

GOVERNEMENT COLLEGE(A), RAJAHMUNDRY
DEPARTMENT OF PHYSICS
2025-26
I.B.Sc-(ELECTRONICS)-(H)
COURSE-I : FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS
Model question paper

Section –A

Answer all from the following

5×7=35

Q. No.	Question	BT Level	CLO	PLO	PI
1	Derive an expression for the electric potential due to charged spherical shell? OR	3/4	1	1	1
2	State and prove Gauss law in electrostatics	2/4	1	1	2
3	Find the capacitance of parallel plate capacitor and discuss effect of dielectric? OR	3/4	2	1	3
4	Explain principle, construction, and working of Kelvin's attractive disc electrometer	2	3	3	4
5	Describe construction of Carey Foster's bridge & determine specific resistance OR	2/3	4	3	5
6	Explain Biot–Savart law and derive expression for B of long straight wire	2/3	5	1	6
7	Derive efficiency and ripple factor of full wave rectifier? OR	3/4	6	1	7
8	Explain construction, working & characteristics of p–n junction diode	2	7	2	8
9	Discuss input and output characteristics of transistor in CE configuration? OR	2/3	8	2	9
10	Construct OR, AND, NOT gates using diodes	3	9	2	10

Section –B

Answer any five from the following

5×3=15

11	State and explain Coulomb's inverse square law	2	1	1	1
12	Derive expression for differential form of Gauss law	3/4	1	1	2
13	Derive expression for energy stored in charged capacitor	3	2	1	3
14	List and classify different types of capacitors with example	2	2	1	3
15	Explain Ampere's law	2	5	1	6
16	Explain how Zener diode used as voltage regulator	2/3	7	2	8
17	Explain how transistor works as amplifier	2/3	8	2	9
18	List and explain modes of operation of a transistor	2	8	2	9

GOVERNEMENT COLLEGE(A), RAJAHMUNDRY
DEPARTMENT OF PHYSICS 2025-26
MODEL PAPER
I.B.Sc-(ELECTRONICS)-(H)
 COURSE-II : Circuit Theory and Electronic Devices

SECTION-A

Answer the following questions
Marks

$5 \times 7 = 35$

Q.No	Question	BT	CLO	PLO	PI
1	Explain the general form of a sinusoidal waveform. Calculate its average value and RMS value. OR	BT2, BT3	CLO1	PLO1, PLO2	1.1.2, 1.3.2
2	Explain and analyze the phase relationship between voltage and current in R, L and C circuits with waveforms. OR	BT2, BT4	CLO1	PLO1, PLO2	1.1.2, 2.2.1
3	Explain and apply Thevenin's theorem with a suitable example. OR	BT2, BT3	CLO2	PLO1, PLO2	1.1.2, 1.3.2
4	Explain the maximum power transfer theorem and its significance. OR	BT2	CLO2	PLO1	1.1.2
5	Explain and analyze the frequency response of RC low-pass and high-pass filters. OR	BT2, BT4	CLO3	PLO1, PLO2	1.1.2, 2.2.1
6	Apply and analyze the concept of resonance in RLC circuits and derive the resonant frequency. OR	BT3	CLO3	PLO2	1.3.2, 2.3.1
7	Explain the operation of a BJT in CE configuration with characteristics. OR	BT2, BT3	CLO4	PLO1	1.1.2, 1.2.2
8	Explain the construction and characteristics of a JFET. OR	BT2	CLO4	PLO1	1.1.2
9	Apply and analyze half-wave and full-wave rectifiers and derive efficiency and ripple factor expressions. OR	BT3, BT4	CLO5	PLO2	1.3.2, 2.3.1
10	Explain the working of L-section and π -section filters used in rectifier circuits.	BT2	CLO5	PLO1	1.1.2

SECTION – B

Answer any five from the following questions

$(5 \times 3 = 15 \text{ Marks})$

11	Define amplitude, frequency and phase of a sinusoidal wave.	BT1	CLO1	PLO1	1.1.1
12	Define and explain the RMS value of a sine wave.	BT1	CLO1	PLO1	1.1.1,
13	State Norton's theorem.	BT1	CLO2	PLO1	1.1.1
14	Define the quality factor of a resonant circuit.	BT1	CLO3	PLO1	1.1.1
15	Explain any three advantages of FET over BJT.	BT2	CLO4	PLO2	2.2.2
16	Define ripple factor.	BT1	CLO5	PLO1	1.1.1
17	Explain the working principle of a photo-diode.	BT2	CLO5	PLO1	1.1.2
18	Explain the working of an LDR and list its applications.	BT2	CLO5	PLO1	1.2.2

