DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

SYLLABUS

B.Sc. FIFTH & SIXTH SEMESTER

[ELECTRONICS (OPTIONAL)]

{Effective from – June- 2011 onwards}

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B.Sc. Electronics (Optional) Third Year Course Structure in Semester System

B.Sc. Third Year

Semester	Course Code	Paper Number	Title of Paper	Marks
V	ELE-501	**Paper XVII**	**POWER ELECTRONICS**	**50**
	ELE-502A OR ELE-502B	**Paper XVIII** (A) OR **XVIII** (B)	**(A) MICROCONTROLLER – I OR (B) 8085 INTERFACING – I**	**50**
	ELE-503	**Paper XIX**	**Practicals based on Paper XVII**	**50**
	ELE-504 A OR ELE-504 B	**Paper XX (A) OR XX (B)**	**Practicals based on Paper XVIII(A) OR Practicals based on Paper XVIII (B)**	**50**
VI	ELE-601A OR ELE-601B	**Paper XXI(A) OR XXI(B)**	**(A) PROGRAMMABLE LOGIC CONTROLLERS Or (B) INSTRUMENTATION**	**50**
	ELE-602A OR ELE-602B	**Paper XXII** (A) OR **XXII** (B)	**(A) MICROCONTROLLER– II OR (B) 8085 INTERFACING – II**	**50**
	ELE-603 A OR ELE-603 B	**Paper XXIII (A) OR XXIII (B)**	**Practicals based on Paper XXI (A) OR Practicals based on Paper XXI (B)**	**50**
	ELE-604 A OR ELE-604 B	**Paper XXIV(A) OR XXIV(B)**	**Practicals based on Paper XXII(A) OR Practicals based on Paper XXII (B)**	**50**

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Fifth Semester

Subject: ELECTRONICS

Course: ELE-501 Paper – XVII

(Effective from June 2011)

Title: POWER ELECTRONICS

Marks: 50 **Periods: 45**

1. **Thyristors** **(12)**
   Silicon Controlled Rectifiers { Construction, Operation, Equivalent Circuit, Characteristics}; Unijunction Transistors, Diac, Triac, IGBTs

2. **Detection Sensors** **(12)**
   Limit Switches, Proximity Detectors, Inductive Proximity Switches {Ports, Output Stages, Operation}: Capacitive Proximity Switches, Photoelectric Sensors, Methods of Detection, Operating Specifications, Sensor Interfacing { Electromagnetic Relays, Resistive Load, Inductive Load, Solid State Relay, Two Wire System}

3. **D C Drives:** **(09)**
   DC Drive Fundamentals, Variable Voltage DC Drive, Motor Braking

4. **A C Drives** **(12)**
   AC Drive Fundamentals, AC Drive System, Drive Controller Internal Circuitry, Circuit Operation of AC Drive, PWM Control Methods, Control Panel Inputs Drive functions, Inverter Self – Protection Function, Motor Braking,

Books Recommended

1. Industrial Electronics { Circuits, Instruments and Control Techniques} – Terry Bartelt, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2009
2. Introduction to Power Electronics – V Jagannathan, PHI, New Delhi, 2004
3. Power Electronics – M D Singh and K B Khanchandani,

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B. Sc. Fifth Semester

Subject: ELECTRONICS

Course: ELE-502 A Paper XVIII (A)

(Effective from June 2011)

Title: MICROCONTROLLER – I

Marks: 50 **Periods: 45**

1. 8051 Microcontroller (15)

Introduction, Microcontrollers and microprocessors, history of microcontrollers, embedded versus external memory devices, 8-bit and 16-bit microcontrollers, CISC and RISC processors, Harvard and Von Neumann architecture, commercial microcontroller devices 8051 Pin Description, Connections, Parallel I/O Ports, Memory Organization

2. Addressing Modes and Instructions (09)

8051 Addressing Modes, MCS – 51 Instruction Set, 8051 Instructions and Simple Programmes, Using Stack Pointer

3. Interrupts, Timer/ Counters and Serial Communication (09)

Interrupts, Interrupts in MCS – 51, Timers and Counters, Serial Communication

4. Applications of MCS – 51 (12)

Pin diagrams of 89C51 and 89C 2051, Applications of MCS – 51 and Atmel 89C51 and 89C2051 Microcontrollers, Square Wave Generation, Pulse Generation, Staircase Ramp Generation, Pulse Width Measurement

Books Recommended:

