Marks)**

b. Represent the 5 bit shift register circuit and explain the working for the input data 10110. **(10 Marks)**

c. Show the implementation of a 4 to 1 Mux. **(04 Marks)**

Module-3

5 a. Bringout the difference between Harward and Von-Neumann processor. **(08 Marks)**

b. Describe the working principle of 7 segment LED display. **(08 Marks)**

c. Give 4 examples for serial communication interfaces. **(04 Marks)**

OR

6 a. Illustrate the instrumentation and control system. **(10 Marks)**

b. Describe the working principles behind 3 input and 3 output transducer. **(10 Marks)**

Module-4

7 a. Represent the analog transmitter and receiver section in an communication system. **(10 Marks)**

b. Explain the concept of multiple access techniques in a wireless communication system. **(10 Marks)**

OR

8 a. Define the following: i) AM ii) FM iii) PAM iv) PWM v) PPM. **(10 Marks)**

b. Describe multipath and fading effect-in a wireless communication system. **(10 Marks)**

Module-5

9 a. Represent a cellular telephone system and concept of frequency reuse. **(10 Marks)**

b. Describe the features of GEO and LEO satellites. **(10 Marks)**

OR

10 a. Briefly explain the GSM architecture. **(10 Marks)**

b. Represent the frequency modulated microwave communication system and explain. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

BBEE103/203

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2023
Basic Electronics for EEE Stream

Time: 3 hrs. Max. Marks: 100

Note: **1.** ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***M : Marks , L: Bloom's level , C: Course outcomes.***
3. ***Assume missed data.***

		Module – 1	M	L	C
Q.1	a.	Explain forward and reverse characteristics of semiconductor diode.	8	L2	CO1
	b.	Calculate forward and reverse resistances offered by a silicon diode with I_f = 100mA at V_R = 50V. Assume V_F for silicon diode to be 0.75V and reverse current $I_R \simeq$ 100nA.	4	L3	CO1
	c.	What is piecewise linear characteristic? With neat diagram explain diode approximation of Ideal diode and practical diode.	8	L2	CO1
		OR			
Q.2	a.	Describe the working of full wave bridge rectifier.	8	L2	CO1
	b.	Explain zener diode as voltage regulator with no load and with load.	6	L2	CO1
	c.	Illustrate RC- π filter.	6	L2	CO1
		Module – 2			
Q.3	a.	Explain output characteristics of a transistor in common base configuration.	6	L2	CO2
	b.	Describe the procedure for drawing dc – load line on transistor CE output characteristics.	8	L2	CO2
	c.	Calculate I_c and I_E for a transistor that has α_{DC} = 0.98, I_B = 100μA. Also determine the value of β_{DC} for the transistor.	6	L3	CO2
		OR			
Q.4	a.	Explain common Emitter input characteristics.	6	L2	CO2
	b.	Explain how transistor can be used as current amplifier.	6	L2	CO2
	c.	Explain the working of N-channel JFET.	8	L2	CO2

		Module – 3			
Q.5	**a.**	Explain Inverting and Non-inverting amplifier.	**8**	**L2**	**CO2**
	b.	Define Op-Amp. Mention any 5 ideal characteristics of an op-amp.	**6**	**L2**	**CO2**
	c.	Draw a summer circuit with $V_1 = +1V$, $V_2 = +3V$, $V_3 = +2V$, $R_1 = R_2 = R_3 = 2K\Omega$. Determine the output voltage when $R_F = 3K\Omega$.	**6**	**L3**	**CO2**
		OR			
Q.6	**a.**	Explain the working of op-amp as Differentiator.	**8**	**L2**	**CO2**
	b.	Define : i) Input offset current ii) Input bias current iii) slew rate iv) CMRR	**6**	**L2**	**CO2**
	c.	With block diagram, explain basic structure of an Op amp. Also write its equivalent circuit diagram.	**6**	**L2**	**CO2**
		Module – 4			
Q.7	**a.**	Convert the following : i) $(2AB.8)_{16} = (\ )_{10}$ ii) $(416.12)_{10} = (\ )_8$ iii) $(25.375)_{10} = (\ )_2$ iv) $(16.2)_8 = (\ )_{16}$	**6**	**L2**	**CO3**
	b.	Find complement of the function i) $F_1 = x'yz' + x'y'z$ ii) $F_2 = x(y'z' + yz)$ Using De-Morgan's theorem.	**8**	**L2**	**CO3**
	c.	Explain the working of Half adder.	**6**	**L2**	**CO3**
		OR			
Q.8	**a.**	Express the Boolean function $F = A + B'C$ in sum of minterms.	**6**	**L3**	**CO3**
	b.	Mention the postulates and theorems of Boolean algebra.	**8**	**L2**	**CO3**
	c.	Explain the working of full adder.	**6**	**L2**	**CO3**
		Module – 5			
Q.9	**a.**	Describe the working of LVDT.	**6**	**L2**	**CO4**
	b.	Explain the working principle of capacitive pressure transducer.	**6**	**L2**	**CO4**
	c.	With neat block diagram, explain the working of communication system.	**8**	**L2**	**CO4**
		OR			
Q.10	**a.**	Describe a Thermistor and sketch approximate resistance/temperature characteristics for a thermistor.	**6**	**L2**	**CO1**
	b.	Write a short notes of photo diodes	**6**	**L2**	**CO5**
	c.	What is modulation? Describe the need of modulation in communication system.	**8**	**L2**	**CO5**

