GOVERNEMENT COLLEGE(A), RAJAHMUNDRY

DEPARTMENT OF PHYSICS

2025-26

I.B.Sc-(ELECTRONICS)-(H)

COURSE-I : FUNDAMENTALS OF ELECTRCITY AND ELECTRONICS

Question bank

UNIT – I: Electrostatics & Gauss Law

Q.No	Bloom's Taxonomy–Based Question	Marks	BT	CLO	PLO	PI
1	Explain and derive Gauss's law and **apply** it to **determine** the electric field due to a uniformly charged sphere.	7	BT2, BT3	CLO1	PLO1, PLO2	1.1.2, 1.3.2
2	**Define and explain** electric field intensity and electric potential. **Derive** an expression for the electric potential due to a charged sphere.	7	BT2, BT3	CLO1	PLO1, PLO2	1.1.2, 1.3.2
3	**Explain** the concept of an electric dipole and dipole moment and **derive** expressions for electric field and potential.	7	BT2, BT3	CLO1	PLO1, PLO2	1.1.2, 1.3.2
4	**State and explain** Coulomb's inverse square law of electrostatics.	3	BT2	CLO1	PLO1	1.1.2
5	**Define** an electric dipole and **state** the expression for dipole moment.	3	BT1	CLO1	PLO1	1.1.1
6	**Derive** the differential form of Gauss's law.	3	BT3	CLO1	PLO2	1.3.2

UNIT – II: Capacitors & Dielectrics

7	Derive an expression for the capacitance of a parallel plate capacitor with a dielectric medium.	7	BT3	CLO2	PLO1, PLO2	1.3.2
8	Explain and analyze capacitors connected in series and parallel and derive expressions for equivalent capacitance.	7	BT2, BT3	CLO2	PLO1, PLO2	1.1.2, 1.3.2
9	Describe and explain Kelvin's attracted disc electrometer and apply it to measure dielectric constant.	7	BT2, BT3	CLO2	PLO2, PLO3	2.2.1, 3.3.3
10	Define capacitance and **list** its applications.	3	BT1	CLO2	PLO1	1.1.1
11	Derive an expression for the energy stored in a charged capacitor.	3	BT3	CLO2	PLO2	1.3.2
12	List and classify different types of capacitors with one example each.	3	BT1	CLO2	PLO1	1.1.1

UNIT – III: Electrical Measurements & Magnetism

13	the Carey–Foster bridge to **determine** the specific Explain and apply resistance of a wire.	7	BT2, BT3	CLO3	PLO1, PLO2	1.1.2, 1.3.2
14	**Describe** the principle, construction and working of a ballistic galvanometer.	7	BT2	CLO3	PLO1	1.1.2
15	**State and derive** Biot–Savart's law and **apply** it to find the magnetic field due to a current-carrying conductor.	7	BT2, BT3	CLO3	PLO2	1.3.2
16	**Explain** the working principle of a potentiometer.	3	BT2	CLO3	PLO1	1.1.2
17	**State** Ampere's circuital law.	3	BT1	CLO3	PLO1	1.1.1
18	**Explain** the concept of calibration of an ammeter.	3	BT2	CLO3	PLO2	2.2.2

UNIT – IV: Diodes & Power Supplies

19	**Explain** the construction, working and characteristics of a p–n junction diode.	7	BT2	CLO4	PLO1	1.1.2
20	**Describe and analyze** a full-wave rectifier and **derive** expressions for efficiency and ripple factor.	7	BT3, BT4	CLO4	PLO2	1.3.2, 2.3.1
21	**Explain and apply** a Zener diode in the design of a regulated power supply.	7	BT2, BT3	CLO4	PLO2, PLO3	2.2.1, 3.3.4
22	**Define** rectification and ripple factor.	3	BT1	CLO4	PLO1	1.1.1
23	**Define and explain** a Zener diode and **state** one application.	3	BT2	CLO4	PLO2	2.2.2
24	**List and explain** the advantages of a bridge rectifier.	3	BT2	CLO4	PLO2	2.2.2

UNIT – V: Transistors & Logic Gates

25	**Explain and analyze** the input and output characteristics of a transistor in CE configuration.	7	BT2, BT4	CLO5	PLO1, PLO2	1.1.2, 2.2.1
26	**Explain and apply** the operation of a transistor as an amplifier and **describe** an RC-coupled amplifier.	7	BT3	CLO5	PLO2	1.3.2
27	**Explain and illustrate** AND, OR and NOT logic gates using truth tables.	7	BT2	CLO5	PLO4	4.1.3
28	**List and explain** the modes of operation of a transistor.	3	BT2	CLO5	PLO1	1.1.2
29	**Define** transistor h-parameters.	3	BT1	CLO5	PLO1	1.1.1
30	**Construct** the truth tables of AND and OR logic gates.	3	BT2	CLO5	PLO4	4.1.3

GOVERNEMENT COLLEGE(A), RAJAHMUNDRY

DEPARTMENT OF PHYSICS 2025-26

QUESTION BANK

I.B.Sc-(ELECTRONICS)-(H)

COURSE-II : Circuit Theory and Electronic Devices

QUESTION BANK

UNIT I Q. No		Marks	BT Level	CLO	PLO	PI
1	**Explain** the general form of a sinusoidal waveform. **Calculate** its average value and RMS value.	7	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.	7	BT2, BT4	CLO1	PLO1, PLO2	1.1.2, 2.2.1
3	**Define** amplitude, frequency and phase of a sinusoidal wave.	3	BT1	CLO1	PLO1	1.1.1
4	**Define and explain** the RMS value of a sine wave.	3	BT1, BT2	CLO1	PLO1	1.1.1, 1.1.2
5	**Explain** any three differences between AC and DC.	3	BT2	CLO2	PLO2	2.2.2

UNIT II

6	**Explain and apply** Thevenin's theorem	7	BT2, BT3	CLO2	PLO1, PLO2	1.1.2, 1.3.2
7	**Explain** the maximum power transfer theorem	7	BT2	CLO2	PLO1	1.1.2
8	**State** Norton's theorem.	3	BT1	CLO2	PLO1	1.1.1
9	**Explain** the Superposition theorem and mention its applications.	3	BT2	CLO2	PLO1	1.1.2