GOVERNMENT COLLEGE(A), RAJAHMUNDRY-2025-26
I B.Sc-ELECTRONICS(H)- SEMESTER-II
COURSE-3 SEMICONDUCTOR MATERIAS & DEVICES
MODEL QUESTION PAPER
SECTION – A

(Answer all questions)

5×7=35

Q.No	Question	BT	CLO	PLO	PI
1	Explain energy band formation in solids and differentiate between conductors, semiconductors and insulators. OR	2	1	1	1.1.1
2	Explain carrier transport in semiconductors including drift and diffusion mechanisms.	2	1	1	1.1.2
3	Explain MS contacts and distinguish between rectifying and non-rectifying contacts. OR	2	2	1	1.2.1
4	Explain the structure and working of MIS with suitable diagrams.	2	2	2	2.1.2
5	Explain the ideal MOS capacitor with band diagrams and C–V characteristics. OR	2	3	1	1.2.1
6	Explain MOSFET structure, operation and short-channel effects.	3	3	2	2.2.1
7	Explain the working principle of solar cells with characteristics. OR	2	4	1	1.2.1
8	Discuss the construction and operation of LEDs and Laser diodes.	2	4	2	2.1.1
9	Explain BJT operation at high frequencies. OR	2	5	1	1.2.1
10	Discuss frequency response of RC-coupled amplifiers.	3	5	2	2.1.1

SECTION – B

Answer Any 5 from the following

5×3=15

Q.No	Question	BT	CLO	PLO	PI
11	Define mobility and drift velocity.	1	1	1	1.1.1
12	Define MIS structure.	1	2	1	1.1.1
13	What is threshold voltage in MOSFET?	2	3	2	2.1.2
14	Define quantum well.	1	4	1	1.1.1
15	What is bandwidth of an amplifier?	2	5	1	1.2.1
16	Define semiconductor surface states.	1	3	1	1.1.1
17	What are 2D materials? Give examples.	1	4	1	1.1.1
18	Define multistage amplifier.	1	5	1	1.1.1

GOVERNMENT COLLEGE(A), RAJAHMUNDRY-2025-26
I B.Sc-ELECTRONICS(H)- SEMESTER-II
COURSE-4 DIGITAL ELECTRONICS
MODEL QUESTION PAPER

Time:2.30Hrs
marks:50

Max

SECTION – A (Essay Questions) (5 × 7 =35Mks)

Q.No	Question	BT	CLO	PLO	PI
1	Explain conversion between Decimal, Binary, Octal and Hexadecimal number systems with examples. OR	2	1	1	1.1.1
2	Compare BCD, Gray, and Excess-3 codes.	3	1	2	2.1.2
3	State and prove De-Morgan's Laws OR	4	2	2	2.2.1
4	Minimize a 3-variable logic function using K-map.	6	2	3	3.1.1
5	Construct Full Adder using two Half Adders and verify truth tables. OR	6	3	3	3.2.2
6	Explain 4:1 Multiplexer	3	3	2	2.2.3
7	What is flip flop? Draw the circuit of J-K flip flop and discuss its working with the help of truth table. OR	4	4	2	2.1.3
8	What is a counter? Design and explain Mod-10 counter	6	4	3	3.3.1
9	Explain the general memory operations in a digital system. OR	2	5	1	1.3.1
10	Explain the architecture and working of RAM.	4	5	2	2.4.1

SECTION – B (Short Answer Questions) (Answer any 5 × 3=15 Marks)

11	Convert $(1011.011)_2$ to Decimal.	3	1	1	1.1.1
12	State the Duality Theorem in Boolean Algebra.	1	2	1	1.1.1
13	Distinguish between Encoder and Decoder.	2	3	1	1.4.1
14	Explain 8-line-to-3-line Encoder.	2	4	1	1.4.1
15	What is volatile memory? Give an example.	1	5	1	1.1.1
16	Why are NAND and NOR called universal gates?	2	2	1	1.4.1
17	Explain T flip flop with truth table.	1	3	1	1.1.1
18	What is the difference between SRAM and DRAM??	1	4	1	1.1.1

Government College (A) Rajahmundry
II B.Sc Electronics (H)..... Semester -3
Course- 5-Semiconductor materials and devices-2025-26
MODEL QUESTION PAPER(w.e.f 2024-25)

Time:2.30Hrs

Max marks:50

Section -A

Answer the following questions.