1. Microcontrollers [Theory and Applications] – Ajay Deshmukh, TMH, New Delhi, 2009
2. The 8051 Microcontroller and Embeded system – M A Mazadi, J G Mazadi and R D McKinlay, Pearson PHI, 2009
3. The 8051 Microcontroller – K J Ayala, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2008

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Fifth Semester

Subject: ELECTRONICS

Course: ELE-502B Paper XVIII (B)

(Effective from June 2011)

Title: 8085 INTERFACING – I

Marks: 50 **Periods: 45**

1. Semiconductor Memories and Interfacing (15)

Semiconductor Memories, Introduction to Memory Interfacing, Memory Organization, Using Decoder for Chip Select Logic, Interfacing Designs (Problem 1 to 5)

2. Programmable Peripheral Interface PPI – 8255 (15)

Intoduction, 8255 Functional Block Diagram, 8255 Initialization, I / O Operating Modes

3. Programmable Communication Interface – 8251 (15)

Introduction to 8251, Pin Description, 8251 Block Diagram and Functional Description, 8251 Control Word, 8251 Data Transfer Operation, Asynchronous Mode Transmission, Asynchronous Mode Receiver, Synchronous Mode Transmission, Synchronous Mode Reception, 8251 Status Word

Books Recommended:

1. 8 – Bit Microprocessor System Design – V J Vibhute and P B Borole, Technova Publications, Pune
2. Microprocessor Architechture, Programming and Applications with 8085 – Ramesh S Gaonkar, Penram International Publishing

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B. Sc. Fifth Semester

Subject: ELECTRONICS

Course: ELE-503 **Paper XIX** (Practicals)

(Effective from June 2011)

Practicals Based on Paper XVII

Every candidate appearing for examination must produce journal showing that he/she has completed *Six* (06) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments **(Marks 50)**

1. Study of SCR characteristics.
2. Study of UJTcharacteristics.
3. Study of DIACcharacteristics.
4. Study of TRIAC characteristics.
5. Study of IGBT characteristics.
6. Study of firing of two SCRs using one UJT for power control.
7. Study of Triac as light dimmer.
8. Half wave & full wave rectifier using SCR.
9. Diac operated temperature sensitive switch using thermister.
10. UJT relaxation oscillator.
11. Timer using SCR & UJT
12. Study of Inductive Switch.
13. Study of Capacitive Switch.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Fifth Semester

Subject: ELECTRONICS

Course: ELE-504 A **Paper XX (A)** (Practicals)

(Effective from June 2011)

Practicals Based on Paper XVIII(A)

Every candidate appearing for examination must produce journal showing that he/she has completed *Four* (04) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

(A) Experiments **(Marks 30)**

1. Write a program to blink LED with 0.5 Hz frequency and implement it using Atmel 89C51.
2. Write a program for 8 – bit up counter and implement it using Atmel 89C51.
3. Write a program for 8 – bit binary down counter and implement it using Atmel 89C51.
4. Write a program to interface a switch and 8 LEDs for binary up counter when switch is closed and pause the counter when switch is open, implement it using Atmel 89C51.
5. Write a program to generate square waveforms using Atmel 89C51 and implement it.
6. Write a program for pulse generation using Atmel 89C51 and implement it.
7. Write a program for pulse width measurement using Atmel 89C51 and implement it.

(B) Project **(Marks 20)**

Every student should construct one *Suitable* project. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Fifth Semester

Subject: ELECTRONICS

Course: ELE-504 B **Paper XX (B)** (Practicals)

(Effective from June 2011)

Practicals Based on Paper XVIII(A)

Every candidate appearing for examination must produce journal showing that he/she has completed *Four* (04) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

(A) Experiments **(Marks 30)**

1. Write an assembly language program (ALP) to interface 8 LEDs and 8 switches to display status of switch using 8255 and implement it.
2. Write an assembly language program (ALP) to interface Hex keyboard and seven segment display to display key pressed on SSD using 8255 and implement it.
3. Write an assembly language program (ALP) to generate squre waveforms of frequency 500 Hz using DAC 0800 with 8255 and8085 microprocessor, implement it.
4. Write an assembly language program for 8 – Bit binary up counter and implement it using 8255.
5. Write an assembly language program for 8 – Bit binary down counter and implement it using 8255.

