**GOVERNMENT COLLEGE(A):RAJAHMUNDRY**
**DEPARTMENT OF PHYSICS**
**SYLLABUS FOR III B.Sc., PHYSICS (w.e.f. 2016-2017)**
**SEMESTER V - PAPAER III**
**CORE III MODULE V- Electricity & Electromagnetism**
**(As Approved in the BOS meeting held on 26 March 2016 for 2016-2017)**

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**UNIT-I :Electronic Instruments & Electrostatics (**9 Periods**): Multimeter, Cathode ray Oscilloscope (CRO){ Circuit diagram and Basic Principles only}**. Gauss Law and its applications- Electric field due to an infinite conducting sheet of charge, Uniformly charged sphere and charged cylindrical conductor. Mechanical force on a charged conductor. Electric potential- potential due to charged spherical conductor and Electric dipole- an infinite line of charge. Potential of a uniformly charged circular disc.

**UNIT-II :Dielectrics and Capacitance (** 14 Periods**):** An atomic view- potential energy of a dipole in an electric field- polarization and charge density- dielectrics and Gauss's Law- Relation between D,E and P. Dielectric constant and susceptibility.
Capacity of concentric spheres and cylindrical condenser- capacity of parallel plate condenser with and without dielectric- electrical energy stored by a charged condenser. **Force between plates of condenser. Attracted disc electrometer-Construction and working only**.

**UNIT-III :Magnetostatics, Moving Charge in electric and magnetic fields (**13 Periods**):** Magnetic shell- potential due to magnetic shell- field due to magnetic shell-equivalent of electric circuit and magnetic shell- application of field due to magnetic shell-magnetic induction (B) and field (H)-permeability and susceptibility - Hysteresis loop.
Hall effect- derivation of hall coefficient - applications - cyclotron, synchrocyclotron and synchrotron-and its applications-force on a current carrying conductor- force and torque on current loop- Biot-Savert's Law and calculation of B due to long straight wire, circular loop and solenoid.

**UNIT-IV : Electromagnetic Induction (**9 Periods**):** Faraday's Law - Lenz's law-expression for induced emf-electromotive force-time varying magnetic fields-betatron-ballistic galvanometer -theory-damping correction-self and mutual inductance-coefficient of coupling -calculation of coupling-calculation of self inductance of a long solenoid- toroid- energy stored in magnetic field. Transformers (Basics only)**.**

**Note:** Problems should be solved at the end of every chapter of all units.

**Reference Books:**

1. Basic Electronics and Linear circuits - NN Bharghava, SC Gupta
2. Principles of Electronics - VK Mehta
3. Physics Vol III - Halliday and Resnick
4. Electricity - Berkeley physics series
5. Electricity and Electronics- Tayal
6. Electricity and Magnetism - Brijlal and Subrahmanyam
7. Electricity and Magnetism - C.J. Smith
8. Electricity and Magnetism - C.J Smith and Rangawala
9. Electricity and Magnetism with Electronics - K.K Tewari (R.Chand)
10. Third year Physics - Telugu Academy.

**GOVERNMENT COLLEGE(A):RAJAHMUNDRY**
**DEPARTMENT OF PHYSICS**
**ADDITIONAL INPUTS**

CLASS :III B.Sc.,
SEMESTER :V
PAPER : III
TITLE OF THE PAPER : ELETRICITY AND ELECTROMAGNETISM

| TOPICS IN THE UNIVERSITY SYLLABUS | ADDITIONAL TOPICS INCLUDED UNDER AUTONOMOUS SET UP |
|---|---|
| 1. Electrostatics<br>2. Dielectrics and capacitance<br>3.Magnetostatics, moving charge in electric and magnetic fields<br>4. Electromagnetic induction | 1. Electronic instruments-multi meter and cathode ray oscilloscope. |

**Government College(A) :: Rajahmundry**

**DEPARTMENT OF PHYSICS**
**SEMESTER V( PAPER III)**
Electricity & Electromagnetism
**EVALUATION SCHEME**

| Examination | No.of Marks | Remarks |
|---|---|---|
| Semester end examination | **75** | |
| Internal examination | **25** | Written examination : 10<br>Viva-voce : 05<br>Seminar : 05<br>Assignment : 05 |

PATTERN OF SEMESTER END THEORY EXAMINATION

| Section | Description | Marks |
|---|---|---|
| A | Essay type questions- Four questions are to be asked with internal choice in each question ( A or B). Student has to answer four questions choosing one (A or B) from each question. Each question carries 10 Marks | 4x10 = 40 |
| B | Short answer type questions - Eight questions are to be asked. 4 Theoritical questions and 4 problems . Student has to answer any 5 questions. Each question carries 3 Marks. | 5x3 = 15 |
| C | Very Short answer type questions - Ten questions are to be asked. Student has to answer all ten questions. Each question carries 2 Marks | 10x2 = 20 |
| | TOTAL MARKS | 75 |

**GOVERNMENT COLLEGE(A)::RAJAHMUNDRY**
**DEPARTMENT OF PHYSICS**
**SEMESTER – V (PAPER – III)**
**ELECTRICITY & MAGNETISM**
**BLUE PRINT FOR SEMESTER END EXAMINATION**

SECTION – A 4 x 10 = 40 M

1 (a) or (b) Unit – I
2 (a) or (b) Unit – II
3. (a) or (b) Unit – III
4. (a) or (b) Unit – IV

SECTION – B 5 x 3 = 15 M

| | |
|---|---|
| THEORETICAL QUESTIONS<br>5. Unit – I<br>6. Unit – II<br>7. Unit – III<br>8. Unit – IV | 9. Problem – Unit – I<br>10. Problem – Unit – II<br>11. Problem – Unit – III<br>12. Problem – Unit – IV |

SECTION – C 10 x 2 = 20 M

<table>
<tr><td colspan="2">13. Unit – I</td><td colspan="2"></td></tr>
<tr><td>14.<br>15.<br>16.</td><td>Unit - II</td><td>20.<br>21.<br>22.</td><td>Unit - IV</td></tr>
<tr><td>17.<br>18.<br>19.</td><td>Unit - III</td><td colspan="2"></td></tr>
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