5×7=35

1. Explain briefly about energy bands in a semiconductor with a neat diagram. (BL2)

OR

2. Describe briefly about the injection and recombination of the excess carriers?(BL2)

3. Write about the metal semiconductor contact rectifiers and non-rectifiers in semiconductors? (BL1)

OR

4. Explain about Metal Insulator Semiconductor (MIS) structures?(BL2)

5. Explain about the ideal MOS capacitors with diagrams?(BL2)

OR

6. Explain about MOSFET construction, classification and working?(BL2)

7. Describe about the working, construction and applications of laser diode? (BL2)

OR

8. Write a note on Quantum dots? (BL1)

9. Derive an expression for the frequency response of the RC coupled amplifiers.(BL2)

OR

10. Explain about transformer coupled transistor (BL3)

Section-B

Answer any five from the following questions

5×3=15

11. The intrinsic carrier density is $1.5 \times 10^{16} \text{ m}^{-3}$. If the mobility of electron and hole are 0.13 and $0.05 \text{ m}^2 \text{ V}^{-1} \text{ s}^{-1}$, calculate the conductivity.(BL3)

12. Explain avalanche breakdown in a semiconductor? (BL1)

13. Draw IV characteristics of MIS structures?(BL2)

14. Write the applications of MOSFET in VLSI?(BL3)

15. Semiconductor diode laser has a peak emission wavelength of $1.55 \mu\text{m}$. Find its band gap in eV.(BL3)

16. Write a short note on solar cell?(BL1)

17. Distinguish between RC coupled and transistor coupled amplifiers? (BL3)

18. Describe briefly about Nano rods (BL4)

Government College (A) Rajahmundry-2025-26
II B.Sc Electronics (H)..... Semester -3
Course- 6-DIGITAL ELECTRONICS
MODEL QUESTION PAPER (w.e.f 2024-25)

Time:2.30Hrs

Max marks:50

Section -A

Answer the following questions.

5×7=35

1. Explain in detail about BCD Code? (BL-1)

(or)

2. Explain the conversion of Decimal to Binary and binary to decimal with an example. (BL-3)

3. State and prove De-Morgan's laws (BL-1), (BL-2)

(or)

4. Explain in detail about 3 variable karnaugh map method to simplify logic Expression. (BL-2)

5. Explain the operation of a full adder circuit with its truth table. (BL-1,3)

(or)

6. Explain the working of TTL NAND Gate circuit with its truth table. (BL-1,2)

7. Describe the working of Master slave JK flip-flop with its truth table.(BL-2,3)

(or)

8. Draw the circuit diagram of decade counter and explain its operation. Draw its timing diagram. (BL-1), (BL-3)

9. Explain the operation of ROM (BL-1)

(or)

10. Explain the operation of Dynamic RAM (BL-1), (BL-3)

Section - B

Answer any Five questions.

5 X 3M =15M

11. Explain Excess-3 code with an example. (BL-1)

12. Explain SOP? (BL-2)

13. Subtract 11001 from 10101 using 2's complement method (BL-3)

14. Prove the Boolean identity $(AB + C)(AB + D) = AB + CD$ (BL-3)

15. Distinguish between RAM and ROM (BL-1)

16. Write down differences between CMOS and TTL logic families. (BL-3)

17. Explain the working of Multiplexer (4:1) with its truth table. (BL-2)

18. Explain the operation of RS flip – flop with truth table (BL-3)

Government College (A) Rajahmundry-2025-26
II B.Sc Electronics (H)..... Semester -3
Course- 7- ANLOG ELECTRONICS
MODEL QUESTION PAPER (w.e.f 2024-25)

Time:2.30Hrs

Max marks:50

Section -A

Answer the following questions.

5×7=35

1. Describe the working of a two-stage RC coupled amplifier. Explain its frequency response curve and why the gain falls at low and high frequencies.

