HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)
(Affiliated to Osmania University)
Nallakunta, Hyderabad

B.Sc. III YEAR SEMESTER V& VI
DEPARTMENT OF PHYSICS
(2022-2023)

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
BOARD OF STUDIES
DEPARTMENT OF PHYSICS

Chairperson

Dr. B. Sreedevi
Department of Physics
Hindi Mahavidyalaya
Nallakunta, Hyderabad.

30/11/22

University Nominee

Prof. D. Karuna Sagar, HOD
Department of Physics
Osmania university
Hyderabad.

30/11/2022

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. Srinivas – Chairman, BOS
Department of Physics
Osmania University
Hyderabad.

30/11/2022

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

Members Of BOS

1. Prof. M. Prasad
   Department of Physics
   Osmania University
   Hyderabad.

30/11/22

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2. Dr. R. Komala – HOD
   Department of Physics
   St. Pious X Degree & PG College
   Nacharam, Hyderabad.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)

BOARD OF STUDIES

B.Sc. III YEAR SEMESTER V & VI

DEPARTMENT OF PHYSICS(2022-2023)

COMPOSITION OF THE BOARD OF STUDIES IN AN AUTONOMOUS COLLEGE

I. Composition: Department of Physics

1. Head of the Department concerned (Chairperson)

Smt.Dr. B. Sreedevi, Department of Physics

2. The entire faculty of each specialization

1. Smt. Dr. B. Sreedevi

2. Ms. M. Shivaleela

3. Ms. Soma Keerthi

3. One expert to be nominated by the Vice Chancellor from a panel of six recommended by the College Principal

1. Chairperson, BOS, Dept. of Physics, Osmania University, Hyderabad.

4. Two experts on the subject from outside the college to be nominated by the Academic Council.

1. Prof. D. Karuna Sagar, Head of Physics Department, Osmania University, Hyderabad.

2. Prof. M. Srinivas, BOS Chairman, Dept. of Physics , Osmania University, Hyderabad.

3. Prof. M. Prasad, Member, Dept. of Physics, Osmania University, Hyderabad.

4. Dr. R. Komala – Member, (HOD)Dept. of Physics, St. Pious X College, Nacharam, Hyderabad.

(a) Experts from outside the College whenever special courses of studies are to be formulated. - To be nominated.

(b) Other members of staff of the same faculty.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS
AGENDA OF THE MEETING

4.1 Welcome address by the chair.

4.2 Previous Meeting Details.

4.3 Details of choice based credit system.

4.4 Discussion and Distribution of Common Core Syllabus for all the Semesters (V and VI)

4.5 Marks allotted for internal and end semester exams.

4.6 Discussion on Pattern and model paper of Semester Exam and internal exam for all the Semesters (V and VI)

4.7 Discussion on Practical exam model paper for all the Semesters (V and VI)

4.8 Panel of Examiners

4.9 Any other matter

4.10 Vote of thanks

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS
BOARD OF STUDIES
Academic Year – 2022-2023
Minutes of BOS Meeting

BOS meeting of the Department of Physics was held on 30/11/2022 From 11:00 am Onwards

The following members were present

Dr. D. KarunaSagar- University Nominee

Dr. M. Srinivas – BOS Chairman

Smt. Dr. B. Sreedevi - Chair person

Dr. M. Prasad - Member of BOS

Dr.R. Komala- Member of BOS

Prof. M. SRINIVAS M.Sc., Ph.D. Chairperson, Board of Studies Department of Physics Osmania University Hyderabad-500 007, T.S

HEAD Department of Physic University College of Sci Osmania University, Hyderabad-500 007. T.S

Dr. M. PRASAD Professor Department of Physics Osmania University Hyderabad-500 007. T. S.

Department of Physics Hindi Mahavidyalaya Autonomous & NAAC REACCREDITED) Nallakunta, Hyderabad-500 044.

4.1 Welcome address by the chair

Head of the Department of Physics welcomed the University Nominee, Chairperson BOS, O.U. Department of Physics and Member Smt. Dr. B. Sreedevi, Professor, Osmania University, Hyderabad.

4.2 Previous Meeting details

The CBCS system has been introduced by Osmania University from 2016-17. The theory and practical syllabus of III& IV Semesters of B.Sc., new syllabus, question paper pattern for theory and practical, internal assessment pattern, practical examination scheme and panel of examiners were discussed and approved by all the BOS Members in previous BOS meeting.

4.3 Details of choice based credit system.

Members were informed that TSCHE has referred that from the academic year 2016-17 autonomous institutions have to follow CBCS i.e. From the Academic Year 2016-17 Osmania University has instructed all the Degree colleges including Autonomous Degree colleges to follow CBCS under which after passing the exam student will get the Grade in the Final Result. B.Sc. III YEAR in V and VI semester 4 credits are given for theory paper and 1 credit is given for practical in each semester.

