

PROGRAMMES



# B.Sc., Electronics Model Papers 2024-25

12/07/2024



**DEPARTMENT OF PHYSICS,  
Government College (A)  
RAJAHMUNDRY-AP-533103**

# Government College (Autonomous) Rajahmundry



Curriculum 2024-25

Version: 1.0

## COURSES OFFERED IN THE PROGRAM

S.No	SEM	COURSE CODE	COURSE TYPE	TITLE OF THE COURSE	CIA	SEE	Hours / Week					
							L	T	P	C		
1	I	124901	MAJOR	Essentials and Applications of Mathematical, Physical and Chemical Sciences	50	50	3	-	2	4		
		124902	MAJOR	Advances in Mathematical, Physical and Chemical Sciences	50	50	3	-	2	4		
2	II		MAJOR	FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS	50	50	3	-	-	3		
				FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS Practical Course	--	50	-	-	2	1		
			MAJOR	CIRCUIT THEORY AND ELECTRONIC DEVICES	50	50	3	-	-	3		
				CIRCUIT THEORY AND ELECTRONIC DEVICES Practical Course	--	50	-	-	2	1		
			MINOR	MINOR (COMPUTER SCIENCE)								
				MINOR PACTICALS				50	-	-	2	1
3	III		MAJOR	SEMICONDUCTOR DEVICES AND MATERIALS	50	50	3	-	-	3		
				SEMICONDUCTOR DEVICES AND MATERIALS Practical Course	--	50	-	-	2	1		
			MAJOR	DIGITAL ELECTRONICS	50	50	3	-	-	3		
				DIGITAL ELECTRONICS Practical Course	--	50	-	-	2	1		
			MAJOR	ANALOG ELECTRONICS	50	50	3	-	-	3		
				ANALOG ELECTRONICS Practical Course	--	50	-	-	2	1		
			MAJOR	ELECTRONIC COMMUNICATION SYSTEMS	50	50	3	-	-	3		
				ELECTRONIC COMMUNICATION SYSTEMS Practical course	--	50	-	-	2	1		
			MINOR	<b>Minor</b> (Computer Science)			50	50	3	-	-	3

				<b>Minor</b> (Computer Science) Practical course	--	50	-	-	2	1
4	IV		MAJOR	ELECTRICAL AND ELECTRONIC INSTRUMENTATION	50	50	3	-	-	3
				ELECTRICAL AND ELECTRONIC INSTRUMENTATION Practical Course	--	50	-	-	2	1
			MAJOR	MICRO CONTROLLER SYSTEM	50	50	3	-	-	3
				MICRO CONTROLLER SYSTEM Practical Course	--	50	-	-	2	1
			MAJOR	MICROPROCESSOR SYSTEMS	50	50	3	-	-	3
				MICROPROCESSOR SYSTEMS Practical Course	--	50	-	-	2	1
			MINORS	<b>Minor 1</b> (Computer Science)	50	50	3	-	-	3
				<b>Minor 1</b> (Computer Science) Practical course	--	50	-	-	2	1
			MINORS	<b>Minor 2</b> (Computer Science)	50	50	3	-	-	3
				<b>Minor 2</b> (Computer Science) Practical course	--	50	-	-	2	1

# GOVERNMENT COLLEGE (A), RAJAHMUNDRY

## I B.Sc Honors – I SEM (Dec 2023)

Course1: Essentials and Applications of Mathematical, Physical and Chemical Sciences  
Model Paper

Time: 2 Hr. 30 Min.