(B)Project **(Marks 20)**

Every student should construct one *Suitable* project. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester

Subject : ELECTRONICS

Course: ELE-601A Paper – XXI(A)

(Effective from June 2011)

Title: PROGRAMMABLE LOGIC CONTROLLERS

Marks: 50 Periods: 45

1. **Introduction to Programmable Controllers (15)**
   Industerial Motor Control circuits, Relay LadderLogic Circuits, building a Ladder Diagram, Rack Assembly, Power Supply, PLC Programming Unit, Input / Output Sections, Processor Unit, Addressing, Relationship of Data File Addresses to I / O Modules

2. **Fundamental PLC Programming (15)**
   PLC Program Execution, Ladder Diagram programming Language, Ladder Diagram Programming,Relay logic Instructions, Timer Instructions, Counter Instructions, Data Manipulation Instructions, Arithmatic Operations, Writing a Program

3. **Advanced Programming, PLC Interfacing and Troubleshooting (15)**
   Jump Commands, Data Manipulations, Discrete Input / Output Modules, Troubleshooting I / O Interfaces,

Books Recommended

1. Industrial Electronics { Circuits, Instruments and Control Techniques} – Terry Bartelt, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2009
2. Introduction to Power Electronics – V Jagannathan, PHI, New Delhi, 2004
3. Power Electronics – M D Singh and K B Khanchandani,

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester

Subject : ELECTRONICS

Course: ELE-601 B Paper – XXI (B)

(Effective from June 2011)

Title: INSTRUMENTATION

Marks: 50 **Periods: 45**

1. **Qualities of Measurements (10)**
   Performance Characteristics, Static Characteristics, Errors in Measurement, Types of Static Errors, Sources of Errors, Dynamic Characteristics, Standard, Atomic Frequency and Time Standards.

2. **Displays and Recorders (15)**
   LED display SSD Display , LCD display, X-Y recorder, Magnetic Tape recorder, Frequency modulation recording, Digital data recording.

3. **Transducers (20)**
   Electrical transducers, selecting a transducer, Resistive transducer, Resistive position transducer, Inductive transducer, Differential output transducer, linear variable differential transducer(LVDT), capacitive(pressure) transducer, Load Cell, Piezo – electric transducer.
   Photo electric transducers: - photo multiplier tube, photo cells, photo-voltaic cell, semiconductor photo diode, photo transistor.
   Temperature transducer:- RTD, Resistance thermometer, Thermistor, Thermocouple.

Books Recommended

1. Electronic Instrumentation –Second edition by H.S.Kasi (Mc Graw Hill Company)
2. Transducers and Instrumentation by D V S Murty (PHI)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester

Subject : ELECTRONICS

Course: ELE-602 A Paper – XXII (A)

(Effective from June 2011)

Title: MICROCONTROLLER – II

Marks: 50 **Periods: 45**

1. **8051 Timer Programming in Assembly Language (9 periods)**
   Programming 8051 Timers, Counter Programming,

2. **8051 Serial Port Programming in Assembly Language (12 periods)**
   Basics of Serial Communication, 8051 Connection to RS232, 8051 Serial Port Programming in Assembly

3. **Interrupts Programming in Assembly Language (12 periods)**
   8051 Interrupts, Programming Timer Interrupts, Programming External Hardware Interrupts, Interrupt Priority in the 8051 / 8052

4. **LCD, Keyboard, ADC, DAC and Sensor Interfacing (12 periods)**
   LCD Interfacing, ADC {0808}, DAC{0808} Interfacing, Sensor Interfacing and Signal Conditioning {LM34 and LM 35}

Books Recommended:

1. The 8051 Microcontroller and Embeded system – M A Mazadi, J G Mazadi and R D McKinlay, Pearson PHI, 2009
2. The 8051 Microcontroller – K J Ayala, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2008
3. Microcontrollers [Theory and Applications] – Ajay Deshmukh, TMH, New Delhi, 2009

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester

Subject : ELECTRONICS

Course: ELE-602B Paper – XXII (B)

(Effective from June 2011)

Title: 8085 INTERFACING – II

Marks: 50 **Periods: 45**

1. 8253 / 8254 Programmable Interval Timer (15)

Intoduction, Features of Programmable Interval Timer, Pin Configuration of 8253 / 8254, 8253 / 8254 Functional Block Diagram, Controle Word Register Format, Modes of Operation, 8253 Write Operation, 253 Read Operation

2. DMA Controlled I / O and DMA Controller (15)

Intoduction, Requirements of DMA Controlled Input / Output, The DMA Controller, Programmable DMA controller 8257, Organization, Operating Modes of 8257

3. Interrupt System and Controller (15)

The 8259 Interrupt Controller, Organization, 8259 – A Programming, command Words of 8259 – A, Singal PIC System, Cascaded PICs System (Vectored Mode), Polled System

Books Recommended:

1. 8 – Bit Microprocessor System Design – V J Vibhute and P B Borole, Technova Publications, Pune
2. Microprocessor Architechture, Programming and Applications with 8085 – Ramesh S Gaonkar, Penram International Publishing

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester

Subject : ELECTRONICS

Course: ELE-603 A Paper – XXIII (A)

(Effective from June 2011)

Practicals Based on Paper XXI (A)

Every candidate appearing for examination must produce journal showing that he/she has completed *Four* (04) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

VII – A: Experiments (Marks 30)

1. Study of Water Level Controller, Using PLC Simulator.
2. Study of Traffic Light Control, Using PLC Simulator.
3. Study of Horizontal Motion of Conveyor Belt using Limit Switches, Using PLC Simulator.
4. Study of Lift Control, Using PLC Simulator.
5. Study of Bottling Plant with Counter, Using PLC Simulator.

VII – B: Project (Marks 20)

Every student should construct one *Suitable* project. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester

Subject : ELECTRONICS

Course: ELE-603 B Paper – XXIII (B)

(Effective from June 2011)

Practicals Based on Paper XXI (B)

Every candidate appearing for examination must produce journal showing that he/she has completed *Four* (04) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

A: Experiments (Marks 30)

1. Study of IC AD590 as Temperature sensor.
6. Study of PT100 as Temperature sensor.
7. Study of Thermistor as Temperature sensor.
8. Study of photo transistor & photo diode as light sensor
9. Study of photo voltaic cell & LDR as light sensor
10. Study of temperature sensing transducer.
11. Study of strain gauge transducer.

B: Project (Marks 20)

Every student should construct one *Suitable* project. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester

Subject : ELECTRONICS

Course: ELE-604A Paper – XXIV (A)

(Effective from June 2011)

Practicals Based on Paper XXII (A)

Every candidate appearing for examination must produce journal showing that he/she has completed *Six* (06) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Write a program to generate square waveforms and implement it using Atmel 89C51 with DAC.
2. Write a program to staircase waveforms and implement it using Atmel 89C51 with DAC.
3. Write a program to generate triangular waveform with period of 1ms and implement it using Atmel 89C51 with DAC.
4. Write a program for stepper motor direction control using a switch and implement it using Atmel 89C51.
5. Write a program to display Microcontroller on 2 × 8 LCD module and implement it using Atmel 89C51.
6. Interfacing of matrix keyboard using MCS – 51.
7. Program based on MCS – 51 TIMER.
8. Program based on MCS – 51 COUNTER.
9. Program based on MCS – 51 INTERRUPT.
10. Temperature Controller with MCS – 51.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Sixth Semester
Subject : ELECTRONICS

Course: ELE-604B Paper – XXIV (B)

(Effective from June 2011)

Practicals Based on Paper XXII (B)

Every candidate appearing for examination must produce journal showing that he/she has completed *Six* (06) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Study of decoder.
2. Study of 8253 in mode '0'.
3. Study of 8253 in mode '1'.
4. Study of 8253 in mode '2'.
5. Study of 8255 in BSR Mode.
6. Interfacing of ADC with 8255.
7. Interfacing of stepper motor for
   (a) Clockwise rotation
   (b) Anti clockwise rotation
8. Interfacing of LCD using 8255.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. SC. FIFTH SEMESTER
Subject : ELECTRONICS

Course: ELE-501 Paper – XVII
(Effective from June 2011)

Title: INDUSTRIAL ELECTRONICS

PAPER PATTERN (THEORY)

Time: $1\frac{1}{2}$ *hours* *Max. Marks:30*

N.B.: (i) Attempt **All** questions.
(ii) All questions carry equal marks.
(iii) Use only Blue or Black pen.
(iv) Draw flow charts wherever necessary.

Q.1 Attempt any one:
(a) Chapter No. 1 (10)
(b) Chapter No. 2 (10)

Q.2 Attempt any one:
(a) Chapter No. 2 (10)
(b) Chapter No. 3 (10)

Q.3 Attempt any one:
(a) Chapter No. 4 (10)
(b) Chapter No. 4 (10)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. SC. FIFTH SEMESTER
Subject : ELECTRONICS

Course: ELE-502 A Paper XVIII (A)
(Effective from June 2011)

Title: MICROCONTROLLER – I

PAPER PATTERN (THEORY)

Time: $1\frac{1}{2}$ *hours* *Max. Marks:30*

N.B.: (i) Attempt **All** questions.
(ii) All questions carry equal marks.
(iii) Use only Blue or Black pen.
(iv) Draw flow charts wherever necessary.