UNIT III

10	**Explain and analyze** the frequency response of RC low-pass and high-pass filters.	7	BT2, BT4	CLO3	PLO1, PLO2	1.1.2, 2.2.1
11	**Apply and analyze** the concept of resonance in RLC circuits and **derive** the resonant frequency.	7	BT3	CLO3	PLO2	1.3.2, 2.3.1
12	**Explain and apply** RC networks as differentiating and integrating circuits.	7	BT2	CLO3	PLO1	1.1.2, 1.3.2
13	**Define** the quality factor of a resonant circuit.	3	BT1	CLO3	PLO1	1.1.1
14	**Explain** the condition for resonance in RLC circuits.	3	BT2	CLO3	PLO1	1.1.2
15	**Define** low-pass and high-pass filters.	3	BT1	CLO3	PLO1	1.1.1

UNIT IV

16	**Explain and apply** the operation of a BJT in CE configuration with characteristics.	7	BT2, BT3	CLO4	PLO1	1.1.2, 1.2.2
17	**Explain** the construction and characteristics of a JFET.	7	BT2	CLO4	PLO1	1.1.2
18	**Apply and analyze** the working of a UJT and explain its operation as a relaxation oscillator.	7	BT3, BT4	CLO4	PLO2, PLO3	2.2.1, 3.3.4
19	**Explain** any three advantages of FET over BJT.	3	BT2	CLO4	PLO2	2.2.2
20	**Define** the hybrid parameters of a transistor.	3	BT1	CLO4	PLO1	1.1.1
21	**Analyze and compare** BJT and FET.	3	BT4	CLO4	PLO2	2.2.2

UNIT V

22	**Apply and analyze** half-wave and full-wave rectifiers and **derive** efficiency and ripple factor expressions.	7	BT3, BT4	CLO5	PLO2	1.3.2, 2.3.1
23	**Explain** the working of L-section and π-section filters used in rectifier circuits.	7	BT2	CLO5	PLO1	1.1.2
24	**Explain and apply** the working of 78XX and 79XX voltage regulator ICs.	7	BT2, BT3	CLO5	PLO4	4.1.3
25	**Define** ripple factor.	3	BT1	CLO5	PLO1	1.1.1
26	**Explain** the working principle of a photo-diode.	3	BT2	CLO5	PLO1	1.1.2
27	**Explain** the working of an LDR and **list** its applications.	3	BT2	CLO5	PLO1	1.2.2

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

UNIT I

Q.No	Question	Type	BT	CLO	PLO	PI
1	Explain energy band formation in solids and differentiate between conductors, semiconductors and insulators.	Essay	2	1	1	1.1.1
2	Explain carrier transport in semiconductors including drift and diffusion mechanisms.	Essay	2	1	1	1.1.2
3	Discuss excess carriers, carrier injection and recombination mechanisms in semiconductors.	Essay	3	1	2	2.1.1
4	Define mobility and drift velocity.	SAQ	1	1	1	1.1.1
5	What is avalanche breakdown?	SAQ	2	1	1	1.2.1
6	Define hot carriers and velocity saturation.	SAQ	1	1	1	1.1.1

UNIT II

1	Explain MS contacts and distinguish between rectifying and non-rectifying contacts.	Essay	2	2	1	1.2.1
2	Explain the structure and working of MIS with suitable diagrams.	Essay	2	2	2	2.1.2
3	Discuss heterojunction and HEMT devices with band diagrams and characteristics.	Essay	3	2	2	2.2.1
4	Define MIS structure.	SAQ	1	2	1	1.1.1
5	Write the applications of HEMT devices.	SAQ	2	2	2	2.1.2
6	What are I-V characteristics of MS diode?	SAQ	2	2	1	1.2.1

UNIT III

1	Explain the ideal MOS capacitor with band diagrams and C-V characteristics.	Essay	2	3	1	1.2.1
2	Discuss non-ideal MOS capacitors and explain the effects of oxide charges and interface states.	Essay	3	3	2	2.1.1
3	Explain MOSFET structure, operation and short-channel effects.	Essay	3	3	2	2.2.1
4	Define semiconductor surface states.	SAQ	1	3	1	1.1.1
5	What is threshold voltage in MOSFET?	SAQ	2	3	2	2.1.2
6	List applications of CCDs in VLSI.	SAQ	1	3	3	3.1.1

UNIT IV

1	Explain the working principle of solar cells with characteristics.	Essay	2	4	1	1.2.1
2	Discuss the construction and operation of LEDs and Laser diodes.	Essay	2	4	2	2.1.1
3	Explain nanostructures such as quantum wells, quantum dots and carbon nanotubes.	Essay	3	4	2	2.2.1
4	Define quantum well.	SAQ	1	4	1	1.1.1
5	What are 2D materials? Give examples.	SAQ	1	4	1	1.1.1
6	Write applications of photo detectors.	SAQ	2	4	2	2.1.2

UNIT V

1	Explain BJT operation at high frequencies.	Essay	2	5	1	1.2.1
2	Discuss frequency response of RC-coupled amplifiers.	Essay	3	5	2	2.1.1
3	Explain transformer-coupled amplifiers with advantages and disadvantages.	Essay	2	5	2	2.1.2
4	Define multistage amplifier.	SAQ	1	5	1	1.1.1
5	What is bandwidth of an amplifier?	SAQ	2	5	1	1.2.1
6	State advantages of RC-coupled amplifiers.	SAQ	1	3	2	2.1.2

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

Unit	Type	Question Description	BT	CLO	PLO	PI
I	Essay	Explain conversion between Decimal, Binary, Octal, and Hex with examples.	2	1	1	1.1.1
	Essay	Perform subtraction using 2's and 10's complement methods; discuss carry/borrow with examples.	3	1	2	2.1.2
	Essay	Compare BCD, Gray, and Excess-3 codes	4	1	1	1.3.1
	Short	Convert $(1011.011)_{(2)}$ to Decimal.	3	1	1	1.1.1
	Short	Define "Self-Complementing Code" with an example.	1	1	1	1.1.1
	Short	Find the 9's complement of $(456)_{(10)}$	3	1	1	1.1.1
II	Essay	State and prove De-Morgan's Laws	4	2	2	2.2.1
	Essay	Minimize a 3-variable logic function using K-Map	6	2	3	3.1.1
	Essay	Discuss SOP and POS representations with conversion examples.	2	2	1	1.4.1
	Short	State the Duality Theorem in Boolean Algebra.	1	2	1	1.1.1
	Short	Why are NAND and NOR gates called "Universal Gates"?	2	2	1	1.4.1
	Short	Simplify the expression: $Y = A + \bar{A}B$	3	2	2	2.1.1
III	Essay	Construct Full Adder using two Half Adders and verify truth tables	6	3	3	3.2.2
	Essay	Explain 4: 1 Multiplexer with diagram	3	3	2	2.2.3
	Essay	Explain the construction and working of NAND gate using TTL logic with neat diagram.	4	3	1	1.3.1
	Short	Write a note on Demultiplexers.	2	3	1	1.4.1
	Short	Explain 8-line-to-3-line Encoder.	1	3	1	1.1.1
	Short	Write the functional difference between a	2	3	1	1.4.1