MAKE-UP EXAM

USN | | | | | | | | | | |

BBEE103/203

First/Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Basic Electronics for EEE Stream

Time: 3 hrs. Max. Marks: 100

Note: **1.** ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***M : Marks , L: Bloom's level , C: Course outcomes.***
3. ***Assume any missing data suitably.***

		Module – 1	M	L	C
Q.1	a.	With the help of neat circuit diagram and waveform, explain the working of full wave, rectifier with center tapped transformer.	8	L2	CO1
	b.	Explain the forward and reverse characteristics of semiconductor diode.	6	L2	CO1
	c.	A Zener regulator has the following data : V_i = 16V, V_0 = 6V, $I_{L(max)}$ = 60mA, Z_z = 7Ω, R = 150Ω. Calculate line regulation and ripple rejection ratio.	6	L3	CO1
		OR			
Q.2	a.	Describe the working of a capacitor filter for a half wave rectifier with a neat circuit diagram and necessary waveforms.	8	L3	CO1
	b.	What is a DC load line? With the help of neat circuit diagram and waveform, explain the procedure of constructing a DC load line for a semiconductor diode.	8	L3	CO1
	c.	Define : i) Line regulation ii) Load regulation.	4	L2	CO1
		Module – 2			
Q.3	a.	Explain the construction and working of n-channel JFET.	8	L3	CO2
	b.	Draw and explain output characteristics of CE configuration.	6	L3	CO2
	c.	For the base bias circuit, R_c = 12KΩ, R_B = 470KΩ, V_{cc} = 20V and V_{BE} = 0.7V. Construct the DC load line and indicate the values.	6	L3	CO2
		OR			
Q.4	a.	Explain the construction and working of n-enhancement MOSFET.	8	L3	CO2
	b.	Explain the common base output characteristics.	8	L2	CO2
	c.	Describe how a transistor can be used as a voltage amplifier.	4	L2	CO2
		Module – 3			
Q.5	a.	Explain the block diagram of a typical op-amp.	8	L2	C2
	b.	Explain the following terms : i) Input offset current ii) Input bias current iii) CMRR iv) Slew rate v) Input offset voltage vi) Voltage gain.	6	L2	C2

	c.	Construct an adder circuit using op-amp to obtain an output voltage of $V_0 = -[2V_1 + 3V_2 + 5V_3]$	6	L3	CO2
		OR			
Q.6	a.	Describe an integrating amplifier using an op-amp in an investing configuration.	8	L2	CO2
	b.	Explain basic differential amplifier using op-amp.	8	L2	CO2
	c.	List the characteristics of an ideal op-amp.	4	L2	CO2
		Module – 4			
Q.7	a.	Explain full adder circuit with truth table. Realize the circuit for sum and carry using basic gates.	8	L2	CO3
	b.	Explain the Boolean function $F = A + \overline{B}C$ in a sum of minterms.	6	L3	CO3
	c.	Convert the following i) $(10AB)_{16} = (\ ?\ )_{10}$ ii) $(240)_{10} = (\ ?\ )_2$ iii) $(1234.56)_8 = (\ ?\ )_{10}$	6	L2	CO3
		OR			
Q.8	a.	Simplify the following Boolean expressions : i) $f(w, x, y, z) = x + xyz + \overline{x}yz + wx + \overline{w}x + \overline{x}y$ ii) $f = \overline{(A+\overline{B}+C)(\overline{A}+\overline{B}+C)+(\overline{A}+B)}$	8	L3	CO3
	b.	Explain SOP and POS with examples.	6	L3	CO3
	c.	Implement half adder using basic gates.	6	L2	CO3
		Module – 5			
Q.9	a.	With suitable diagram, explain working of Linear variable differential transducer.	8	L2	CO4
	b.	What is modulation? Describe the need of modulation in communication systems.	6	L2	CO4
	c.	Write short note on piezoelectric transducer.	6	L2	CO4
		OR			
Q.10	a.	Explain the working of potentiometric resistive transducer with neat diagram.	8	L2	CO5
	b.	Explain the various blocks involved in an electrical communication systems.	6	L2	CO5
	c.	A parallel plate capacitive transducer has a plate area ($\ell \times w$) = 40mm * 40mm) and plate spacing (d) = 0.5mm. Calculate the device capacitance and the displacement that causes the capacitance to change by 5pF. Also determine the transducer sensitivity.	6	L3	CO5