OR

2. Derive the expression for the maximum collector efficiency of a Class B Push-Pull power amplifier.
3. Discuss the four types of feedback topologies (Voltage-Series, Voltage-Shunt, Current-Series, Current-Shunt) and their effects on input and output impedance.

OR

4. Mathematically prove that negative feedback reduces the sensitivity of gain to variations in internal amplifier parameters.
5. What is a Differential Amplifier? Explain the working of an Op-amp in differential mode and derive the expression for CMRR.

OR

6. Explain the various offset parameters of an Op-amp (Input offset voltage, Input bias current, Input offset current) and how they affect the output.
7. With neat circuit diagrams, explain how an Op-amp can be used as a:
 - a. Summing Amplifier (Adder)
 - b. Integrator

OR

8. Explain the working of a Phase Shift Oscillator using an Op-amp. Derive the expression for its frequency of oscillation.
9. Describe the construction and working of a Wien Bridge Oscillator. Derive the condition for oscillation and the frequency formula.

OR

10. Explain the operation of a Schmitt Trigger using an Op-amp. Draw the hysteresis loop.

Section - B

Answer any Five questions.

5 X 3M =15M

11. Define the operating point (Q-point) and explain why it must remain stable in a Class A amplifier.
12. If an amplifier has an open-loop gain of $A = 1000$, calculate the gain with 10% negative feedback.
13. Briefly explain how negative feedback increases the bandwidth of an amplifier.
14. Define Slew Rate. Why is it an important parameter for high-frequency applications?
15. Draw the ideal voltage transfer characteristics of an Operational Amplifier.
16. What is a Comparator? Draw the circuit diagram of a basic Op-amp comparator.
17. State the Barkhausen Criterion for sustained oscillations.
18. Explain the primary difference between an Astable and a Monostable multivibrator.

Government College (A) Rajahmundry-2025-26
II B.Sc Electronics (H)..... Semester -III
Course- 8- ELECTRONIC COMMUNICATION SYSTEM
MODEL QUESTION PAPER (w.e.f 2024-25)

Time:2.30Hrs

Max marks:50

Section -A

Answer the following questions.

5×7=35

1). Describe the construction and working of dipole antenna **(BL-2)**

OR

2). Describe the construction and working of Yagi uda antenna **(BL-2)**

3). What is modulation? Explain the generation and detection of Amplitude Modulation with the help of circuit diagrams **(BL-3)**

OR

4). Mention the types of modulations. Explain briefly about DSB and SSB modulations. **(BL--4)**

5). Define frequency modulation. Explain the generation of frequency modulation with circuit diagram **(BL-3)**

OR

6). Describe briefly how the frequency modulated wave detected using balanced slope detector **(BL-4)**

7). Explain briefly about the Pulse Amplitude Modulation using block diagram and mention the advantages, disadvantages and applications **(BL-2)**

OR

8). What is pulse modulation? Explain briefly about Digital Communication using block diagram **(BL-3)**

9). Write down the advantages and disadvantages of Digital Communication **(BL-3)**

OR

10). Describe the construction and working of fiber optics **(BL-2)**

SECTION-B

Answer any FIVE of the following (each question carries 3 marks)

5×3=15M

11) Define the following

a).Antenna

b) Bandwidth. **(BL-1)**

12) Write the differences between Ground, Sky and Space propagation **(BL-2)**

13) Draw the block diagram of AM Radio transmitter **(BL-3)**

14) Explain about balanced modulator **(BL-4)**

15) Explain about reactance tube modulator **(BL-2)**

16) Describe Delta modulation **(BL-2)**

17) Explain about satellite communication **(BL-3)**

18) Define multiplexing and its applications **(BL-3)**

GOVERNMENT COLLEGE (A) RAJAHMUNDRY
II-B.Sc. Electronics - SEMESTER-IV
COURSE 9: ELECTRICAL AND ELECTRONIC INSTRUMENTATION

Max Marks: 50

MODEL QUESTION PAPER

Time: 2.30

Hours

Section A

Answer **ALL**

7X5=35

1. Explain the construction and working of a PMMC galvanometer. Discuss its sensitivity and the effect of loading effect in measurements.

(OR)

2. Describe the principle, construction, and working of an Electrodynamometer. How does it differ from a Thermocouple instrument?

3. Draw the circuit diagram of a Kelvin's bridge and derive the expression for the unknown resistance. Why is it used?

(OR)

4. Explain the circuit diagram and balancing condition for a Maxwell's bridge. Discuss how Wein's bridge can be used for the determination of frequency.