4.4 Discussion and Distribution of Common Core Syllabus for semester V and VI.

i. Members were informed by the chair that Department of Physics, Hindi Mahavidyalaya is following common core syllabus prescribed by Osmania University B.Sc. III YEAR in V and VI semesters.

ii. The syllabus comprises of 4 units.

iii. Syllabus copy for both the semesters is enclosed.

iv. Syllabus was approved by the Members of BOS.

4.5 Marks allotted for Internal and end Semester exams.

1. Internal assessment is of 30 marks and this is online test, where students have to answer 20 MCQs in 25 minutes. Each question carries 1 mark. In each Semester two internal assessments of 20 Marks will be conducted and an average of both the internal assessments will be added in the marks of theory exam.

2. Theory Question paper is of 70 marks.

3. Total allotted marks are 100 for each theory paper DSC/DSE (A&B).

The distribution of marks was approved by the Members of BOS.

4.6 Discussion on Pattern and Model Paper of Semester exam and Model Paper of Internal Exam

1. It was informed by the department that in each Semester Two Internal exams will be conducted for 20 marks. The internal assessment will have three sections.

Section – A 20 Multiple choice questions each carries 1marks (20 X 1 =20M),

Section – B Assignment – 5 Marks

Section – C Seminar – 5 Marks

Average marks of these two internal exams will be taken.

2. Semester exam will be conducted as per the Almanac which will be provided by the exam branch. Internal exam duration will be 25 Min and Semester exam duration will be of 2 1/2hrs.

3. Model Question paper for Semester V and Semester VI was discussed. Theory paper for each Semester will have 2 sections.

i) Section A contains 8 short Questions. The student has to answer six questions. Each Question carries 3 Marks (6X3=18 Marks)

ii) Section B contains 4 Essay type Questions with internal choice. Each Question carries 13 Marks (4X13=52 Marks)

4. Model Question paper of GE for Semester III and Semester IV was discussed. Theory paper for each GE will have 2 sections.

i) Section A contains 8 short Questions. The student has to answer Six questions. Each Question carries 5 Marks (6X3=18 Marks)

ii) Section B contains 4 Essay type Questions with internal choice. Each Question

carries 13Marks (4X13=52 Marks)

• Pattern of Model Theory Question Papers for DSC and GE Paper V are enclosed.

Pattern of Model Theory Question Papers for DSC and GE was approved by Member of BOS

4.7 Discussion on Practical Exam Model paper.

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

It was decided in BOS meeting that 25 Marks Practical Exam of 3 hrs will be held in each Semester and 1 credit will be given for Practical in each Semester.

• It is decided that the practical examinations held for B. Sc third years (Semester V&VI) from the academic year 2022-23 onwards will have the pattern of 25 marks scheme and the credits will remain the same i.e. 1 credit. The duration of the exam will be 3 hours.

• Pattern of Model Practical Question Papers for Paper V and Paper VI are enclosed.

• Pattern of Model Practical Question Papers was approved by Members of BOS

4.8 Panel of Examiners

The panel of examiners was approved by the members.

List is enclosed

4.9 Any other matter.

4.10 Vote of Thanks

Meeting concluded with the Vote of Thanks by Smt. Dr. B. Sreedevi.

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007. T.S

Chairperson	University Nominee	Chairperson	Members	Principal
		(BOS, Dept of Physics , OU)		

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

HINDI MAHAVIDYALAYA

(AUTONOMOUS)

Affiliated to Osmania University, Nallakunta, Hyderabad-44

CBCS STRUCTURE FOR 2022-2023 BATCH

B.Sc- MATHEMATICS, PHYSICS, CHEMISTRY/ COMPUTER SCIENCE

ACADEMIC YEAR 2022-2023

FINAL YEAR SEMESTER - V					Semester End Exam		Continuous Internal Evaluation		Practical 3 hours	Total Marks
de	Course Title	Course Type	HPW	Credits	Duration in Hours	Marks	Exam Duration	Marks		
501	**RENEWABLE ENERGY RESOURCES**	**GE**		**4**	**2 1/2**	**70**	**30 min.**	**30**	-	100
502	English	CC-1E	3	3	2 1/2	70	30 min.	30	-	100
503	Second Language	CC-2E	3	3	2 1/2	70	30 min.	30	-	100
504	Optional - I	DSC-1E	4T+3P =7	4+1=5	2 1/2	70	30 min	30	25	125
505	**MODERN PHYSICS**	**DSC-2E**	**4T+3P =7**	**4+1=5**	**2 1/2**	**70**	**30 min**	**30**	**25**	**125**
506	Optional - III	DSC-3E	4T+3P =7	4+1=5	2 1/2	70	30 min	30	25	125

30/11/22 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S.