* * * * *

CBCS SCHEME

3

USN | | | | | | | | | | |

18ELN14/24

First/Second Semester B.E. Degree Examination, Dec.2023/Jan.2024
Basic Electronics

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain the operation of PN – junction diode under forward and reverse biased condition. **(06 Marks)**

b. Explain how Zener diode can be used as a voltage regulator. **(06 Marks)**

c. Write short notes on light emitting diode and photo coupler. **(08 Marks)**

OR

2 a. With a neat circuit diagram and waveform explain the working of a centre tapped full wave rectifier. **(08 Marks)**

b. Explain the operation of 7805 fixed IC regulator. **(06 Marks)**

c. Determine the range of V_i in which the zener diode of Fig.Q2(C) conducts.

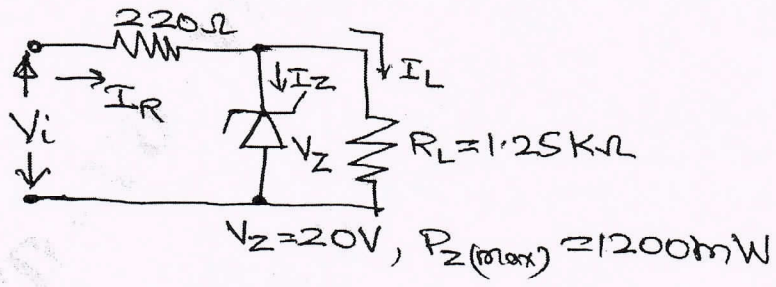

Fig.Q2(c) **(06 Marks)**

Module-2

3 a. Explain the construction and operation of JFET with necessary diagram. **(08 Marks)**

b. What is SCR? Explain the working of two transistor model of SCR. **(08 Marks)**

c. A certain JFET has an I_{GSS} of –2nA for V_{GS} = –20V. Determine the input resistance. **(04 Marks)**

OR

4 a. Draw and explain the V – I characteristics of Silicon controlled rectifier. **(05 Marks)**

b. Explain the construction and working of N-channel enhancement type MOSFT. **(08 Marks)**

c. With a neat circuit diagram, explain the working of CMOS inverter. **(07 Marks)**

Module-3

5 a. List the ideal characteristics of operational amplifier. **(04 Marks)**

b. Draw three input inverting summer circuit and derive an expression for its output voltage. **(08 Marks)**

c. With a neat circuit diagram of an inverting operational amplifier, derive an expression for its voltage gain. **(08 Marks)**

OR

6 a. With a neat circuit diagram explain how an operational amplifier can be used as a differentiator. **(06 Marks)**

b. A non inverting operational amplifier has input resistance 10KΩ and feedback resistance 60KΩ with load resistance 47KΩ. Draw the circuit and calculate output voltage, voltage gain and load current when input voltage is 1.5Volts. **(08 Marks)**

c. Find the output V_0 of the following op-amplifier circuit Fig.Q6(c). R_1 = 20KΩ, R_F = 100KΩ.

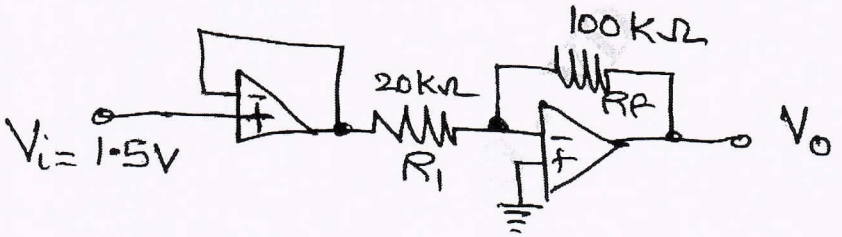

Fig.Q6(c) **(06 Marks)**

Module-4

7 a. What is an amplifier? Explain the operation of transistor amplifier circuit. **(08 Marks)**

b. Define feedback amplifier. Draw and explain the operation of a voltage series feedback amplifier with an expression for its voltage gain. **(12 Marks)**

OR

8 a. Explain the Barkhausen's Criterian of Oscillator. **(06 Marks)**

b. Explain the operation of a RC phase shift Oscillator. **(06 Marks)**

c. Explain the working of a Astable Oscillator construction using IC – 555 timer. **(08 Marks)**