MAX MARKS: 50M

### SECTION - A

Answer any Three of the following Essays

3x10= 30M

1. If  $(x + iy) = \frac{1}{1 + \cos\theta + i\sin\theta}$ , Show that  $4x^2 - 1 = 0$
2. State and explain Newton's laws of motion
3. Explain briefly about the electronic configuration
4. Explain how physics helps in environmental monitoring?
5. What is Internet and give it's applications

### SECTION - B

Answer All of the following Very Short Answers questions

12x1= 12M

6. If  $\sec\theta + \tan\theta = 5$ , then find  $\sec\theta - \tan\theta$
7. Find the multiplicative inverse of  $3-5i$
8. Find the median of numbers 11,15,16,14,11,13,12,14,15,16
9. Prove that  $2i+3j-k$  and  $4i-2j+2k$  are perpendicular
10. Write any two applications of Mathematics in physics and chemistry
11. What is the derivative of integral of  $x^2$
12. Give any two Applications of physics in automotive industry
13. Expand the forms NMR and FBDD in drug industry
14. What type of firewall operates as an intermediary between two systems?
15. What is the system that translates human-readable domain names into numerical IP addresses?
16. What is IP address?
17. Give two example of 3rd generation of computer?

### SECTION - C

Match the following

2x4= 08

#### Column 1

#### Column 2

- |                                  |                         |
|----------------------------------|-------------------------|
| 18. Energy                       | ( ) a.Quantum Mechanics |
| 19. Microscopic domain           | ( ) b .Generator        |
| 20. Second Law of Thermodynamics | ( ) c.Joul              |
| 21. Electro-Magnetic Induction   | ( ) d.Refrigerator      |

#### Column 1

#### Column 2

- |                   |                        |
|-------------------|------------------------|
| 22. Proteins      | ( ) a. Monosaccharides |
| 23. Carbohydrates | ( ) b. Triglycerides   |
| 24. Lipids        | ( ) c. Nucleotides     |
| 25. Nucleic acids | ( ) d. Amino acids     |

# GOVERNMENT COLLEGE (A), RAJAHMUNDR

## I B.Sc. Honors – I SEM (Dec 2023)

### Course: Advances in Mathematical, Physical and Chemical Sciences Model Paper

Time: 2 Hr. 30 Min.  
MARKS: 50M

MAX

#### SECTION - A

Answer any Three of the following Essays

3x10= 30M

Transform  $x + y - 2 = 0$

- i) Slope Intercept form ii) Normal form
- Write about different Renewable Energy resources and energy storage methods?
- What is Computer aided drug design and Delivery?
- Write a note on solid waste management?
- Explain the network devices?

#### SECTION - B

Answer All of the following Very Short Answers questions

12x1= 12M

- Find  $\frac{d}{dx} e^x =$
- Find  $\frac{d}{dx} \sin 3x$
- If  $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$  Then find out  $A^{-1}$
- write the slope intercept formula?
- Energy \_\_\_\_\_ technologies play a crucial role in smoothing out fluctuations in renewable energy generation
- \_\_\_\_\_ resources like batteries and pumped hydro storage can store excess energy for later use.
- Nanoparticles can be engineered to carry drugs directly to the \_\_\_\_\_ of disease.
- \_\_\_\_\_ is the process by which neurons adjust their sensitivity to incoming signals based on the level of simulation.
- What is QSAR
- What is Chemical Biology?
- Write any two Applications of Nano sensors ?
- What is Fenton's Reaction?

#### SECTION - C

Answer All of the following Matching questions

2x4=8M

1.Match the following

- |                       |     |   |
|-----------------------|-----|---|
| 1. Photovoltaic cells | ( ) | a. Heating buildings and water              |
| 2. Wind turbines      | ( ) | b Converting flowing water into electricity |
| 3. Hydropower plants  | ( ) | c. Generating electricity from sunlight     |

4. Solar water heaters ( ) d. Harnessing wind energy

**2. Match the following**

- |           |     |                            |
|-----------|-----|----------------------------|
| 1. Modem  | ( ) | a. continuity              |
| 2. Analog | ( ) | b. Bluetooth               |
| 3. Codec  | ( ) | c. modulation-demodulation |