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007, T.S.

2.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44, T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA

(AUTONOMOUS)

Affiliated to Osmania University, Nallakunta, Hyderabad-44

CBCS STRUCTURE FOR 2022-2023 BATCH

B.Sc- MATHEMATICS, PHYSICS, CHEMISTRY/ COMPUTER SCIENCE

ACADEMIC YEAR 2022-2023

FINAL YEAR SEMESTER - VI					Semester End Exam		Continuous Internal Evaluation		Practical 3 hours	Total Marks
de	Course Title	Course Type	HPW	Credits	Duration in Hours	Marks	Exam Duration	Marks		
601	**NANOSCIENCE (OR) PROJECT WORK**		**4**	**4**	**2 1/2**	**70**	**30 min.**	**30**	-	100
602	English	CC-2F	3	3	2 1/2	70	30 min.	30	-	100
603	Second Language	CC-2E	3	3	2 1/2	70	30 min.	30	-	100
604	Optional - I	DSC-1F	4T+3P =7	4+1=5	2 1/2	70	30 min	30	25	125
605	**ELECTRONICS**	**DSC-2F**	**4T+3P =7**	**4+1=5**	**2 1/2**	**70**	**30 min**	**30**	**25**	**125**
606	Optional – III	DSC-3F	4T+3P =7	4+1=5	2 1/2	70	30 min	30	25	125

30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS
MODERN PHYSICS
Physics - Paper V

Code: BS505	**DSC-2E**
Instruction	
Theory classes	**4 hrs /week**
Practical classes	**3 hrs/week**
Credit for theory	**4**
Credit for practical	**1**
Duration of semester examination	**2 ½ hrs**
Duration of internal examination	**30 mins**
Semester examination marks	**70 marks**
Internal marks	**30 marks**

Unit-I: SPECTROSCOPY

Atomic Spectra: Introduction –Drawbacks of Bohr's atomic model –Sommerfield's elliptical orbits – relativistic correction (no derivation). Stern & Gerlach experiment vector atom model and quantum numbers associated with it. L-S and J-J coupling schemes spectral terms, selection rules. Intensity rules. Spectra of alkali atoms, doublet fine structure, Zeeman effect.

Molecular spectroscopy: Types of molecular spectra pure rotational energies and spectrum of diatomoic molecule. Determination of inter nuclear distance. Vibrational energies and spectrum of diatomic molecule. Raman effect, Classical theory of Raman effect. Experimental arrangement of Raman effect and its application.

Unit-II: QUANTUM MECHANICS

Inadequacy of classical physics: Spectral radiation-Planck's law (only discussion). Photoelectric effect and its applications, Compton's effect – experimental verification.

Matter waves and uncertainity principle: De Broglie's hypothesis – wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment. Double slit experiment. Standing De Broglie waves of electron in Bohr orbits. Heisenberg's Uncertainity principle for position and momentum (x and P_x), energy and time (E and t). Gamma ray microscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Complementary principle of Bohr.

Schrodinger wave equation: Schrodinger time independent and time dependent wave equations. Wave function properties – significance. Basic postulates of quantum mechanics, Operators, Eigen functions and eigen values, expectation values.

Unit-III: Nuclear Physics

Nuclear structure: Basic properties of nucleus – Size, Charge, Mass, Spin, Magnetic dipole moment and electric quadrapole moment. Binding energy of nucleus. Deuteron binding energy, p-p, n-n and n-p scattering. Nuclear forces. Nuclear models – Liquid drop model, Shell model.

Alpha and Beta Decays: Range of alpha particles, Geiger nutal law, Gamow's Theory of alpha decay, Geiger nutal law from Gamow's theory. Beta spectrum – neutrino hypothesis

Particle detectors: Gm counter, Proportional counter, scintillation counter.

Unit-IV: Crystal Growth and imperfections:

Crystalline nature of matter, Crystal lattice, Unit cell (only discussion)

Crystal growth from solution and melt, Growth from vapour phase, Experimental techniques of growth from melt. Classification of imperfections, Schottky and Frenkel defects.

X-ray diffraction: Diffraction of X-rays by crystals, Bragg's law, experimental techniques – Laue's method and powder method.s

Reference Books:

1. Modern physics by G. Aruldhas.
2. Nuclear physics by D.C. Tayal, Himalaya publishing house.
3. Spectroscopy by Gurdeep R Chatwal and Shyam Anand – Himalaya publishing house.
4. Third year physics – Telugu Academy.
5. Elements of solid state physics by J.P. Srivastava.
6. Crystallography and solid state physics – A.R. Verma and O.N. Srivastava
7. Solid State physics – RL Singhal, KedarNath & Ramnath & Co, 2006.