5. Draw the Block Diagram of an Oscilloscope and explain the function of each block.

(OR)

6. Differentiate between Analog and Digital Storage Oscilloscopes. Explain how phase difference and time intervals are measured using a CRO.

7. Explain the necessity of an Instrumentation Amplifier. Draw its circuit diagram and derive the expression for its output voltage.

(OR)

8. Explain the Fundamentals of a Spectrum Analyser and differentiate it from a Wave Analyser.

9. Describe the construction, working, and applications of a Linear Variable Differential Transducer (LVDT).

(OR)

10. Explain the working principle of a Strain Gauge (bounded/unbounded). Describe the operation of a Pen Recorder for data acquisition.

Section B

Answer **any five** of the following questions.

Briefly explain the operation of an Electrostatic Voltmeter.

12. List and explain the different Types of Errors encountered in electrical measurements.

13. State the Balancing Condition for an AC Bridge.

14. What is Deflection Sensitivity in a CRO? Give its formula.

15. Write a short note on the working and advantages of a Sampling Oscilloscope.

16. Briefly explain the working of a Digital Voltmeter (DVM).

17. Explain the principle of operation of a Photoelectric Transducer.

18. Describe the operation of a Resistance Thermometer.

GOVERNMENT COLLEGE(A), RAJAHMUNDRY
II-B.Sc. Electronics - SEMESTER-IV
COURSE 11: MICRO CONTROLLER SYSTEM
Model Question Paper

Max Marks: 50

Time: 2.5 Hours

Section A

Answer **ALL**.

1. Differentiate between a Microprocessor and a Microcontroller and discuss the evolution of microcontrollers from 4-bit to 32-bit.
(OR)
2. Explain the function of various development tools like Assembler, Compiler, and Simulator/Debugger in microcontroller system development.
3. Draw and explain the Architecture of the 8051 Microcontroller.
(OR)
4. Explain the Register banks and Program Status Word (PSW) register of the 8051.
Describe the organization and function of the Ports in the 8051.
5. Explain the various Addressing Modes of the 8051 with suitable examples for each.
(OR)
6. Discuss the instruction set of 8051, focusing on Logical instructions and Jump, Loop, and Call instructions.
7. Write an Assembly Language Program for the 8051 to perform the Multiplication of two 8-bit numbers.
(OR)
8. Write an Assembly Language Program for the 8051 to arrange a given set of N 8-bit numbers in ascending (smallest to largest) order.
9. Draw and explain the interfacing of a Seven Segment Display with the 8051 Microcontroller.
(OR)
10. Explain the principle and interfacing of a Stepper Motor (Uni-Polar) with the 8051 to achieve continuous rotation.

Section B:

Answer **any five** of the following questions.

5x3=15

11. Write a short note on the Pin diagram of the 8051.
12. Explain the role of the Program Counter and Memory Organization in the 8051.
13. Briefly explain the use of Simple bit instructions in the 8051 instruction set.
14. How is Time Delay Generation and Calculation performed using the 8051's Timers?
15. Write the logic for performing the Division of two 8-bit numbers in 8051 assembly language.
16. Explain the interfacing of the DAC (0804) with the 8051 Microcontroller.
17. Briefly explain the use of PPI 8255 for parallel interfacing.
18. Describe the importance of Data Types and Directives in 8051 programming.

**GOVERNMENT COLLEGE(A),
RAJAHMUNDRY**

DEPARTMENT OF PHYSICS::2025-26

II B.Sc. Electronics - SEMESTER-IV

**COURSE 11: MICROPROCESSOR
SYSTEMS**

Max Marks: 50

Model Question Paper

Time: 2.5 Hours

Section A

Answer **ALL**

5 x 7 Marks = 35 Marks.