Module-5

9 a. Convert the following :

i) $FA27D_{16} = (\ ?\ )_{10}$

ii) $57345_{10} = (\ ?\ )_{16}$. **(06 Marks)**

b. Simplify and realize the expressing using basic gates :

$(B+\overline{C})(\overline{B}+C)+\overline{\overline{A}+B+\overline{C}}$. **(08 Marks)**

c. What is a flip-flop? Explain the master slave JK flip-flop operation. **(06 Marks)**

OR

10 a. With a neat circuit diagram and truth table, explain the full Adder circuit. **(06 Marks)**

b. With a neat block diagram, explain the operating principle of the GSM system. **(08 Marks)**

c. What is Multiplexer? Explain the working of 8 : 1 multiplexer. **(06 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

BBEE103/203

First/Second Semester B.E/B.Tech. Degree Examination, Dec.2023/Jan.2024
Basic Electronics for EEE Stream

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Explain the forward and reverse characteristics of pn–junction diode (consider a silicon semiconductor).	6	L2	CO1
	b.	With a neat circuit diagram and waveform, explain the working of Bridge rectifier.	6	L1	CO1
	c.	A 9.1V reference source in to use a series connected zener diode and a resistor of 1kΩ, connected to a 30V supply. Calculate the circuit current when the supply voltage drops to 27V. Assume I_{ZT} = 20mA. Also find the power dissipated in the resistor.	8	L3	CO1
		OR			
2	a.	Write a note on diode approximation, also calculate current in the circuit when a silicon diode connected in series with a resistor of 4.7KΩ is driven by a 15V dc supply.	6	L1	CO1
	b.	With necessary waveform and circuit diagram, explain how a RC π-filter work.	6	L1	CO1
	c.	Explain how Zener diode works as voltage regulator considering no-load and full-load conditions.	8	L2	CO1
		Module – 2			
3	a.	Considering a BJT common emitter circuit, explain how voltage amplification is obtained.	6	L1	CO2
	b.	With a neat circuit diagram, and characteristics graph, explain common base configuration of pnp transistor.	8	L1	CO2
	c.	Explain the drain and transfer characteristics of n-channel JFET.	6	L2	CO2
		OR			
4	a.	Explain how Q-point is obtained on a DC load line, considering a transistor base bias circuit.	6	L2	CO2
	b.	Explain common collector configuration of pnp transistor with neat circuit diagram and characteristics.	8	L2	CO2
	c.	With neat semiconductor model, explain how an enhancement type MOSFET works.	6	L1	CO1

		Module – 3			
5	a.	Define the following with respect to op-amp : i) Input offset voltage ii) Input bias current iii) CMRR iv) Slew rate.	**8**	**L1**	**CO2**
	b.	Explain the open loop differential amplifier circuit using op-amp. Mention the advantage of negative feedback in amplifier circuit.	**6**	**L2**	**CO2**
	c.	Derive output voltage equation for 3 input inverting summer using op-amp.	**6**	**L3**	**CO2**
		OR			
6	a.	Mention all the ideal op-amp characteristics.	**6**	**L1**	**CO2**
	b.	Design a non-inverting amplifier circuit using op-amp, if the gain of the amplifier in 10 and input voltage is 1V.	**6**	**L3**	**CO2**
	c.	Explain the working of op-amp connected as integrator, also draw the output waveforms.	**8**	**L2**	**CO2**
		Module – 4			
7	a.	Convert the following numbers : i) 141.6875_{10} = ———$_2$ ii) 125.076_8 = ———$_{16}$ iii) $41F.BD_{16}$ = ———$_{10}$.	**6**	**L3**	**CO3**
	b.	Find the complement of the functions : i) $F_1 = \bar{X}Y\bar{Z} + \bar{X}\bar{Y}Z$ ii) $F_2 = X(\bar{Y}\bar{Z} + YZ)$ Apply De-Morgan's theorem as many times as necessary.	**6**	**L3**	**CO3**
	c.	Define combinational circuit. Design a half adder and implement using NAND gates.	**8**	**L1**	**CO3**
		OR			
8	a.	Solve the following : i) Subtract using 10's complement 3250 – 72532 ii) Subtract using 2's complement 1010100 – 1000100.	**6**	**L3**	**CO3**
	b.	Express the Boolean function $F = XY + \bar{X}Z$ in product of maxterms form.	**6**	**L2**	**CO3**
	c.	Design a full adder and implement using basic gates.	**8**	**L3**	**CO3**