30/11/22

Chairperson | University Nominee | Chairperson (BOS, Dept of Physics , OU) | Members | Principal

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

PROF. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44 T.S.

Head of the Department
Department of Physic s
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD

(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester – V, Paper –V – Modern Physics

(Laboratory Course) 45h (3 h/w)

1. Photo Cell – Determination of Planck's constant.
2. To find the value of photo electric work function of a material of the cathode using a photo - electric cell.
3. To determine the Planck's constant using LEDs of at least 4 different colors.
4. To verify the inverse square law of radiation using a photo – electric cell.
5. Photo electric effect : Photo current verses intensity and wavelength of light; maximum energy of photo electrons verses frequency of light.
6. To determine the value of e/m by (a) Magnetic focussing or (b) Bar magnet.
7. To determine the value of e/m for electron by long solenoid method.
8. To determine the Wavelength of laser source using diffraction of single slit.
9. To determine the Wavelength of laser source using diffraction of double slits.
10. G. M. Counter – Absorption coefficients of a material.

Reference Books:

1. Advanced practical physics for students, B.L. Flint and H. T. Worsnop, House.
2. A text Book of practical physics, I. Prakash & Ramakrishna, 11th Edn, 2011, Mahal

Note: Minimum of 08 experiments should be performed

30/11/22

Chairperson | **University Nominee** | **Chairperson (BOS, Dept of Physics , OU)** | **Members** | **Principal**

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007, T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007, T. S.

2.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44, T.S.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS
Semester – V Paper – V

Time: 2 1/2 hrs **Theory Model Question Paper** Max.Marks:70

SECTION A

I Write short notes on any Six of the following: **6 X 3 = 18 Marks**

1. A question from Unit I
2. A question from Unit I
3. A question from Unit II
4. A question from Unit II
5. A question from Unit III
6. A question from Unit III
7. A question from Unit IV
8. A question from Unit IV

SECTION B

II Answer all the Questions. Each question carries 13 marks **4 X 13 = 52 Marks**

9 (a) A question from Unit I
(b) A question from Unit I
(OR)
(c) A question from Unit I
(d) A question from Unit I

10. (a) A question from Unit II
(b) A question from Unit II
(OR)
(c) A question from Unit II
(d) A question from Unit II

11.(a) A question from Unit III
(b) A question from Unit III
(OR)
(c) A question from Unit III
(d) A question from Unit III

12.(a) A question from Unit IV
(b) A question from Unit IV
(OR)
(c) A question from Unit IV
(d) A question from Unit IV

30/11/22 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**
(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.
Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007, T.S.

2.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester – V Paper - V

Practical Model Question Paper

Time 3 hrs **Max. Marks:25**

1. Write the Aim, apparatus, formula, model graph, diagrams, observation tables, precautions and result. (7 Marks)

2. Performing the experiment (8 Marks)

3. Record (5 Marks)

4. Viva (5 Marks)

30/11/22 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
2. Hyderabad-500 007. T. S.

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College for Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester – VI, Paper VI

Electronics

Code: BS605	**DSC – 2F**
Instruction	
Theory classes	**4 hrs /week**
Practical classes	**3 hrs/week**
Credit for theory	**4**
Credit for practical	**1**
Duration of semester examination	**2 ½ hrs**
Duration of internal examination	**30 mins**
Semester examination marks	**70 marks**
Internal marks	**30 marks**
Electronics	**60 Hrs**

Unit-I

Band theory of P-N junction: Energy band in solids (Band theory), Valence band, Conduction band and forbidden gap in solids, insulators, semi conductors and their types, Fermi level, continuity equation.

Diodes: P-N junction diode, Half wave, Full wave and Bridge rectifier, Zener diode and its characteristics, Zener diode as voltage regulator.

Unit-II

Bipolar Junction Transistor (BJT): p-n-p and n-p-n transistors, Current components in transistors, CB, CE and CC configurations – Transistor as an amplifier – RC coupled amplifier – Frequency response (Qualitative analysis)

Feedback concept and oscillators: Feedback, General theory of feedback – concept of oscillators, Barkhausen's criteria, Phase shift oscillator – Expression for frequency of oscillation.

Unit-III: Data transmission and Telemetry

Methods of data transmission – General telemetry system – functional blocks of telemetry system – Types of telemetry systems – land line telemetering system – voltage telemetering system – current telemetering system – position telemetering system – Land line telemetry feedback system.

Unit-IV

Digital Electronics: Binary number system, Conversion of binary to decimal and vice versa. Binary addition and subtraction (1's & 2's complement methods). Hexadecimal number system, Conversion from binary to hexadecimal and vice versa, Decimal to hexadecimal and vice versa.

Logic Gates: OR, AND and NOT gates – truth tables, realization of the gates using discrete components, NAND, NOR as universal gates, Exclusive – OR gate (EX–OR). De–Morgan's laws – Verification.