4. Wireless media ( ) d. multiplexing and de multiplex

**Government college(A), Rajahmundry**

**B.Sc- Electronics W.E.F 2023-24**

**Semester-II**

**Course-4 CIRCUIT THEORY AND ELECTRONIC DEVICES**

**Model paper**

**Time: 2.30Hrs**

**Max Marks: 50**

**Section –A**

**I. Answer all from the following questions?**

**5×7=35**

1. A). Define alternating current? And explain average value, effective (R.M.S) values.?(BT1)

OR

2. B). Explain about Phase relation of R,L and C in alternating current?

3. A) State and prove Thevenin's Theorem? (BT1)

OR

4. B) State and prove Norton's Theorem? (BT1)

5. A) 1.Explain LCR series resonance circuit and derive the resonating frequency of it? (BT2)

OR

6. B). Explain LCR parallel resonance circuit and derive the resonating frequency of it? (BT2)

7. A). Explain Hybrid parameters of transistor? (BT1)

OR

8. B). Explain about hybrid equivalent circuit of CE Transistor

9. A). Explain construction and working of Fullwave rectifier and derive the expression for its efficiency? (BT2)

OR

10. B). Explain construction and working about I.C. regulators 78XX? (BT3)

**Section –B**

**II. Answer any five from the following questions?**

**5×3=15**

11. Write any 3 differences between A.C & D.C? (BT3)

12. Explain about delta to star conversion? (BT1)

13. Distinguish LCR Series and parallel resonance? (BT3)

14. Explain the Frequency response of RC circuits? (BT2)

15. Explain Hybrid parameters of transistor? (BT1)

16. Explain about integrating circuits? (BT2)

17. Explain Light Emitting Diode? (BT1)

18. Explain about Photo diode? (BT2)

**Government College (A) Rajahmundry**  
**II B.Sc Electronics (H)..... Semester -3**  
**Course- 5**

**Semiconductor materials and devices- (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 nanorods **(BL4)**

Government College (A) Rajahmundry  
II B.Sc. SEMESTER – III  
(MAJOR) COURSE 5: DIGITAL ELECTRONICS  
{ for 2023-2027 Batch (w.e.f. 2024-2025) }  
MODEL QUESTION PAPER

Time: 21/2 Hrs.

Max. Marks: 50

SECTION – A

Answer any FIVE questions. Each question carries 7 marks.

5 x 7 = 35M

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), (BL-3)

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

(or)

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

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

(or)

8. Draw the circuit diagram of decade counter and explain it's 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**  
**II B.Sc.(ELECTRONICS)**

**SEMESTER – III**  
**(MAJOR2) COURSE 6: ANALOG ELECTRONICS**  
**{for 2023-2027 Batch (w.e.f. 2024-2025)}**  
**MODEL QUESTION PAPER**