Q.1 Attempt any one:
(a) Chapter No. 1 (10)
(b) Chapter No. 1 (10)

Q.2 Attempt any one:
(a) Chapter No. 2 (10)
(b) Chapter No. 3 (10)

Q.3 Attempt any one:
(a) Chapter No. 4 (10)
(b) Chapter No. 4 (10)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. SC. FIFTH SEMESTER
Subject : ELECTRONICS

Course: ELE-502 B Paper XVIII (B)
(Effective from June 2011)

Title: 8085 INTERFACING – I

PAPER PATTERN (THEORY)

Time: $1\frac{1}{2}$ *hours* *Max. Marks:30*

N.B.: (i) Attempt **All** questions.
(ii) All questions carry equal marks.
(iii) Use only Blue or Black pen.
(iv) Draw flow charts wherever necessary.

Q.1 Attempt any one:
(a) Chapter No. 1 (10)
(b) Chapter No. 1 (10)

Q.2 Attempt any one:
(a) Chapter No. 2 (10)
(b) Chapter No. 2 (10)

Q.3 Attempt any one:
(a) Chapter No. 3 (10)
(b) Chapter No. 3 (10)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. SC. SIXTH SEMESTER
Subject : ELECTRONICS

Course: ELE-601 A **Paper – XVII (A)**

(Effective from June 2011)

Title: PROGRAMMABLE LOGIC CONTROLLERS

PAPER PATTERN (THEORY)

Time: $1\frac{1}{2}$ *hours* *Max. Marks:30*

N.B.: (i) Attempt **All** questions.
(ii) All questions carry equal marks.
(iii) Use only Blue or Black pen.
(iv) Draw flow charts wherever necessary.

Q.1 Attempt any one:
(a) Chapter No. 1 (10)
(b) Chapter No. 1 (10)

Q.2 Attempt any one:
(a) Chapter No. 2 (10)
(b) Chapter No. 2 (10)

Q.3 Attempt any one:
(a) Chapter No. 3 (10)
(b) Chapter No. 3 (10)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. SC. SIXTH SEMESTER
Subject : ELECTRONICS

Course: ELE-601 B Paper – XVII (B)
(Effective from June 2011)

Title: INSTRUMENTATION

PAPER PATTERN (THEORY)

Time: $1\frac{1}{2}$ *hours* *Max. Marks:30*

N.B.: (i) Attempt **All** questions.
(ii) All questions carry equal marks.
(iii) Use only Blue or Black pen.
(iv) Draw flow charts wherever necessary.

Q.1 Attempt any one:
(a) Chapter No. 1 (10)
(b) Chapter No. 1 (10)

Q.2 Attempt any one:
(a) Chapter No. 2 (10)
(b) Chapter No. 2 (10)

Q.3 Attempt any one:
(a) Chapter No. 3 (10)
(b) Chapter No. 3 (10)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. SC. SIXTH SEMESTER
Subject : ELECTRONICS

Course: ELE-602 A **Paper XXII (A)**

(Effective from June 2011)

Title: MICROCONTROLLER – II

PAPER PATTERN (THEORY)

Time: $1\frac{1}{2}$ *hours* *Max. Marks:30*

N.B.: (i) Attempt **All** questions.
(ii) All questions carry equal marks.
(iii) Use only Blue or Black pen.
(iv) Draw flow charts wherever necessary.

Q.1 Attempt any one:
(a) Chapter No. 1 (10)
(b) Chapter No. 2 (10)

Q.2 Attempt any one:
(a) Chapter No. 3 (10)
(b) Chapter No. 3 (10)

Q.3 Attempt any one:
(a) Chapter No. 4 (10)
(b) Chapter No. 1 (10)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. SC. SIXTH SEMESTER
Subject : ELECTRONICS

Course: ELE-602 B Paper XXII (B)
(Effective from June 2011)

Title: 8085 INTERFACING – II

PAPER PATTERN (THEORY)

Time: $1\frac{1}{2}$ *hours* *Max. Marks:30*

N.B.: (i) Attempt **All** questions.
(ii) All questions carry equal marks.
(iii) Use only Blue or Black pen.
(iv) Draw flow charts wherever necessary.

Q.1 Attempt any one:
(a) Chapter No. 1 (10)
(b) Chapter No. 1 (10)

Q.2 Attempt any one:
(a) Chapter No. 2 (10)
(b) Chapter No. 2 (10)

Q.3 Attempt any one:
(a) Chapter No. 3 (10)
(b) Chapter No. 3 (10)

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