1. Draw and explain the Architecture of the INTEL 8085 Microprocessor,
(OR)
- 2 Describe the Pin Description, of the 8085 Microprocessor.
3. Classify the 8085 Instruction Set and explain the operation of Logical Instructions and Arithmetic Instructions with one example for each.
(OR)
- 4 Explain the use and purpose of Data Transfer Instructions, Branch Instructions, in the 8085 instruction set.
5. Write an Assembly Language Program (ALP) using 8085 to perform the Addition of two 8-bit numbers. Include necessary comments.
(OR)
- 6 Write an ALP for BCD to ASCII conversion. (BL4)
7. Explain the difference between Minimum Mode and Maximum Mode configurations of the 8086 Microprocessor and specify the signals used for each.
(OR)
- 8 Describe serial and parallel communication interfaces in 8086. (BL2)
9. Explain the ARM Architecture and Organization?
(OR)
10. Explain the ARM instruction set and its characteristics. (BL3)

Section B:

Answer any five of the following questions.

5x3=15

- 11 Explain the Register Organization of the 8085 microprocessor.
- 12 Briefly describe the 8085 Instruction Format.
- 13 Explain the function of Branch Instructions in 8085 programming.
- 14 Write the logic for BCD to ASCII conversion using 8085.
15. Describe the role and importance of Programmable Timers in the 8086 I/O interface.
16. Explain the concept of Interrupt Priority Management in 8086.
17. List the advantages of ARM Processors compared to traditional 8-bit/16-bit microprocessors.
18. Write a short note on Arm based MCUs (Microcontroller Units).

GOVERNMENT COLLEGE (A), RAJAHMUNDRY
DEPARTMENT OF PHYSICS
III B.Sc ELECTRONICS (H)—SEMESTER-V
MAJOR-12- CELLULAR MOBILE COMMUNICATION
MODEL QUESTION PAPER

Time : 2.30 Hr

Max.Marks : 50

SECTION-A

Answer the following questions

5X7=35 M

1. Describe the Global System for Mobile Communication (GSM) with its system components.

OR

2. Discuss the evolution and features of third-generation (3G) wireless systems
3. Explain the concept of handoff and describe detection techniques.

OR

4. Write a detailed note on ACI and CCI interference with examples
5. **Describe mobility management and its importance in GSM.**

OR

6. **Discuss the working of the Short Message Service (SMS) in GSM.**
7. **Describe the architecture and components of the Wireless Application Protocol.**

OR

8. **Explain Wireless Mark-up language (WML) with examples.**
9. **Explain the working of Wireless Local Loop (WLL) and its applications.**

OR

10. **Write an essay on third-generation mobile services and their benefits.**

SECTION-B

Answer any FIVE from the following questions

5X3=15 M

11. Mention any two features of a digital cellular system
12. Define 3G and list its two advantages
13. What is roaming management?
14. Write two functions of the mobility management entity.
15. Explain International roaming?
16. Write two uses of wireless mark-up language.
17. Define datagram with an example
18. Explain services provided by Bluetooth

GOVERNMENT COLLEGE (A), RAJAHMUNDRY
III B.Sc. ELECTRONICS (H) – SEMESTER V
COURSE-13: COMPUTER NETWORK
MODEL QUESTION PAPER (2025-26)

Time: 2.30 Hours
Marks: 50

Max.

SECTION – A

Answer all question
35 M

5 × 7 =

1. Describe the functions of each layer of the OSI model and provide a detailed comparison with the TCP/IP model.

OR

2. Explain different network topologies (Bus, Star, Ring, and Mesh). Highlight their specific advantages and disadvantages in a practical networking environment.
3. Explain the concepts of IPv4 and IPv6 addressing. Detail the structural differences, address space, and new features introduced in IPv6.

OR

4. Describe the functions of common network devices: Switches, Routers, and Hubs. Explain how each operates at different layers of the OSI model.
5. Compare and contrast TCP and UDP protocols in terms of reliability, speed, header structure, and real-world applications.

OR

6. Explain the process of data encapsulation and decapsulation as a packet moves through the protocol stack from the Application layer to the Physical layer.
7. Discuss the key steps involved in setting up a wired LAN and a Wi-Fi network, including the hardware required and configuration basics.

OR

8. Describe how network administrators use diagnostic tools such as ping, trace route, and netstat to monitor and troubleshoot connectivity issues.
9. What is the Internet of Things (IoT)? Explain its four-layer architecture and provide examples of how IoT is used in modern scientific research.

OR

10. Explain the basic concepts of Software-Defined Networking (SDN). How does it differ from traditional networking in terms of the Control Plane and Data Plane?