Unit	Type	Question Description	BT	CLO	PLO	PI
		MUX and a De-MUX.				
IV	Essay	What is flip flop? Draw the circuit of J-K flip flop and discuss its working with the help of truth table.	4	4	2	2.1.3
	Essay	What are Shift registers? Explain the construction and working of Serial-In-Serial-Out shift register.	6	4	3	3.3.1
	Essay	What is a counter? Design and explain Mod-10 counter	2	4	1	1.4.1
	Short	Explain D flip flop with truth table.	1	4	1	1.1.1
	Short	Explain T flip flop with truth table.	2	4	1	1.4.1
	Short	Explain the working of PIPO shift register.	4	4	2	2.2.1
V	Essay	Explain the general memory operations in a digital system.	2	5	1	1.3.1
	Essay	Explain the architecture and working of RAM.	4	5	2	2.4.1
	Essay	Describe different types of ROM.	2	5	1	1.4.1
	Short	Define ROM and RAM.	1	5	1	1.1.1
	Short	What is EPROM?	1	5	1	1.1.1
	Short	What is the difference between SRAM and DRAM?	2	5	1	1.4.1

GOVERNMENT COLLEGE (A), RAJAHMUNDRY-2025-26
II B.Sc-ELECTRONICS (H) - SEMESTER-III(w.e.f-2024)
COURSE-5- SEMICONDUCTOR MATERIALS AND DEVICES

Credits: 1 Practical 2 hrs/week

List of Experiments

1. To study the Hall Effect: determine the Hall coefficient, type of semiconductor andcarrier concentration in the given semiconductor sample.
2. To study the four probe method: calculate the resistivity and energy band gap of givensemiconductor sample.
3. To determine the resistivity of the given semiconductor specimen using Vander Pauwmethod.
4. To design a MOSFET as switching regulator for given duty cycle and plot the current-voltage (I-V) characteristic of MOSFET using Keithley.
5. To design a phase controlled rectifier using SCR and plot the I-V characteristic of SCRusing Keithley.
6. To design a relaxation oscillator using UJT and plot the I-V characteristic of UJT usingKeithley.
7. I-V characteristics measurement of a p-n diode/LEDs using Keithley - calculate itsideality factor.

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

Essays Questions

1. Explain briefly about energy bands in a semiconductor with a neat diagram. (BL2)
2. Describe briefly about the injection and recombination of the excess careers?.(BL2)
3. What are high speed effects in semiconducting materials? (BL2)
4. Write about the metal semiconductor contact rectifiers and non-rectifiers in semiconductors?
5. Explain about MESFET structure and works ng?(BL3)
6. Explain about Metal Insulator Semiconductor (MIS) structures?(BL2)
7. Explain about the ideal MOS capacitors with diagrams? (BL2)
8. Explain about MOSFET construction, classification and working?(BL2)
9. How semiconductors material workers as charge coupled devices (CCD)?(BL3).
10. Describe about the working, construction and applications of laser diode? (BL2)
11. Write a note on Quantum dots? (BL1)
12. Explain how carbon Nano tubes(CNT) are works and construct? (BL3)
13. Derive an expression for the frequency response of the RC coupled amplifiers.(BL2)
14. Write a note on carbon nanotube?.(BL1)

SAQs

1. 15.The intrinsic carrier density is 1.5 × 1016 m–3. If the mobility of electron and hole are 0.13 and 0.05 m2 V-1 s-1, calculate the conductivity.(BL3)
2. 16. Explain avalanche breakdown in a semiconductor? (BL1)
3. 17. Draw IV characteristics of MIS structures?(BL2)
4. Draw C-V characteristics of MIS structures?(BL2)
5. Write about short channel affects in MIS structure?,(BL2)
6. Write the applications of MOSFET in VLSI?(BL3)
7. Semiconductor diode laser has a peak emission wavelength of 1.55 μm. Find its band gap in eV.(BL3)
8. Write a short note on solar cell?(BL1)
9. Explain how photo diode works as photo detector?(BL3)
10. explain about the working of LED with a neat diagram?(BL2)
11. Explain about the working of BJT in high frequencies? (BL2)
12. Describe briefly about nano rods (BL4)

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

UNIT-I

ESSAY QUESTIONS:

1. Explain in detail about BCD Code?
2. Explain the conversion of Decimal to Binary and binary to decimal with an example.
3. Explain 1's & 2's Complement of a number in binary system with example. Explain 2's complement method of subtraction by suitable example

SHORT ANSWER QUESTIONS:

4. Explain Excess-3 code with an example.
5. Subtract 11001 from 10101 using 2's complement method
6. Explain the process of converting BCD to Excess-3 code

UNIT-II

ESSAY QUESTIONS:

7. State and prove De-Morgan's laws
8. Explain in detail about 3 variable karnaugh map method to simplify logic Expression.

***SHORT ANSWER QUESTIONS*:**

9. Prove the Boolean identity (AB +C) (AB +D) = AB + CD
10. Explain how AND, OR and NOT gates are realized from NAND & NOR gates.
11. Explain SOP?

UNIT-III

ESSAY QUESTIONS:

12. Explain the operation of a full adder circuit with its truth table.
13. Explain the working of TTL NAND Gate circuit with its truth table.
14. Design 4: 1 Multiplexer & explain it with diagram.

SHORT ANSWER QUESTIONS*:*

15. Write down differences between CMOS and TTL logic families.
16. Explain the working of Demultiplexer (1:4) with its truth table.
17. Explain Encoder.

UNIT-IV

ESSAY QUESTIONS:

18.Describe the working of Master slave JK flip-flop with its truth table.

19. Draw the circuit diagram of decade counter and explain it's operation. Draw its timing diagram.

20. Define counter? Explain Differences between Asynchronous and Synchronous counter.

SHORT ANSWER QUESTIONS:

21. Explain the operation of RS flip – flop with truth table

22. Design and explain Mod-8 counter

23. Explain Synchronous 4-bit counter

UNIT-V

ESSAY QUESTIONS:

24. Explain the operation of ROM

25. Explain the operation of Dynamic RAM

SHORT ANSWER QUESTIONS:

26. Distinguish between RAM and ROM

27. Write a note on PROM

28. Write a note on EPROM

GOVERNMENT COLLEGE (A), RAJAHMUNDRY-2025-26
II B.Sc-ELECTRONICS (H) - SEMESTER-III
COURSE-7- ANALOG ELECTRONICS

QUESTION BANK

UNIT-I:

Essay Questions:

1. Explain the construction and working of a two-stage RC Coupled Transistor Amplifier. Derive the expression for its gain and discuss its frequency response curve.
2. Describe the operation of a Class B Push-Pull amplifier. Calculate its maximum efficiency and discuss how cross-over distortion occurs and how it can be eliminated.
3. Discuss the classification of amplifiers based on their operating points (Class A, B, AB, and C). Provide a detailed analysis of a Transformer Coupled Class A power amplifier.