Reference Books:

1. Principles of Electronics by V.K. Mehta – S. Chand & Co.

2. Third year Electronics – Telugu Academy.

3. Electrical and Electronics Measurement and Instrumentation – A.K.Sawhaney.

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester – VI, Paper –VI - Electronics

(Laboratory Course)45h (3 h/w)

1. Construction of logic gates (AND,OR and NOT gates) with descrete components – Truth table verification.
2. AND, OR, NOT – gates construction using universal gates – verification of truth tables.
3. Construction of NAND and NOR gates with discrete components and truth table verification.
4. Verification of De-Morgan's theorems.
5. zener diode V-I characteristics.
6. p-n junction diode V-I characteristics.
7. Zener diode as a voltage regulator.
8. R.C. Coupled amplifier – frequency response.
9. R.C. phase shift oscillator – determination of output frequency.
10. Construction of a model D.C. power supply.
11. Characteristics of a transistor in CE configuration.

Note: every student should complete minimum 06 experiments.

Suggested Books:

1. B.Sc. Practical physics – C.L. A

Chairperson | **University Nominee** | **Chairperson** (BOS, Dept of Physics , OU) | **Members** | **Principal**

Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
2. Hyderabad-500 007. T. S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. Physics - III Year
Semester – V & VI
Paper V & VI
Internal Model Question Paper

Time: ½ hrs **Marks: 20**

Multiple Choice Questions

Ten (20) MCQ 1 Marks Each 20 Marks

Chairperson **University Nominee** **Chairperson** **Members** **Principal**
(BOS, Dept of ~~Maths~~ PHYSICS, OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

1.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

2. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

Department of Physics
Hindi Mahavidyalaya
nomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester – VI , Paper – VI

Time: 2 1/2 hrs **Theory Model Question Paper** Max.Marks:70

SECTION A

I Write short notes on any Six of the following: **6 X 3 = 18 Marks**

1. A question from Unit I
2. A question from Unit I
3. A question from Unit II
4. A question from Unit II
5. A question from Unit III
6. A question from Unit III
7. A question from Unit IV
8. A question from Unit IV

SECTION B

II Answer all the Questions. Each question carries 13 marks **4 X 13 = 52 Marks**

9 (a) A question from Unit I
(b) A question from Unit I
(OR)
(c) A question from Unit I
(d) A question from Unit I

10. (a) A question from Unit II
(b) A question from Unit II
(OR)
(c) A question from Unit II
(d) A question from Unit II

11.(a) A question from Unit III
(b) A question from Unit III
(OR)
(c) A question from Unit III
(d) A question from Unit III

12.(a) A question from Unit IV
(b) A question from Unit IV
(OR)
(c) A question from Unit IV
(d) A question from Unit IV

Chairperson **University Nominee** **Chairperson** **Members** **Principal**
(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007, T.S.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007, T.S

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Practical Model Question Paper

Time 3 hrs **Max. Marks:25**

1. Write the Aim, apparatus, formula, model graph, diagrams, observation tables, precautions and result. (7 Marks)

2. Performing the experiment (8 Marks)

3. Record (2 Marks)

4. Viva (3 Marks)

30/11/22 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**
(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.
2.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44 T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester V
Renewable Energy Resources
(GE)

Unit 1:Principles of Solar Radiation and Collection (Qualitative only):
Non renewable energy resources –Principles of power generation and transmission. A model of conventional thermal power plant. Advantages and disadvantages of conventional power plants. Role and potential of new and renewable sources, the solar energy option, environmental impact of solar power, physics of the sun, the solar constant, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

Unit 2: Solar Energy Storage and Applications:
Solar energy collectors – Flat Plate and Concentration Collectors , Classification of concentration collectors and orientation, advanced collectors. Different sensible, latent heat and stratified storage, solar ponds. Solar Applications – Solar heating / cooling technique, solar distillation and drying, photo voltaic energy conversion.

Unit 3: Wind and Bio – Mass Energy :
Resources and Potentials, Horizontal and vertical axis windmills, Performance characteristics. Principles of Bio – Conversion, Energy from waste, Types of Bio – gas digesters, gas yield, Combustion characteristics of Bio – gas, utilization for cooking, LPG and CNG.

Unit 4: Geothermal and Ocean Energy :
Resources, Types of wells, Methods of harnessing the energy, Potential in India. OTEC, Principles of Utilization, Setting of OTEC plants, Thermodynamic cycles. Tidal and Wave Energy, Potential and Conversion Techniques, Mini – hydel power plants, Land and their economics.