SECTION – B

Answer any FIVE questions.
M

5 × 3 = 15

11. What is the importance of computer networks in modern scientific data sharing?
12. Briefly describe the primary role of the Physical Layer in the OSI model.
13. What is the primary function of a Modem in a home network?
14. Define Subnetting and state its primary use in IP address management.
15. What is the main difference between SMTP and POP3/IMAP protocols?
16. How is a Virtual Private Network (VPN) different from a Proxy Server?
17. Give an example of a high-speed research network and its purpose.
18. Name two essential components of an IoT system.

GOVERNMENT COLLEGE (A)-RAJAHMUNDRY
DEPARTMENT OF PHYSICS-2025-26
III- B.Sc. Electronics –SEMESTER-V
COURSE 14A-INDUSTRIAL ELECTRONICS

Time: 2.30 Hours |

Max. Marks: 50

SECTION – A

Answer ONE question from each Unit.

(5 × 7 = 35 Marks)

1. Explain the working of a Bridge Rectifier and derive the expression for its Efficiency
- OR**
2. Explain the operation of a pi-section filter and discuss how it reduces ripple components.
 3. Draw and explain the circuit and working of a simple regulated transistorized power supply.

OR

4. Describe the functional block diagram and working of an SMPS.
5. Explain the operation of a Full-wave Voltage Doubler with a neat circuit diagram.

OR

6. Explain the construction and working of a Voltage Tripler circuit.
7. Explain the working of an SCR Full-wave rectifier with resistive load and relevant waveforms.

OR

8. Discuss the working principle of SCR Parallel Inverters.
9. Explain the principle of Dielectric heating. Mention its specific applications in scientific research.

OR

10. Describe the principle of operation and applications of Resistance heating.

SECTION – B

Answer any FIVE questions.

(5 × 3 = 15 Marks)

11. Define Ripple Factor and give its value for a Full Wave Rectifier.
12. What is the difference between 7805 and 7905 IC regulators?
13. List the advantages of SMPS over Linear Power Supplies.
14. Give two applications of Voltage Multipliers.
15. Define Firing Angle and Conduction Angle of an SCR.
16. What is the function of an Inverter?
17. Name the factors affecting the heat produced in Induction heating.
18. Briefly explain "Eddy Current" heating.

GOVERNMENT COLLEGE (A), RAJAHMUNDRY-2025-26
III B.Sc-ELECTRONICS (H)- SEMESTER-V
COURSE 14 B: EMBEDDED SYSTEMS DESIGN

Time: 2.30Hrs

MODEL PAPER

Max marks: 50

Section - A

Answer ALL the following:

(5 X 7 = 35 Marks)

1. Draw the block diagram of an embedded system. Explain the features of Embedded Systems.
(OR)
2. Explain various technologies involved in designing an embedded system.
3. Explain (i) Combination logic and (ii) Sequential logic circuits
(OR)
4. Explain in detail about RT Level custom single purpose processor.
5. Explain in detail about embedded software development tools.
(OR)
6. Explain various debugging techniques used in Embedded Systems.
7. Define and explain Universal asynchronous receiver transmitter (UART).
(OR)
8. Explain the working of Stepper motor controller for embedded systems.
9. Distinguish between parallel and serial communication Principles. Explain USB Serial Protocol.
(OR)
10. Write a short note on (a) PCI BUS and (b) ARM BUS

Section - B

Answer ANY 5 of the following:

(5 X 3 = 15 Marks)

11. What are the components of an embedded hardware system?
12. Explain the design challenges of embedded systems.
13. Explain various steps to design a custom single-purpose processor.
14. Explain combinational logic circuit design.
15. Write a short note on the linker for embedded systems.
16. Briefly explain the operation of a general-purpose processor.
17. What is Watchdog Timer? Explain.
18. Explain the working of Real-time Clocks in embedded systems.

GOVERNMENT COLLEGE (A), RAJAHMUNDRY-2025-26
III B.Sc-ELECTRONICS (H) - SEMESTER-V
COURSE 15 A: DIGITAL SYSTEM DESIGN

Time: 2.30 Hours

Max. Marks: 50

SECTION – A (Long Answer Questions)

Answer ONE question.

(5 × 7 = 35 Marks)

1. Simplify the Boolean function $F(A,B,C,D) = \sum m(1,3,7,11,15)$ using a Karnaugh Map and realize it using logic gates.