Short Answer Questions (SAQs):

1. Define the terms 'Gain' and 'Bandwidth' of an amplifier. How are they related?
2. What is an Emitter Follower? List its main characteristics and applications.
3. Draw the equivalent circuit of an RC coupled amplifier at high frequencies and explain the factors affecting its gain in this region.

UNIT-II:

Essay Questions:

1. Define the basic concept of feedback. Derive the general expression for the transfer gain of an amplifier with feedback and show that negative feedback increases stability.
2. Analyze the effect of negative feedback on the following parameters: (i) Gain Stability, (ii) Distortion, and (iii) Bandwidth.
3. Classify the different types of feedback topologies (Voltage Series, Voltage Shunt, Current Series, Current Shunt). Explain how each type affects the input and output resistance of the amplifier.

Short Answer Questions (SAQs):

1. State the advantages of negative feedback over positive feedback in amplifiers.
2. What is 'Feedback Fraction' (beta)? If an amplifier has an open-loop gain of 100 and negative feedback with $\beta = 0.1$, calculate the gain with feedback.
3. Briefly explain how negative feedback reduces noise in an amplifier circuit.

UNIT-III:

Essay Questions:

1. Define an Operational Amplifier (Op-amp) and explain its ideal characteristics. Draw the internal block diagram of a typical Op-amp.

2. Define and explain the significance of the following Op-amp parameters: (i) CMRR, (ii) Slew Rate, (iii) Input Offset Voltage, and (iv) Input Bias Current.
3. Explain the transfer characteristics of an Op-amp. Discuss why a high Differential Gain is essential for Op-amp operations.

Short Answer Questions (SAQs):

1. Define CMRR. Why is a high CMRR desirable in differential amplifiers?
2. What is the 'Virtual Ground' concept in Op-amps? Explain its significance.
3. Explain why the bandwidth of an Op-amp decreases as the closed-loop gain increases.

UNIT-IV:

Essay Questions:

1. Derive the expression for the output voltage of an Op-amp used as: (i) An Integrator, and (ii) A Differentiator. Draw their respective circuit diagrams.
2. Explain the working of a Square wave generator and a Triangular wave generator using Op-amps with neat circuit diagrams and waveforms.
3. What are Active Filters? Discuss the design and working of a first-order Low Pass and High Pass Butterworth active filter.

Short Answer Questions (SAQs):

1. Draw the circuit of a Summing Amplifier (Adder) for three inputs and provide the output equation.
2. Explain the operation of a Sample and Hold circuit using an Op-amp.
3. Differentiate between a Comparator and a Schmitt Trigger.

UNIT-V

Essay Questions:

1. State the Barkhausen Criterion for sustained oscillations. Explain the working of a Wien Bridge Oscillator and derive the expression for its frequency of oscillation.
2. Describe the operation of Hartley and Colpitts oscillators. Derive the frequency of oscillation for both and compare their performance.
3. Explain the working of Astable, Monostable, and Bistable multivibrators. Discuss the role of a Schmitt trigger in wave-shaping circuits.

Short Answer Questions (SAQs):

1. What is a Piezoelectric effect? Why are Crystal Oscillators considered highly stable?
2. Explain the working principle of a UJT Relaxation Oscillator.
3. What is the requirement of "Positive Feedback" in an oscillator compared to "Negative Feedback" in an amplifier?

GOVERNMENT COLLEGE (A), RAJAHMUNDRY-2025-26
II B.Sc-ELECTRONICS (H) - SEMESTER-III
COURSE-8- ELECTRONIC COMMUNICATION SYSTEM
QUESTION BANK

Unit-I:
Essay Questions:

1. Describe the characteristics and applications of different types of antennas (dipole, folded dipole, Yagi-Uda, helical, discone, parabolic dish).
2. Explain the concepts of directive gain, beam width, and polarization in antennas.
3. Discuss the propagation mechanisms of ground waves, sky waves, and space waves.
4. Describe the working principle of an Array antenna.
5. Describe the working principle of a Yagi-Uda antenna.

Short Questions:

1. Define antenna gain and directivity.
2. What is the difference between beam width and bandwidth?
3. Explain polarization in antennas.
4. What is skip distance in radio propagation?

Unit-II:
Essay Questions:

1. Explain the need for modulation and its types.
2. Describe the generation and detection circuits for Amplitude Modulation.
3. Compare and contrast DSB/SC, SSB, and VSB modulation techniques.
4. Discuss the block diagram and working principle of an AM radio transmitter and superheterodyne receiver.

Short Questions:

1. Define modulation index and its significance.
2. What is the difference between balanced and unbalanced modulation?
3. Explain the working principle of a balanced modulator.
4. Describe the advantages of SSB modulation.
5. What is the purpose of the mixer stage in a superheterodyne receiver?

Unit-III:
Essay Questions:

1. Derive the expression for the modulated wave in Frequency Modulation.
2. Describe the generation of FM using varactor diodes and reactance tubes.
3. Explain the working principle of FM detectors (balanced slope, Foster Seeley, ratio).
4. Discuss the block diagram and working principle of an FM transmitter and receiver.

Short Questions:

1. Define frequency deviation and its significance.
2. What is the difference between narrowband and wideband FM?

3. Explain the working principle of a varactor diode modulator.
4. Describe the advantages of FM over AM.
5. What is the purpose of the limiter stage in an FM receiver?

Unit-IV:
Essay Questions:

1. Explain the sampling theorem and its significance in Pulse Modulation.
2. Describe the principles of PAM, PWM, and PCM.
3. Discuss quantizing, sampling, coding, and decoding in PCM.
4. Compare and contrast delta modulation and adaptive delta modulation.

Short Questions:

1. Define sampling rate and its significance.
2. What is the difference between PAM and PWM?
3. Explain quantization error in PCM.
4. Describe the working principle of a delta modulator.
5. What is the purpose of coding in PCM?

Unit-V:
Essay Questions:

1. Explain the principles of FDM, TDM, and CDMA.
2. Describe the advantages of digital communication over analog.
3. Discuss the basics of microwave, fiber optic, and satellite communications.
4. Explain the working principle of RADAR and its range equation.