**Time: 2½ Hrs.**

**Max. Marks: 50**

**SECTION – A**

**Answer any FIVE questions. Each question carries 7 marks. 5 x 7 = 35M**

1. Explain and working of two stage RC coupled amplifier with graphically? **(BL3)**

**(OR)**

2 Explain Emitter follower **(BL3)**

3. List Five characteristics of an amplifier which are modified by negative feedback amplifier..  
**(BL2, BL3)**

**(OR)**

4. Draw and explain the circuit of a voltage – shunt feedback amplifier **(BL2,BL3)**

5. Draw the block diagram of the basic op-amp with inverting and non-inverting inputs. **(BL3)**

**(OR)**

6. List the characteristics of an Ideal amplifier. **(BL2,BL2)**

7. Draw the circuit of an op-amp Integrator. **(BL2,BL3).**

**(OR)**

8. Draw the circuit of an op-amp Differentiator. **(BL1,BL2)**

9. To derive the basic operational amplifier applications. **(BL3)**

**(OR)**

10. Draw and explain the Phase-Shift Oscillator.. **(BL1, BL2, BL3)**

**SECTION – B**

**Answer any FIVE questions. Each question carries 3 marks. 5 x 3 = 15M**

11. Draw the circuit diagram of multistage transformer coupled amplifier.. **(BL2)**

12 What is Power dissipation.. **(BL1, BL3)**

13 What is Distortion and bandwidth. **(BL2)**

14. What are transfer characteristics of an op-amp.. **(BL2)**

15 Explain the comparator.. **(BL2)**

16. Draw the circuit of Astable Multivibrator **(BL3)**

17. Draw the circuit of an Hartley Oscillator. **(BL3)**

18. Explain the Schmitt Trigger. **(BL3)**

**Government College (A) Rajahmundry**

**II B.Sc Electronics (Hon)**

**SEM III Course 9**

**Paper Title: Electronic Communication System**

**Model Paper**

**Time: 2 1/2 hours.**

**Max marks 50**

**Section A**

**Answer all the questions below given (each question carries 7 marks)**

**5x7=35M**

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)**

**5x3=15M**

11) Define the following

A} Antenna b) Beamwidth and c) 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-7: Electrical and electronic instrumentation 2024-25**  
**Section -A**

**Answer all from the following questions**

**5\*7=35**

1. Explain how to convert the galvanometer into voltmeter by using shunt resistance?(BT-1)

**OR**

2. Explain how to convert galvanometer into shunt type ohmmeter?(BT-3)

3. Derive balancing condition for maxwells bridge?(BT-3)

**OR**

4. Derive the balancing condition for Schering bridge?(BT-2)

5. Explain the working of oscilloscope using block diagram?(BT-1)

**OR**

6. Explain measurement of frequency, time intervals and phase differences using oscilloscope?(BT-3)

7. Explain the working of multimeter with a neat block diagram?(BT-2)

**OR**

8. What is a digital voltmeter explain its working with the help of block diagram?(BT-1)

9. Explain the working of a LVDT with the help of block diagram?(BT-2)

**OR**

10. What is seven segment display and explain its working?(BT-2)

**Section-B**

**Answer any 5 from the following questions**

**5\*3=15**

11. Define accuracy and precision ?.(BT-1)

12. Write a short note on multimeter?(BT-1)

13. Derive the Balance in condition of wheatstone bridge? (BT-2)

14. Explain deflection sensitivity?(BT-1)

15. Write applications of oscilloscope?(BT-1)

16. Write the applications of spectrum analyser?(BT-3)

17. Write the applications of 7 segment display?(BT-2)

18. Explain about audio tape recorders briefly?(BT-2)

Government college(A), Rajahmundry  
II B.Sc -(electronics)- Semester-IV  
MICRO CONTROLLER SYSTEMS  
2024-25

**Model paper**

**SECTION-A**

**Answer Five Questions from the following**

**5x7=35M**

1. Write a short note on assembler, compiler and simulator/debugger in 8051.  
(or)
2. Explain Evolution of Microcontroller.
3. Draw and explain the architecture of 8051.  
(or)
4. Explain memory organization, register banks and stack in 8051.
5. Write about addressing modes and accessing memory using various addressing modes in 8051.  
(or)
6. Explain instruction set and their usage in 8051.
7. Explain addition, multiplication, subtraction, division each with an example.  
(or)
8. Write a program to arrange given set of numbers in largest order.
9. Draw and explain the interfacing of Seven segment displays  
(or)
10. Draw and explain the interfacing of DAC with 8051

**SECTION-B**

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

**5x3=15M**

11. Write a note on development tools
12. Explain in detail PSW register.
13. Explain about interrupts in 8051.
14. Explain the jump, loop and call instructions.
15. What is Counter Programming in 8051?
16. Write a program on Multiplication of two 8-bit numbers.
17. Write LCD advantages over LED.
18. Write a note on LM34?