OR

2. Perform the subtraction $(25)_{(10)} - (14)_{(10)}$ using 2's Complement arithmetic in binary.
3. Design and explain a BCD to Excess-3 code converter.

OR

4. Design a Full Subtractor using two Half Subtractors and an OR gate.
5. Explain the working of a 4-to-1 Multiplexer and implement a Full Adder using it.

OR

6. Describe the architecture of a Programmable Logic Array (PLA) with a neat diagram.
7. Discuss the excitation tables and working of SR, JK, D, and T Flip-Flops.

OR

8. Design a 4-bit Asynchronous (Ripple) Counter and draw its timing diagram.
9. Explain the steps involved in the design of Asynchronous Sequential Circuits.

OR

10. Define Hazards. Explain how to design a hazard-free switching surface.

SECTION – B (Short Answer Questions)

Answer any FIVE questions.

(5 × 3 = 15 Marks)

11. State the Duality principle in Boolean Algebra.
12. Draw the logic circuit for the Boolean expression: $Y = AB + C$
13. What is the main function of an Encoder?
14. Define "Fan-in" and "Fan-out" of a logic gate.
15. What is the difference between Synchronous and Asynchronous counters?
16. List the types of Shift Registers.
17. What is a "Stable State" in an asynchronous circuit?
18. Briefly explain what an HDL is used for in digital design.

GOVERNMENT COLLEGE (A), RAJAHMUNDRY-2025-26
III B.Sc.-ELECTRONICS (H) - SEMESTER-V
COURSE 15 B: COSUMER ELECTRONICS

Time: 2.30 Hrs

MODEL QUESTION PAPER

Max Marks: 50

SECTION – A (Long Answer Questions)

Answer ONE question

(5 × 7 = 35 Marks)

1. Explain the construction and working of a Microwave Oven with a neat block diagram.

OR

2. Discuss the importance of Single-Chip Controllers and LCD timers with alarms in microwave ovens.
3. Describe the features of different types of washing machines and explain how electronic controllers manage the wash cycles.

OR

4. What is Fuzzy Logic? Explain how it is applied to optimize the washing process in modern machines.

5. Explain the various components of an Air Conditioning system and discuss the working of a Split AC.

OR

6. Compare and contrast Unitary and Centralized air conditioning systems.

7. Draw the block diagram of a Digital Clock and explain the working of its frequency divider and display sections.

OR

8. Explain the structure and internal organization of a digital calculator.

9. Explain the working principle of an ATM and the various networks involved in its operation.

OR

10. Describe the working of Barcode Scanners and Decoders. List their applications in retail.

SECTION – B (Short Answer Questions)

Answer any FIVE questions.

5 × 3 = 15 M

11. What is the range of microwaves used for cooking?
12. Mention any three safety instructions for wiring a microwave oven.
13. List two features of a front-loading washing machine.
14. What are the advantages of an "All-Water" AC system?
15. Briefly explain the principle of a Xerographic copier.
16. What is the role of an encoder in a digital calculator?
17. Define Digital Cable TV.
18. What is the function of a Set-Top Box?

**GOVERNMENT COLLEGE(A),RAJAHMUNDRY.
DEPARTMENT OF PHYSICS
III B.Sc ELECTRONICS(H)
MAJOR-4 CONSUMER ELECTRONICS
MODEL QUESTION PAPER**

TIME: 2.30h

MAX MARKS:50M

PART-A (5 X 7 = 35 Marks)

Answer the following

1. a) Draw and explain the Microwave oven block diagram
(Or)
b) Draw and explain the LCD timer with alarm
2. a) Explain hardware and software of Washing machine
(Or)
b) Explain the block diagram of Electronic controller for washing machines.
3. a) Explain Components of All air conditioning systems with its block diagrams
(Or)
Explain all water air conditioning systems with its block diagrams
4. a) Explain the basic Structure of a calculator
(Or)
b) Explain the Block diagram of a digital clock.
5. a) Discuss the Barcode Scanner and decoder
(Or)
b) Explain the Electronic Fund Transfer

PART-B (5 X 3 = 15 Marks)

Answer any five of the following questions

6. Explain Wiring and Safety instructions of microwave oven?
7. Explain the Types of washing machines
8. Describe the features of Washing Machine.
9. Explain about Split air conditioners
10. Briefly explain the Facsimile machine
11. Explain Automated Teller Machines (ATMs)
12. Describe Xerographic copier