TEXTBOOKS :

1. **Non – Conventional Energy Sources – G.D Rai , Khanna Publishers.**
2. **Renewable Energy Resources – Twidell & Wier, CRC Press (Taylor and Francis)**

REFERENCE BOOKS :

1. **Renewable Energy Resources – Tiwari and Ghosal, Narosa.**
2. **Renewable Energy Technologies – Ramesh and Kumar, Narosa.**
3. **Non – Conventional Energy Systems – K Mittal, Wheeler.**
4. **Renewable Energy Sources and Emerging Technologies by D.P.Kothari, K.C.Singhal.**

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED
Nallakunta, Hyderabad-500 044.

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

1.

2.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44 (T.S)

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester V
SEC – I
Experimental methods and error analysis

Credits : 02 **Hours : 30**

Unit 1: (15 Hrs)
Experimental methods; Least count of instruments, Instruments for measuring mass, length, time, angle, current, voltage. Fundamental units. Precession and accuracy of measurements, source of error in measurements, necessity of estimating errors, types of errors, reading error of instrument, calibration error, random error, systematic error, significant digits, order of magnitude and rounding of numbers, rounding error, absolute and relative errors, errors of computation – addition, subtraction, multiplication, division, error in power and roots, Propagation of errors, analysis of data, standard deviation, calculation of mean value.

Unit 2: (15 Hrs)
Statistical Analysis of errors : Mean, Median and mode and standard deviation, standard deviation of mean, least squares fitting, normal distribution, covariance and correlation, binomial distribution, passion distribution, chi square test.

NOTE: Problems should be solved at the end of every chapter of all units

References:

1. The theory of errors in physical measurements – J C Pal – New Central Book Agency – 2010.
2. Data reduction and error analysis for the physical sciences by D K Robbinson and P R Bevington.

30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**
(BOS, Dept of Physics , OU)

Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Head of the Department
Department of Physic s
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester V

SEC – II

Electrical Circuit Networking

Credits : 02 **Hours : 30**

Unit 1: (15 Hrs)

Basic Electricity Principles: Voltage, Current, Resistance and Power. Ohm's law. Series, Parallel and Series – parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, Voltmeter and Ammeter.

Understanding Electrical Circuits: Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single phase and three phase alternating current sources. Rules to analyze AC sourced electrical circuits. Real, Imaginary and complex power components of AC source. Power fac tor. Saving energy and money.

Electrical Drawing and symbols : Drawing symbols. Blue prints. Readings schematic. Ladder diagrams. Electrical schematics. Power circuits. Control circuits. Reading of circuit schematic. Tracking the connections of elements and identify current flow and voltage drop.

Generators and transformers : DC power sources. AC/ DC generators. Inductance, Capacitance and impedance. Operation of transformers.

Electric motors : Single phase, Three phase & DC motors. Basic design. Interfacing DC pr AC sources to control heaters & motors. Speed & Power of AC motors

Solid state devices: Resistors, Inductors and Capacitors. Diode and Rectifiers. Components in series or in shunt. Response of Inductors and capacitors with DC or AC sources.

Unit 2: (15 Hrs)

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground – fault protection. Grounding and isolating. Phase reversal. Surge protection. Interfacing DC or AC sources to control elements (Relay protection device)

Electrical Wiring: different types of conductors and cables. Basics of wiring – star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation. Solid and stranded cable. Conduit. Cable trays.

Splices: Wirenuts, crimps, terminal blocks, split bolds and solder. Preparation of extension board.

NOTE: Problems should be solved at the end of every chapter of all units

Reference Books:

1. A Text book in Electrical Technology – B L Theraja – S Chand & Co.
2. A Text book of Electrical Technology – A K Theraja .
3. Performance and Design of AC Machines – M G Say ELBS Edn..

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007, T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44, T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester V

SEC – III

Basic Instrumentation

Credits : 02 **Hours : 30**

Unit 1: (15 hrs)

Basics of measurement: Instruments accuracy, Precision, sensitivity, resolution range etc. Errors in measurements and loading effects. Multimeter: Principles of measurement of DC voltage and DC current, AC voltage, AC current and resistance. Specifications of a multimeter and their significance.

Electronic voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurements (Block diagram only). Specifications of an electronic voltmeter / Multimeter and their significance. AC milli voltmeter : Type of AC milli voltmeters : Amplifier – Rectifier and Rectifier – amplifier. Block diagram of AC milli voltmeter, specifications and their significance.

Cathode ray oscilloscope: Block diagram of Basic CRO. Construction of CRP, Electron gun, Electrostatic focusing and acceleration (Explanation only) – NO mathematical treatment), Brief discussion on screen phosphor, visual persistence & Chemical composition. Time Base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.

Use of CRO for the measurement of voltage (DC and AC frequency , Time period, special features of Dual trace, Introduction to digital oscilloscope, Probes. Digital storage oscilloscope: Block diagram and principle of working.