Government college(A), Rajahmundry  
II B.Sc -(electronics)- Semester-IV  
**Microprocessor systems** 2024-25  
Model paper

**SECTION-A**

**Answer Five Questions from the following**

**5x7=35M**

1. Draw the block diagram of 8085 microprocessors and explain terms in it

**(Or)**

2. Explain the pin configuration of 8085 microprocessor

3. Explain data transfer and logical instruction set of 8085 with examples?

**(Or)**

4. Explain Arithmetic and Branch instruction set of 8085 with examples?

5. Write an ALP for to find the largest number in an array.

**(Or)**

6. Write an Assembly language program for Addition of Two 16 bits numbers

7. Draw and Explain the architecture of 8086 microprocessors in detail.

**(Or)**

8. Explain minimum mode and maximum mode of 8086 microprocessors.

9. Explain the Arm architecture with the help of neat diagram.

**(Or)**

1. Explain about ARM processor instruction set.

**SECTION-B**

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

**5x3=15M**

10. Write a short note on Register organization of 8085 microprocessors.

11. Discuss about arithmetic & logical set of instructions.

12. Write an ALP for subtraction of two 8 bit numbers.

13. Write a short note on addressing modes of 8086 microprocessors.

14. Write the differences between 8085 & 8086 microprocessors.

15. Discuss about serial and parallel communication.

16. Explain about ARM based MCUs.

17. Write a short note on ARM Processor.

**GOVERNMENT COLLEGE(A), RAJAHMUNDRY**  
**Department of Physics and Electronics**  
**VI Semester**  
**Embedded Systems**  
**Model Question Paper**

**Max Marks: 50M**

**SECTION - A**

**Answer the following questions**

**5X7 = 35M.**

1. a) Classification of Embedded system and explain?  
OR  
b) What is Embedded System. Explain its history?
2. a) Explain characteristics and quality attributes of embedded systems?  
OR  
b) Explain application specific embedded system?
3. a) Explain structure of embedded program?  
OR  
b) Explain Downloading of embedded program?
4. a) Explain different types of Memories in embedded systems?  
OR  
b) Explain Memory map and I/O Map in embedded system?
5. a) Explain embedded system development Environment?  
OR  
b) Write about types of File Generated on Cross Compilation?

**SECTION – B**

**Answer any FIVE of the following**

**5X3 = 15M.**

6. Write Five applications of embedded system?
7. Write about embedded Firmware.
8. Explain domain specific of embedded system?
9. Explain Infinite loop in embedded system?
10. Explain External Peripherals in embedded system?
11. Explain Trends in embedded Industry.
12. Draw the structure of Embedded program
13. Explain Flash memory in embedded system.

**Electronics**  
**SEMESTER-V**  
**A2 CONSUMER ELECTRONICS**

**Time: 3Hrs**

**Max Marks : 75M**

**PART-I**  
**SECTION-A**

**Answer any FOUR questions choosing at least one from each section**

**5X7=35M**

1. Draw the Block diagram of Microwave Oven. Explain the operation of each block.  
(or)
2. Draw the diagram of Microwave Oven LCD Timer with alarm. Explain its working principle.
3. How a washing Machine Works ? Explain the electronic controller for washing machine with diagram.  
(or)
4. Draw the program flowchart for a washing Machine control. Explain Fuzzy logic washing Machines.
5. Draw the Three arrangements of Basic Components of Heating, Cooling, Heating and Cooling systems of All- Water Air Conditioning Systems. Explain its operation.  
(or)
6. Draw the diagram of Basic Components of Room Air Conditioner. Explain Unitary and Central Air Conditioning System operation.
7. Draw the Block diagram of a Digital Clock and explain its working.  
(or)
8. What is meant by Electronic Funds Transfer? Draw the diagram of Electronic Funds Transfer system. Explain Automated Teller Machine (ATM).
9. Discuss about Digital Computer in detail?  
(OR)
10. Illustrate online line ticket Reservation?

**PART –II**

**Answer any FIVE of the following.**

**5X3=15M**

11. What are the Ranges used in microwaves (Microwave Oven).
12. Write the Wiring and Safety instructions of Microwave Ovens.
13. Explain the types of Washing Machines.
14. Write a short note on Split Air Conditioner.
15. Draw the Block diagram of Register structure of a calculator. Explain its operation.
16. Draw the Basic steps of Xerography. Explain Xerographic process.
17. Draw the basic Fax Machine operation .Explain its operations in detail.
18. Explain video on Demand.