Short Questions:

1. Define multiplexing and its types.
2. What is the difference between ASK, FSK, and PSK?
3. Explain the concept of bandwidth in communication systems.
4. Describe the working principle of a satellite transponder.
5. What is the purpose of the mixer stage in a microwave receiver?

GOVERNMENT COLLEGE (A) RAJAHMUNDRY

II-B.Sc. Electronics - SEMESTER-IV

COURSE 9: ELECTRICAL AND ELECTRONIC INSTRUMENTATION

QUESTION BANK

UNIT I: DC AND AC INDICATING INSTRUMENTS

Essay Questions

1. Explain the construction and working of a PMMC galvanometer. Discuss its sensitivity and loading effect in measurements. (BL3)
2. Describe the principle, construction, and working of an Electrodynamometer instrument. Compare it with a Thermocouple instrument. (BL4)
3. Explain how a galvanometer can be converted into an ammeter, voltmeter, and shunt-type ohmmeter. (BL3)
4. Describe the working principle, construction, and applications of a Watt-hour meter. (BL2)

Short Answer Questions

1. Define accuracy and precision in electrical measurements. (BL1)
2. List and explain the different types of errors in measurements. (BL2)
3. Explain the operation of an electrostatic voltmeter. (BL2)
4. What is meant by loading effect in measuring instruments? (BL1)
5. What is the principle of thermocouple instruments? (BL1)

UNIT II: DC AND AC BRIDGES

Essay Questions

1. Draw the circuit diagram of Wheatstone bridge and derive the condition for balance. (BL3)
2. Explain the construction and working of Kelvin's bridge and derive the expression for unknown resistance. Why is it used? (BL4)
3. Explain the balancing condition of Maxwell's bridge and its applications. (BL3)
4. Describe the working principle of Schering bridge and its use in measurement of capacitance. (BL2)
5. Explain how Wein's bridge can be used for frequency determination. (BL3)

Short Answer Questions

1. State the balancing condition for an AC bridge. (BL1)
2. What is the principle of Wheatstone bridge? (BL1)
3. What are the advantages of Kelvin's bridge? (BL2)
4. Write a short note on Schering bridge. (BL2)
5. What are AC bridges used for? (BL1)

UNIT III: OSCILLOSCOPES

Essay Questions

1. Draw the block diagram of a CRO and explain the function of each block. (BL3)
2. Explain electrostatic deflection and electrostatic focusing in a CRT. (BL2)
3. Describe how a CRO can be used to measure frequency, phase difference, and time intervals. (BL3)
4. Differentiate between Analog Storage Oscilloscope and Digital Storage Oscilloscope. (BL4)

Short Answer Questions

1. Define deflection sensitivity of a CRO and give its formula. (BL1)
2. What is the function of the CRT screen? (BL1)
3. ---Write a short note on sampling oscilloscope. (BL2)
4. What are the advantages of digital oscilloscopes? (BL2)
5. What is the purpose of time-base circuit in CRO? (BL1)

UNIT IV: INSTRUMENTATION AMPLIFIERS AND SIGNAL ANALYSERS

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Essay Questions

1. Explain the necessity of an instrumentation amplifier. Derive the expression for its output voltage. (BL4)
2. Describe the construction and working of an electronic voltmeter. (BL2)
3. -Explain the working principle of a Digital Voltmeter (DVM). (BL3)
4. Describe the working of a function generator and its applications. (BL2)
5. Explain the fundamentals of a spectrum analyser and compare it with a wave analyser. (BL4)

Short Answer Questions

1. Define instrumentation amplifier. (BL1)
2. Write the advantages of electronic voltmeters. (BL1)
3. What is a wave analyser? (BL1)
4. List the applications of spectrum analysers. (BL2)
5. What is the difference between analog and digital voltmeters? (BL2)

--UNIT V: TRANSDUCERS AND DISPLAY DEVICES

Essay Questions

1. Explain the construction, working, and applications of LVDT. (BL3)
2. Describe the principle and working of strain gauges (bounded and unbounded). (BL3)
3. Explain the operation of a pen recorder for data acquisition. (BL2)
4. Discuss the working of resistance thermometer and photoelectric transducer. (BL2)

Short Answer Questions

1. Define transducer with examples. (BL1)
2. What is the principle of photoelectric transducer? (BL1)
3. Write the advantages of LVDT. (BL2)
4. What is a pen recorder? (BL1)
5. Write a short note on audio tape recorder as a recording device. (BL2).

GOVERNMENT COLLEGE (A) RAJAHMUNDRY
B.Sc. Electronics -SEMESTER-IV
COURSE 10: MICRO CONTROLERS
_ QUESTION BANK

UNIT I: INTRODUCTION TO MICROCONTROLLERS

Essay Questions

1. Differentiate between microprocessors and microcontrollers. Discuss the evolution of microcontrollers from 4-bit to 32-bit. (BL4)
2. Explain the architecture and general features of microcontrollers. (BL2)
3. Describe the development tools used in microcontroller system design such as assembler, compiler, and simulator/debugger. (BL3)

Short Answer Questions

1. Define microcontroller. (BL1)
2. What are embedded systems? (BL1)
3. List the advantages of microcontrollers over microprocessors. (BL2)
4. What is a simulator/debugger? (BL1)
5. What is the role of an assembler? (BL1)

UNIT II: 8051 MICROCONTROLLER ARCHITECTURE

Essay Questions

1. Draw and explain the architecture of the 8051 microcontroller. (BL3)
2. Explain the Program Counter, memory organization, and stack operation in 8051. (BL3)
3. Describe the PSW register and register banks of the 8051. (BL2)
4. Explain the port organization and pin diagram of the 8051. (BL3)

Short Answer Questions

1. Write a short note on the pin diagram of the 8051. (BL1)
2. What is the function of PSW register? (BL1)
3. Explain the role of program counter. (BL2)
4. What is stack operation in 8051? (BL1)
5. What are timers and interrupts in 8051? (BL2)

UNIT III: INSTRUCTION SET AND PROGRAMMING FUNDAMENTALS

Essay Questions

1. Explain the addressing modes of the 8051 with examples. (BL3)
2. Describe the instruction set of 8051 including arithmetic, logical, jump, loop, and call instructions. (BL3)
3. Explain time delay generation and timer programming in the 8051. (BL4)

Short Answer Questions

1. What are logical instructions in 8051? (BL1)
2. Write a short note on simple bit instructions. (BL2)
3. What is the purpose of jump instructions? (BL1)
4. What is timer/counter programming? (BL2)
5. Define addressing mode. (BL1)