Module – 5					
9	a.	A strain gauge with 40cm wire length and 25μm wire diameter has a resistance of 250Ω and a gauge factor of 2.5. Calculate the change in wire length and diameter when the resistance change is measured as 0.5Ω. Assume that the complete length of wire is strained positively.	**6**	**L3**	**CO4**
	b.	With a neat diagram, explain the working of LVDT. Also mention the applications of it.	**8**	**L1**	**CO4**
	c.	With a neat block diagram, explain the simple communication system.	**6**	**L1**	**CO4**
OR					
10	a.	A parallel – plate capacitive transducer has a plate area ($l \times w$) = (40mm × 40mm) and plate spacing (d) = 0.5mm. Calculate the device capacitance and the displacement (Δd) that causes the capacitance to change by 5pF. Also, determine the transducer sensitivity.	**6**	**L4**	**CO5**
	b.	With neat diagram, explain potentiometer type resistive transducer. Also mention the applications of it.	**8**	**L1**	**CO5**
	c.	With a neat block diagram, explain AM superheterodyne receiver.	**6**	**L1**	**CO5**

* * * * *

b

CBCS SCHEME

USN | | | | | | | | | | |

15ELN15/25

First/Second Semester B.E. Degree Examination, July/August 2021
Basic Electronics

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions.***

1 a. Draw and explain the V – I – characteristics of Si – diode and Ge – diode. **(06 Marks)**

b. With neat circuit diagram, explain the working principles of full wave bridge rectifier. **(06 Marks)**

c. Calculate I_C and I_E for a transistor that has $\alpha_\mu = 0.98$ and $I_B = 100\mu A$ and also determine the value of β_{dc} for the transistor. **(04 Marks)**

2 a. Distinguish between Avalanche break down and Zener break down. **(04 Marks)**

b. A half wave rectifier uses a diode whose Internal resistance is 30Ω to supply power to 1.1kΩ load from 110V (rms) source of supply. Calculate i) DC Load Voltage ii) DC Load Current iii) AC Load Current iv) Efficiency of the rectifier. **(06 Marks)**

c. Draw and explain the input and output characteristics of a transistor in common emitter configuration. **(06 Marks)**

3 a. For the base bias circuit $V_{CC} = 18V$, $R_C = 2.2K\Omega$, $R_B = 470\ K\Omega$, $\beta = 100$ and $V_{BE} = 0.7V$. Find I_B , I_C and V_{CE}. **(06 Marks)**

b. Explain the Ideal Op – Amp characteristics. **(04 Marks)**

c. Show how an Op-amp can be used as an differentiator. Derive expression for output voltage. **(06 Marks)**

4 a. Explain Voltage divider bias circuit, with neat circuit diagram. **(05 Marks)**

b. With a neat circuit diagram and waveform, explain how Op-amp can be used as a Inverting amplifier. **(06 Marks)**

c. Determine the output voltage of the following circuit.

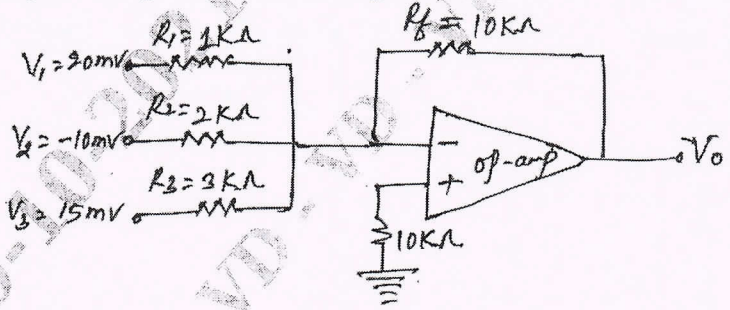

Fig. Q4(c) **(05 Marks)**

5 a. Convert i) $(59)_{10} = (?)_2$ ii) $(10000101)_2 = (?)_{10}$ iii) $(AEF5)_{16} = (?)_2$ iv) $(1543)_8 = (?)_{10}$. **(06 Marks)**

b. Realize the i) OR ii) AND iii) NOT gates using NAND and NOR gate only. **(06 Marks)**

c. Design a half adder circuit and realize using Basic gates. **(04 Marks)**

6 a. Factorize the following Boolean equations :
i) $Y = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}\,D + A\overline{B}\,\overline{C}\,\overline{D} + A\overline{B}\,\overline{C}D.$
ii) $Y = ABC + A\overline{B}C + AB\overline{C} + \overline{A}BC.$ **(06 Marks)**

b. Perform (22 – 17) using 1's and 2's Complement method. **(04 Marks)**

c. Draw and explain the Full adder circuit. **(06 Marks)**

7 a. What is Flip – Flop? Explain the operation of NAND – gate latch with its truth table. **(04 Marks)**

b. With neat diagram, explain the architecture of 8051 micro controller. **(06 Marks)**

c. Explain the working of clocked R – S Flip – flop with logic diagram and truth table. **(06 Marks)**