Unit 2: (15Hrs)

Signal Generators and Analysis Instruments: Block Diagram, Explanation and Specifications of low frequency signal generators. Pulse generator and function generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.

Impedance Bridges & Q – meter: Block Diagram of Bridge.Working Principles of Basic (balancing type) RLC Bridge. Specifications of RLC Bridge. Block Diagram & Working Principles of a Q – meter. Digital LCR Bridges.

Digital Instruments: Principle and Working of Digital Meters. Comparison of Analog and Digital Instruments. Characteristics of a digital meter. Working Principles of Digital Voltmeter.

Digital Multimeter: Block Diagram and Working of a Digital Multimeter. Working Principle of Time Interval, Frequency and Period Measurement using universal Counter/Frequency counter, Time – Base Stability, Accuracy and Resolution.

NOTE: Problems should be solved at the end of every chapter of all units

Reference Books:

1. **A text book in Electrical Technology – B L Theraja – S Chand and Co.**
2. **Performance and design of AC machines – M G Say ELBS Edn.**
3. **Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.**
4. **Logic Circuit Design, shimon P. Vingron, 2012, Springer.**
5. **Digital electronics, Subrata Ghosal, 2012, Cengage Learning.**
6. **Electronic Devices and circuits, S. Saivahanan & N. S. Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill.**
7. **Electronic Circuits: Handbook of Design and applications, U. Tietze, Ch.Schenk, 2008, Springer.**
8. **Electronic devices, 7/e Thomas L. Floyd, 2008, Pearson India.**

30/11/22 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44, T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester V

SEC – IV

Biomedical Instrumentation

Credits : 02 **Hours : 30**

Unit 1: (15 hrs)

FUNDAMENTALS OF BIOMEDICAL ENGINEERING

Cell and its structure – Resting and Action potential – Nervous system and its fundamentals – Basic components of a biomedical system – Cardiovascular systems-Respiratory Systems-Kidney and Blood flow – Biomechanics of bone – Biomechanics of soft tissues – basic mechanics of spinal column and limbs – physiological signals and transducers – Transducers – selection criteria – piezo electric, ultrasonic transducers – Temperature measurements – Fibre optic temperature sensors.

NON ELECTRIC PARAMETERS MEASUREMENT AND DIAGNOSTIC PROCEDURES

Measurement of Blood Pressure – Cardiac output – Heart rate – Heart sound – Pulmonary function measurements – spirometer – Photo plethysmography, Body plethysmography – Blood gas analyzers, pH of Blood – measurement of blood pCO_2, pO_2, finger – tip oxymeter – ESR, GSR measurements.

Unit 2: (15 hrs)

ELECTRICAL PARAMETERS ACQUISITION AND ANALYSIS

Electrodes – Limb electrodes – floating electrodes – pregelled disposable electrodes – micro, needle and surface electrodes – Amplifiers, Preamplifiers, Differential amplifiers, chopper amplifiers – Isolation amplifier – ECG – EEG – EMG – ERG – Led systems and recording methods – Typical waveforms – Electrical safety in medical environment, shock hazards – leakage current – instruments for checking safety parameters of biomedical equipments.

IMAGING MODALITIES AND ANALYSIS

Radio graphic and fluoroscopic techniques – Computer Tomography – MRI – Ultrasonography – Endoscopy – Thermography – Different types of bio telemetry systems – Retinal Imaging – Imaging application in Biometric systems – Analysis of digital images.

LIFE ASSISTING, THERAPEUTIC AND ROBOTIC DEVICES

Pacemakers – Defibrillators – Ventillators – Nerve and muscle stimulators – Dithermy – Heart – Lung machine – Audio meters – Dialysers – Lithotripsy – ICCU patient monitor system – Nano Robots – Robotic surgery – Advanced 3D Surgical techniques – Orthopedic prostheses fixation.

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

References :

1. R.S. Khandpur, Handbook of Biomedical Instrumentation, Tata Mc Graw Hill

2. J. G. Webster, Medical Instrumentation, Application and Design, John Wiley and Sons

30/11/22 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44 T.S.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester V

SEC – V

Digital Electronics

Credits : 02 **Hours : 30**

Unit 1: (15 hrs)
Number System: Decimal, Binary, Octal and Hexadecimal.
Conversion: Binary to Decimal, Octal to Decimal, Hexadecimal to Decimal, Decimal to Binary, Decimal to Octal and Decimal to Hexadecimal.
Binary Coded Decimal, Excess – 3 code, grey code, ASCII code.
Logic Gates: OR, AND,NOT,EX-OR,NAND,NOR, Universal gates.
Half adder and Full adder.