UNIT IV: ASSEMBLY LANGUAGE PROGRAMMING

Essay Questions

1. Write an assembly language program to perform addition of two numbers. (BL3)
2. Write an assembly language program for multiplication of two 8-bit numbers. (BL3)
3. Write an assembly program to arrange numbers in ascending or descending order. (BL4)

Short Answer Questions

1. Write the logic for division of two numbers in 8051 assembly language. (BL3)
2. What are the steps in writing assembly programs? (BL2)
3. Define assembly language programming. (BL1)
4. What is the importance of comments in ALP? (BL1)
5. Write a short note on program debugging. (BL2)

UNIT V: INTERFACING AND APPLICATIONS

Essay Questions

1. Explain the interfacing of seven segment display with 8051. (BL3)
2. Describe the interfacing of DAC (0804) with 8051. (BL3)
3. Explain the working and interfacing of stepper motor (uni-polar) with 8051. (BL4)
4. Describe the temperature measurement using LM35 with 8051. (BL3)

Short Answer Questions

1. Explain the use of PPI 8255 for parallel interfacing. (BL2)
2. What is DAC? (BL1)
3. What is a seven segment display? (BL1)
4. What are applications of stepper motors? (BL2)
5. Write a short note on LCD interfacing. (BL2)

II-B.Sc. Electronics - SEMESTER-IV

COURSE 11: MICROPROCESSOR PRACTICALS

CREDITS:2 Hrs 3/WEEK

Student has to record a minimum of SIX Experiments Programs using Intel 8085 /8086

1. Addition and Subtraction (8 bit and 16-bit)
2. Multiplication and Divition (8-bit)
3. Largest number in an array.
4. Smallest number in an array.
5. BCD to ASCII and ASCII to BCD .
6. Program To Convert Two Bcd Numbers In To Hex
7. Program To Convert Hex Number In To Bcd Number.
8. Program To Find The Square Root Of A Given Number.

Interfacing Experiments Using 8086 Microprocessor (Demo):

1. Traffic Light Controllers
2. Elevator,
3. 7-Segment Display

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COURSE 11: MICROPROCESSOR
QUESTION BANK

UNIT I: CPU ARCHITECTURE

Essay Questions

1. Draw and explain the architecture of the Intel 8085 microprocessor. (BL3)
2. Describe the ALU, register organization, and system buses in 8085. (BL3)
3. Explain the architecture, pin description, and addressing modes of the 8085 microprocessor. (BL4)

Short Answer Questions

1. Explain the register organization of 8085. (BL2)
2. What are address, data, and control buses? (BL1)
3. What are addressing modes? (BL1)
4. What is the function of ALU? (BL1)

UNIT II: 8085 INSTRUCTION SET

Essay Questions

1. Classify the 8085 instruction set and explain each category. (BL3)
2. Explain arithmetic and logical instructions with examples. (BL3)
3. Describe data transfer, branch, and machine control instructions. (BL2)

Short Answer Questions

1. What are branch instructions? (BL1)
2. Write the advantages of instruction classification. (BL2)
3. What are logical instructions? (BL1)
4. What are data transfer instructions? (BL1)

UNIT III: 8085 ASSEMBLY LANGUAGE PROGRAMMING

Essay Questions

1. Write an ALP for addition and subtraction of two numbers using 8085. (BL3)
2. Write an ALP for multiplication and division of numbers. (BL3)
3. Write an ALP for BCD to ASCII conversion. (BL4)

Short Answer Questions

1. Write the logic for BCD to ASCII conversion. (BL3)
2. What are assembly language instructions? (BL1)
3. What is ASCII code? (BL1)
4. What is BCD representation? (BL1)

UNIT IV: 8086 CONFIGURATIONS AND I/O INTERFACES

Essay Questions

1. Explain the minimum mode and maximum mode configurations of 8086. (BL3)
2. Describe the function and interfacing of programmable timers (8254). (BL3)
3. Explain the working of DMA controller in a microcomputer system. (BL4)
4. Describe serial and parallel communication interfaces in 8086. (BL2)

Short Answer Questions

1. What is interrupt priority management? (BL2)
2. Define DMA. (BL1)
3. What are programmable timers used for? (BL1)
4. What is serial communication? (BL1)
5. What is parallel communication? (BL1)

UNIT V: ARM PROCESSOR

Essay Questions

1. Explain the ARM architecture and organization. (BL3)
2. Describe the ARM programming model. (BL2)
3. Explain the ARM instruction set and its characteristics. (BL3)
4. Discuss why ARM processors are considered RISC processors. (BL4)

Short Answer Questions

1. List the advantages of ARM processors. (BL2)
2. What are ARM-based microcontroller units? (BL1)
3. What is the ARM register model? (BL2)
4. What are applications of ARM processors? (BL1)

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

UNIT-I:

Essay Questions

1. Explain the architecture and features of Advanced Mobile Phone Service (AMPS).
2. Describe the Global System for Mobile Communication (GSM) with its system components.
3. Discuss the evolution and features of third-generation (3G) wireless systems.

Short Answer Questions (3 Marks)

1. What is cordless telephony?
2. Mention two features of a digital cellular system.
3. Define 3G and list its two advantages.

UNIT-II:

Essay Questions (7 Marks)

1. Explain the concept of handoff and describe handoff detection techniques.
2. Describe the structure of a 7-cell cluster and how channel assignment is managed.
3. Write a detailed note on ACI and CCI interference with examples.

Short Answer Questions (3 Marks)

1. What is roaming management?
2. Define intersystem handoff.
3. Mention any two cellular digital packet data features.

UNIT-III:

Essay Questions (7 Marks)

1. Explain GSM network architecture and signaling methods.
2. Describe mobility management and its importance in GSM.
3. Discuss the working of the Short Message Service (SMS) in GSM.

Short Answer Questions (3 Marks)

1. Define international roaming.
2. What is network signaling?
3. Write two functions of the mobility management entity.

UNIT-IV:

Essay Questions (7 Marks)

1. Describe the architecture and components of the Wireless Application Protocol (WAP).
2. Explain wireless markup language (WML) with examples.
3. Discuss various layers of the WAP protocol stack and their functions.

Short Answer Questions (3 Marks)

1. What is a transaction protocol?
2. Write two uses of wireless markup language.
3. Define datagram with an example.

UNIT-V:

Essay Questions (7 Marks)

1. Explain the working of Wireless Local Loop (WLL) and its applications.
2. Discuss Bluetooth technology, its architecture, and different layers.
3. Write an essay on third-generation mobile services and their benefits.