8 a. Explain R – S Flip – Flop using its circuit diagram, logic symbol the truth table. **(06 Marks)**

b. Explain with neat diagram, Microcontroller based stepper motor control system. **(06 Marks)**

c. Identify the value of Q and $\overline{Q}$ for the Fig. Q8(c), when i) R = S = 0 ii) R = S = 1 iii) R = 0 , S = 1 and iv) R = 1 , S = 0. **(04 Marks)**

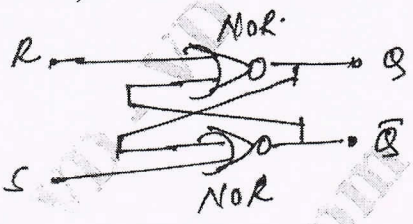

Fig.Q8(c)

9 a. Explain the elements of Communication system, with a neat block diagram. **(06 Marks)**

b. What is Modulation? Derive the expression for Amplitude Modulation. **(06 Marks)**

c. What is Transducer? Differentiate between Active and Passive transducer. **(04 Marks)**

10 a. A 500W, 1MHz carrier is amplitude modulated with a Sinusoidal signal of 1KHz. The depth of modulation is 60%. Calculate the i) Bowl width ii) Power in the sidebands and iii) The total power transmitted. **(06 Marks)**

b. Explain the working of LVDT, with neat diagram. **(05 Marks)**

c. Explain the differences between Amplitude and Frequency modulation. **(05 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

17ELN15/25

First/Second Semester B.E. Degree Examination, July/August 2021
Basic Electronics

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

1 a. With a neat sketch of VI characteristics of PN Junction Diode. Explain forward and reverse characteristics of it. **(06 Marks)**

b. Discuss the working of full wave rectifier with necessary waveforms with the utilization of two diodes. **(07 Marks)**

c. Consider an bridge rectifier with capacitor filter input 230V, 50Hz. Find the output DC output voltage if an filter of 1000 μF is used, calculate the ripple factor and the DC output voltage with filter by considering load resistance of 100Ω. **(07 Marks)**

2 a. Explain briefly the CB configuration of PNP transistor with its input and output characteristics. **(08 Marks)**

b. Explain Avalanche Breakdown and Zener Breakdown. **(06 Marks)**

c. Derive the relationship between CB mode DC current gain and CE mode DC current gain. **(06 Marks)**

3 a. Explain the working of collector to basic bias and voltage divider bias circuit. **(08 Marks)**

b. Draw the DC load line and determine the operating point for the transistor circuit having $\beta = 50$, $R_C = 1K\Omega$, $R_B = 100k\Omega$ and $V_{CC} = 5V$. **(06 Marks)**

c. Define stability factor for transistor bias circuit and thermal stability of Bias circuit. **(06 Marks)**

4 a. List the ideal and typical characteristics of OP-AMP. **(08 Marks)**

b. With relevant equations and circuit diagram, describe OP-AMP as Adder and Integrator. **(08 Marks)**

c. Explain the need for an OP-AMP. **(04 Marks)**

5 a. State and prove De-Morgan's theorems. **(06 Marks)**

b. Using respective truth–tables, show the implementation of not gate, and gate, OR-Gate and NOR gate using only Nand gate. **(08 Marks)**

c. Perform the following :

i) $(ABCD)_{16} = (\ )_{10} = (\ )_8 = (\ )_2$

ii) $(24742)_8 = (\ )_{10} = (\ )_{16} = (\ )_2$. **(06 Marks)**

6 a. Design and implement half adder using only Nand gates. **(08 Marks)**

b. Compute the following :

i) CDEF, 5DB + 49E6.F74

ii) 101011 – 100110 using 1's complement

iii) $(342.56)_{10} = (\ )_{16} = (\ )_8$. **(06 Marks)**

c. Simplify the following equation and realize using logic gates :

i) $X = \bar{A}BC + A\bar{B}C + ABC$

ii) $Z = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C}$. **(06 Marks)**

7 a. List out the features of 8051 Micro controller. **(10 Marks)**

b. With the block-diagram explain microcontroller based stepper motor control system. **(10 Marks)**

8 a. Explain the operation of clocked RS flip-flop with its waveforms. **(10 Marks)**

b. Explain the operation of NoR gate latch. **(05 Marks)**

c. Explain the operation of RS flip-flop. **(05 Marks)**

9 a. With neat waveforms. Derive the expression for Amplitude Modulation(AM). **(10 Marks)**

b. With suitable block-diagram, explain basic communication system. **(05 Marks)**

c. Give the comparison of AM and FM. **(05 Marks)**

10 a. Briefly describe the basic requirements of an transducer. **(07 Marks)**

b. Explain construction of linear variable differential transformer (LVDT) with its advantages and limitations. **(08 Marks)**

c. An AC LVDT has following data, Input = 6.3V, output = 5.2V range ±0.5 in, determine output voltage Vs core position for a core movement going from +0.45 in to –0.30 in and also output voltage when core is –0.25 in from center. **(05 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18ELN14/24

First/Second Semester B.E. Degree Examination, July/August 2021
Basic Electronics

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Explain the operation of p–n junction Diode under unbiased condition with a neat diagram. **(08 Marks)**

b. In a full wave rectifier, input is from 30 – 0 – 30V. The load and R_f are 100Ω and 10Ω respectively. Calculate area voltage, efficiency, percentage regulation. **(06 Marks)**

c. Determine I_D, V_1, V_2 and V_0 for the given circuit.