Short Answer Questions (3 Marks)

1. List two services provided by Bluetooth.
2. What is WLL? Give one example.
3. Mention two features of 3G services.

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

Time:2.30Hrs **Question Bank** **Max marks:50**

Unit 1:

Essays

1. Describe the functions of each layer of the OSI model and compare it with the TCP/IP model.
2. Explain the different types of network topologies, including bus, star, ring, and mesh, highlighting their advantages and disadvantages.
3. Discuss the characteristics of different transmission media, such as twisted pair, coaxial, and fiber optic cables, in the context of network performance.

Shorts

1. What is the importance of networks in modern science?
2. Briefly describe the role of the physical layer in the OSI model.
3. Name two advantages of a star topology.

Unit 2:

Essays

1. Explain the concepts of IPv4 and IPv6 addressing, detailing their differences in structure and features.
2. Describe the functions of common network devices like switches, routers, and hubs, and explain their roles in a network.
3. Explain the processes of ARP (Address Resolution Protocol) and MAC addressing, and how they work together in a local network.

Shorts

1. What is the primary function of a modem?
2. How is a router different from a switch?
3. Define **s**ub netting and state its primary use.

Unit 3:

Essays

1. Compare and contrast TCP and UDP in terms of reliability, speed, and applications.
2. Explain the process of data encapsulation as a packet moves down the protocol stack from the application layer to the physical layer.
3. Describe the working of two key application layer protocols: HTTP and FTP.

Shorts

1. Which protocol is connection-oriented, TCP or UDP?
2. What is the main difference between SMTP and POP3/IMAP?
3. What is the main difference between IEEE 802.3 and IEEE 802.11?

Unit 4:

Essays

1. Discuss the key steps involved in setting up a wired LAN and a Wi-Fi network.
2. Describe how network administrators use diagnostic tools such as ping, trace route, and netstat to monitor and troubleshoot network issues.
3. Explain the fundamental principles of cloud networking and its benefits in modern network management.

Shorts

1. What is the function of Wire shark?
2. How is a VPN different from a proxy server?
3. Briefly explain the role of an antivirus in network security.

Unit 5:

Essays

1. What is the Internet of Things (IoT)? Explain its architecture and provide examples of its use in scientific research.
2. Explain the basic concepts of SDN (Software-Defined Networking) and how it differs from traditional networking architectures.
3. Describe the fundamental concepts of Quantum Networking and its potential future applications for scientific communication.

Shorts

1. Give an example of a high-speed research network.
2. What is the key idea behind SDN?
3. Name two components of an IoT system.

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

Unit I:

- **Essays:**

1. Explain the working of a Full Wave Bridge Rectifier. Derive expressions for its efficiency and ripple factor.
2. Discuss the operation of L-section and π-section filters. Why is a π-filter considered superior?
3. Describe the working of Transistor Series and Shunt voltage regulators with neat circuit diagrams.

- **Shorts:**

1. Compare Half Wave and Full Wave rectifiers.
2. What is the significance of the Ripple Factor?
3. Explain the naming convention of 78XX and 79XX three-terminal regulators.

Unit II: Power Supplies

- **Essays:**

1. Draw the block diagram of a Regulated Power Supply and explain the function of each block.
2. Explain the principle and working of a Switch Mode Power Supply (SMPS). List its advantages over linear power supplies.

- **Shorts:**

1. What is the role of a "Bleeder Resistor" in a power supply?
2. Define Load Regulation and Line Regulation.

Unit III: Voltage Multipliers

- **Essays:**

1. Explain the circuit diagram and working of a Half-wave and Full-wave voltage doubler
2. Describe the working of a Voltage Tripler circuit. Mention three practical applications of voltage multipliers.

- **Shorts:**

1. What is the PIV (Peak Inverse Voltage) requirement for diodes in a voltage doubler?
2. In what scenarios are voltage multipliers preferred over transformers?

Unit IV: Controlled Rectifiers

- **Essays:**

1. Explain the working of an SCR Half-wave rectifier with resistive load and draw its input/output waveforms.
2. Provide a mathematical analysis for the average and RMS output voltage of an SCR Full-wave rectifier.
3. Describe the operation of SCR as a Series Inverter.

- **Shorts:**

1. What is the "Firing Angle" in an SCR circuit?
2. Distinguish between a controlled and uncontrolled rectifier.

Unit V: Heat Effects

- **Essays:**

1. Explain the principle of Induction Heating. Discuss its applications in industrial processes.
2. What is Dielectric Heating? Explain its principle of operation and its use in the plastic and food industries.

- **Shorts:**

1. Compare Resistance heating and Induction heating.
2. Define the term "Skin Effect" in the context of induction heating.

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

Time: 2.30Hrs **Question bank** **Max marks: 50**

Unit 1

Short Answer Questions

1. Write the characteristics of embedded systems.
2. Illustrate the common metrics that are used in design metrics of embedded systems.
3. Explain synthesis in design technology.

Essay Questions

1. Explain Design metrics of embedded systems.
2. Explain Processor technology in embedded system.
3. Explain IC technology in embedded system

Unit 2

1. Explain Custom Single Purpose Processor Design
2. Write a note on RT-Level combinational components of custom single-purpose processor.
3. Explain RT-Level sequential components of custom single-purpose processor.

SHORT ANSWER QUESTIONS

4. Write a note on transistors and logic gates of Combinational Logic.
5. Illustrate the role of flip-flops in Sequential Logic.
6. Write a note on sequential logic design.
7. Explain the function of Register, shift register in RT-level sequential components.

Unit 3

1. Explain instruction execution and pipelining.
2. Draw the basic architecture of general-purpose processor and explain its operation.
3. Explain Programmer's View

SHORT ANSWER QUESTIONS

4. Describe Host and Target Machines.
5. Explain design flow and tools in development environment.
6. Write a note on testing and debugging in development environment.
7. Write a short note on ASIPs.

Unit 4

ESSAY QUESTIONS

1. Describe Analog – to – Digital Converters.

2. Explain UART

3. Explain Real Time Clocks.

SHORT ANSWER QUESTIONS

4. Discuss Pulse Width Modulators.

5. Describe Timers, counters.

6. Explain Watchdog Timers.

7. Explain Stepper Motor Controllers.

Unit-V

1.What do you mean by Serial and Parallel communication? Explain how they work with simple diagrams.

2. Explain how the I2C protocol works using its two wires (SDA and SCL). Also, describe the USB protocol.

3. Write a detailed note on Bluetooth and IEEE 802.11 (Wi-Fi). Explain their range (how far they reach), speed, and give two real-life examples of where each is used.