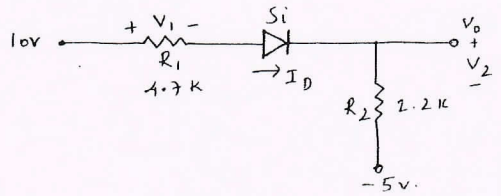

Fig.Q1(c) **(06 Marks)**

2 a. With a neat diagram and waveforms explain the working of a bridge rectifier. **(08 Marks)**

b. Explain the operation of a zener diode with line regulation and load regulation. **(08 Marks)**

c. For a zener regulator shown in Fig.Q2(c), calculate the range of input voltage for which output remain constant. $V_Z = 6.1V$, $I_{Zmin} = 2.5mA$, $I_{Zmax} = 25mA$, $r_Z = 0\Omega$.

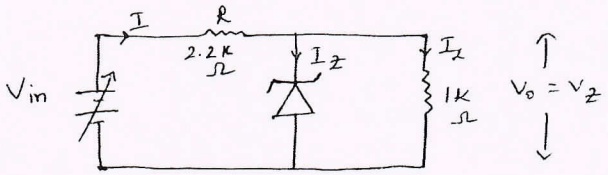

Fig.Q2(c) **(04 Marks)**

3 a. Explain the characteristics of N-channel JFET(Drawn and transfer characteristics). **(12 Marks)**

b. For a N-channel JFET, $I_{DSS} = 8mA$, $V_P = -5V$. Find :
i) I_D @ $V_{GS} = -2V$ and $-3V$
ii) V_{GS} @ $I_D = 3mA$ and $5mA$. **(06 Marks)**

c. List out classification of FET with symbols. **(02 Marks)**

4 a. Draw and explain forward and reverse characteristics of an SCR. **(07 Marks)**

b. Sketch the transfer and drain characteristics for an n-channel depletion – type MOSFET for the range of values of $V_{GS} = -6V$ to $+1V$ with $I_{DSS} = 8mA$, $V_P = V_{GS(off)} = -6V$. **(08 Marks)**

c. With a neat diagram, explain the 2 transistor model of SCR. **(05 Marks)**

5 a. Explain following with respect to OP-Amp.
i) Virtual ground ii) CMRR iii) Slew rate
iv) Offset voltage v) Matched transistors. **(10 Marks)**

b. Derive the expression for output voltage of an
i) integrator ii) inverting summing amplifier. With a neat circuit diagram. **(10 Marks)**

6 a. Explain the ideal characteristics of on op-Amp. **(08 Marks)**

b. Derive the expression for output voltage of an non inventing amplifier with a neat circuit and waveform. **(08 Marks)**

c. Design an adder circuit using an op-Amp to obtain output expression. $V_0 = -2(0.1V_1 + 0.5V_2 + 20V_3)$. **(04 Marks)**

7 a. Explain the operation of BJT as an amplifier and as a switch. **(10 Marks)**

b. Draw and explain the operation of a voltage series –ve feedback amplifier and derive an expression for its input impedance. **(10 Marks)**

8 a. Define an oscillator. Explain Brakhausen's criteria for oscillations with block diagram. **(06 Marks)**

b. Derive the expression for frequency of oscillations of Wien bridge oscillator. **(08 Marks)**

c. With a neat diagram, explain the working of RC phase shift oscillator. **(06 Marks)**

9 a. Subtract $(111001)_2$ from $(101011)_2$ using 2's complement method. **(04 Marks)**

b. State and prove Demorgan's theorem for 3 variables. **(04 Marks)**

c. Simplify the following Boolean expression :

i) $A + \overline{A}B = A + B$

ii) $\overline{X}\overline{Y}\overline{Z} + \overline{X}\overline{Y}Z + \overline{X}\overline{Y} + X\overline{Y}$

iii) $\overline{\overline{XY} + XY\overline{Z} + X(Y + \overline{X}\overline{Y})}$

iv) $ABC + A\overline{B}C + AB\overline{C} + \overline{A}BC$

v) $\overline{\overline{A}\overline{B} + ABC + A(B + A\overline{B})}$

vi) $AB + \overline{AC} + A\overline{B}C(AB + C)$. **(12 Marks)**

10 a. With block diagram and truth table, explain the operation of full ladder using 2 half adder. **(08 Marks)**

b. Explain the operation NOT, AND and OR gates using analogous switch equivalent circuit. **(09 Marks)**

c. Implement Ex – OR gate using only NOR gate. **(03 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18ELN14/24