SHORT ANSWER QUESTIONS

1. What is the CAN Bus protocol?

2. Explain briefly about IrDA and FireWire

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

COURSE 15 A: DIGITAL SYSTEM DESIGN

QUESTION BANK

Unit I:

- **Essays:**

1. State and prove De Morgan's Theorems using truth tables.
2. Simplify the following function using a K-Map: $F(A,B,C,D) = \sum m(0,1,2,5,8,9,10)$.
3. Explain the Tabulation (Quine-McCluskey) method for simplifying Boolean functions with an example.

- **Shorts:**

1. Convert $(1011.01)_2$ to Decimal.
2. Draw the logic symbol and truth table for the XOR and NAND gates.
3. What are Universal Gates? Why are they called so?

Unit II: Combinational Logic

- **Essays:**

1. Design a Full Adder circuit using logic gates. Give its truth table and expressions.
2. Explain the design procedure for a Binary-to-Gray code converter.
3. Design a 4-bit Magnitude Comparator and explain its working.

- **Shorts:**

1. What is a Half Subtractor? Draw its circuit.
2. Mention the basic structure of a Verilog/VHDL module (HDL).

Unit III: Design with MSI Devices

- **Essays:**

1. Implement the function $F(A,B,C) = \sum m(1,3,5,6)$ using an 8-to-1 Multiplexer.
2. Explain the working of a 3-to-8 Decoder with a logic diagram.
3. Discuss the different types of ROM (PROM, EPROM, EEPROM).

- **Shorts:**

1. Difference between a Multiplexer and a Demultiplexer.
2. What is a Priority Encoder?

Unit IV: Synchronous Sequential Logic

- **Essays:**

1. Explain the working of a Master-Slave JK Flip-Flop. How does it eliminate the Race-Around condition?

2. Design a 3-bit Synchronous Up-Counter using T Flip-Flops.
3. Describe the operation of a Universal Shift Register with a block diagram.

- **Shorts:**

1. Differentiate between Latches and Flip-Flops.
2. What is State Reduction in sequential circuits?

Unit V: Asynchronous Sequential Logic

- **Essays:**

1. Explain the analysis procedure of Asynchronous Sequential Circuits with an example.
2. What are Hazards in digital circuits? Explain Static-0 and Static-1 hazards with diagrams.
3. Discuss the concept of "Races" and "Cycles" in asynchronous circuits.

- **Shorts:**

1. Define a Flow Table.
2. What is a Race-free state assignment?

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

Unit I: Microwave Ovens

- **Essays:**

1. Draw and explain the block diagram of a Microwave Oven.
2. Discuss the role of single-chip controllers in modern microwave ovens.
3. Explain the different types of microwave ovens (Solo, Grill, and Convection) and their features.

- **Shorts:**

1. What is the frequency range used in microwave ovens?
2. Mention three important safety instructions for using a microwave.
3. How should one clean and care for a microwave oven?

Unit II: Washing Machines

- **Essays:**

1. Explain the different types of washing machines (Top load vs. Front load) and their features.
2. Discuss the principle and advantages of Fuzzy Logic in washing machines.
3. Describe the hardware and software components used in a washing machine controller.

- **Shorts:**

1. What is the function of a water level sensor in a washing machine?
2. Define the "Spin Cycle" in electronic washing machines.
3. List two advantages of fuzzy logic washing machines.

Unit III: Air Conditioners and Refrigerators

- **Essays:**

1. Explain the working principle and components of a Split Air Conditioner.
2. Compare Unitary (Window) air conditioning systems with Central air conditioning systems.
3. Describe "All-Air" and "All-Water" air conditioning systems.

- **Shorts:**

1. Name the four main components of a refrigeration cycle.
2. What is the purpose of an evaporator in an AC?
3. Distinguish between a window AC and a split AC.

Unit IV: Home/Office Digital Devices

- **Essays:**

1. Explain the internal organization and block diagram of a digital electronic calculator.
2. Describe the working principle of a Xerographic copier (Xerox machine).
3. Draw the block diagram of a Digital Clock and explain the function of each block.

- **Shorts:**

1. What is the primary function of a Facsimile (Fax) machine?
2. Mention the steps involved in servicing an electronic calculator.
3. How does a crystal oscillator help in a digital clock?

Unit V: Digital Access Devices

- **Essays:**

1. Explain the architecture and working of an Automated Teller Machine (ATM).
2. Discuss the working of a Barcode Scanner and its decoder.
3. Explain the concept of Set-Top Boxes and how they enable Digital Cable TV.

- **Shorts:**

1. Define Electronic Fund Transfer (EFT).
2. What is "Video on Demand" (VoD)?
3. Briefly explain the process of online ticket reservation systems.

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

Unit-I

ESSAY QUESTIONS

1. Explain the block diagram of microwave oven
2. Sketch and explain the LCD timer with alarm.
3. Explain Wiring and Safety instructions of microwave oven.

SHORT ANSWER QUESTIONS

4. Explain Types of Microwave oven.
5. Explain Care and Cleaning.
6. Explain Single-Chip Controllers with the help of diagrams.
7. Explain Wiring and Safety instructions of microwave oven.

Unit-II

ESSAY QUESTIONS

1. Explain the block diagram of electronic controller for washing machines.
2. Discuss about washing machine hardware and software.
3. Explain Fuzzy logic washing machines.

SHORT ANSWER QUESTIONS

4. Explain types of washing machines.
5. Describe the features of washing machines.

Unit-III

ESSAY QUESTIONS

1. Describe various components of air conditioning systems.
2. Explain All water air conditioning systems.
3. Explain All air conditioning systems.

SHORT ANSWER QUESTIONS

4. Explain Modularly and central air conditioning systems.
5. Describe Split air conditioners.

Unit-IV

ESSAY QUESTIONS

1. Describe Calculator? Explain the structure of a calculator
2. Explain Internal Organization of a calculator.
3. Draw the Block diagram of a digital clock. Explain each block.

SHORT ANSWER QUESTIONS

4. Describe Xerographic copier.
5. Explain Facsimile machine.
6. Discuss about Digital clock.
7. Describe how electronic calculators can be serviced.

Unit-V

ESSAY QUESTIONS

1. Discuss about Digital computer in detail.
2. Describe about the Barcode scanner and decoder.
3. Explain how electronic fund transfer can be done.
4. Illustrate online ticket reservation.

SHORT ANSWER QUESTIONS

5. Illustrate Automated Teller Machines (ATMs).
6. Explain Set-Top boxes.
7. Explain Digital cable TV and Video on demand.
8. Describe how to access Internet.