First/Second Semester B.E. Degree Examination, June/July 2023
Basic Electronics

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain how Zener diode can be used as a voltage Regulator with and without load resistance. **(07 Marks)**

b. Define the following parameters and mention its ideal values for both half wave and bridge rectifier
   i) Ripple factor
   ii) Power conversion Efficiency
   iii) PIV **(07 Marks)**

c. Explain the working of Light Emitting Diode and mention its Applications. **(06 Marks)**

OR

2 a. Draw the circuit diagram of a Full wave bridge rectifier and explain it. **(07 Marks)**

b. Draw the functional block diagram of the 78XX series voltage regulator and mention the function of each block. **(07 Marks)**

c. Write the ideal diode, piecewise Linear model and approximate model of a Diode with VI – characteristics. **(06 Marks)**

Module-2

3 a. Draw the Drain and Transfer Characteristics of N-channel JFET and explain it. **(07 Marks)**

b. Explain the working of CMOS inverter and also mention its Advantages. **(07 Marks)**

c. For JFET, $I_{DSS} = 6mA$, $V_p = -4.5V$, determine drain current at $V_{GS} = -2V$ and $-4V$. **(06 Marks)**

OR

4 a. Draw the characteristics of SCR and explain it. **(07 Marks)**

b. Explain the construction and operation of N-channel Enhancement type MOSFET. **(07 Marks)**

c. Compare FET with BJT and also write the square Law expression for drain current. **(06 Marks)**

Module-3

5 a. Define the following op-amp parameters and mention its ideal values
i) CMRR ii) Slew rate iii) SVRR/PSRR iv) Input bias current. **(08 Marks)**

b. Design an adder circuit using op-amp to get the output $V_0 = -(0.1V_1 + V_2 + 10V_3)$. Assume $R_f = 10K\Omega$ and V_1, V_2, V_3 are the input voltages. **(06 Marks)**

c. What is differentiator and obtain the expression of output voltage using op-amp. **(06 Marks)**

OR

6 a. What are the op-amp input modes and explain it. **(08 Marks)**

b. For the op-amp circuit shown in Fig Q6(b), find V_0' and V_0

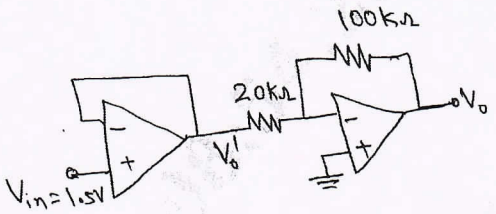

Fig Q6(b) **(06 Marks)**

c. Derive the expression of closed loop voltage gain of a non-inverting amplifier using op-amp. **(06 Marks)**

Module-4

7 a. Explain the operation of BJT can be used as a switch. **(07 Marks)**

b. Mention the properties and advantages of Negative feedback. **(07 Marks)**

c. State Barkhausen condition for oscillator. Write the circuit diagram, equations for sustained oscillation and frequency of oscillation. **(06 Marks)**

OR

8 a. Explain the operation of a Astable Multivibrator using IC-555 Timer and also write the equation of frequency of oscillation. **(07 Marks)**

b. Draw the transistor switch circuit to switch ON/OFF on LED and explain it. **(07 Marks)**

c. Design a wein bridge oscillator to get oscillation frequency of 5KHz. Assume R = 100KΩ and R_1 = 200KΩ. **(06 Marks)**

Module-5

9 a. Mention the differences between Analog and digital signals. Write the waveform for converting analog into digital signal. **(07 Marks)**

b. Convert the following :

i) $(FA876)_{16}$ in to Binary form

ii) $(345.75)_{10}$ into Hexadecimal

iii) $(0.705)_{10}$ into octal **(06 Marks)**

c. What is multiplexer? Implement 8 to 1 multiplexer using basic Gates. **(07 Marks)**

OR

10 a. Implement the following Boolean functions

i) $F = (A + C\overline{D} + \overline{D}\,\overline{E}$ using NAND Gates

ii) $F = (\overline{C} + A)(\overline{C} + B)$ using NOR – Gates **(07 Marks)**

b. Explain the operation of a JK-master slave flip-flop. **(07 Marks)**

c. Draw the block diagram of a cellular mobile radio unit and mention the functions of each block. **(06 Marks)**

* * * * *