Unit 2:(15 hrs)

Boolean Algebra: Boolean laws, DeMorgan's Theorems, Sum of Products, Product of sums and karnaugh maps. Multiplexers and Demultiplexers.
Flip – Flops: RS flip – flop, D flip – flop, JK flip – flop and MS flip – flop.
Registers: Types of Registers.
Counters: Synchronous and Asynchronous Counters and their differences.

NOTE: Problems should be solved at the end of every chapter of all units

References:
1. Digital Electronics by Gothaman.
2. Digital principles and applications by Malvino and Leach.

Chairperson **University Nominee** **Chairperson** **Members** **Principal**
(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007, T.S.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD

(AUTONOMOUS)

B.Sc PHYSICS (Semester VI)

Project work Theory

4 Hours per week

Credits : 4

• The total allotted marks 100 are divided into the following way

➢ Internal Assessment (30 marks)

• First seminar (15 marks – in between 25 to 30 days after commencement of class work).
This seminar include the study of existing system, literature survey, problem definition.

• Second seminar (15 marks – in between 55 to 60 days after commencement of class work). This seminar include the requirements specification, analysis, design and partial implementation.

➢ External Assessment (70 marks)

• The students should submit one page of synopsis on the project work for display on the notice board.

• The project presentation is for 10 minutes followed by 05 minutes for discussion.

• The student should submit a dissertation/technical write-up on the project. At least two teachers will be associated with the project seminar to evaluate students for the award of seasonal marks which will be on the basis of performance in all the 3 items (synopsis, presentation, dissertation/technical write-up).

Dissertation	: 40 Marks
Presentation	: 15 Marks
Viva	: 15 Marks

30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007, T.S.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1. Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44, T.S.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Paper in lieu of project

Nano Science

Unit I: (14 Hours)

Length scales in physics, Nanostructures: 1D, 2D and 3D nanostructures (nanodots, thin films, Nano wires, Nanorods), Band structure and density of states of materials at nanoscale, Size Effects in ano systems, Quantum confinement in 3D, 2D, ID nanostructures and its consequences.

Unit II: (14 hours)

SYNTHESIS OF NANOSTRUCTURE MATERIALS: Top down and Bottom up approach, Photolithography. Ball milling. Gas phase condensation. Vacuum deposition. Physical vapor deposition (PVD): Thermal evaporation, E-beam evaporation, Pulsed Laser deposition. Chemical vapor deposition (CVD). Sol-Gel. Electro deposition. Spray pyrolysis. Hydrothermal synthesis. Preparation through colloidal methods. MBE growth of quantum dots.

CHARACTERIZATION: X-Ray Diffraction. Optical Microscopy. Scanning Electron Microscopy. Transmission Electron Microscopy. Atomic Force Microscopy. Scanning Tunneling Microscopy.

Unit III : (14 Hours)

OPTICAL PROPERTIES: Coulomb interaction in nanostructures. Concept of dielectric constant for nanostructures and charging of nanostructure. Quasi-particles and excitons. Excitons in direct and indirect band gap semiconductor nanocrystais.

Quantitative treatment of quasi-particles and excitons, charging effects. Radiative processes: General formalization-absorption, emission and luminescence. Optical properties of heterostructures and nanostructures.

ELECTRON TRANSPORT: Carrier transport in nano structures. Coulomb blockade effect, thermionic emission, tunneling and hoping conductivity. Defects and impurities: Deep level and surface defects.

Unit IV: (14 hours)

APPLICATIONS: Applications of nanoparticles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells). Single electron devices (no derivation).

CNT based transistors. Nanomaterial Devices: Quantum dots heterostructure lasers, optical switching and optical data storage. Magnetic quantum well; magnetic dots - magnetic data storage. Micro Electromechanical Systems (MEMS), Nano

Electromechanical Systems (NEMS).

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

Reference books:

1. C.P. Poole, *Jr.* Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).
2. S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company)
3. K.K. Chattopadhyaj' and A. N. Banerjee, Introduction to Nanoscience and Technology (PHI Learning Private Limited).
4. Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).
5. M. Hosokawa, K. Nogi, M. Naita, T. Yokoyama, Nanoparticle Technology Handbook (Elsevier, 2007).
6. Bharat Bhushan, Springer Handbook ofNanotechnology (Springer-Verlag, Berlin, 2004).

30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

HEAD
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

2.

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

Head of the Department
Department of Physic s
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD

(AUTONOMOUS)
DEPARTMENT OF PHYSICS

Semester – V

GE Theory Model Question Paper

Time: 2 1/2 hrs

Max.Marks:70

SECTION A

I Write short notes on any Six of the following: **6 X 3 = 18 Marks**

1. A question from Unit I
2. A question from Unit I
3. A question from Unit II
4. A question from Unit II
5. A question from Unit III
6. A question from Unit III
7. A question from Unit IV
8. A question from Unit IV

SECTION B

II Answer all the Questions. Each question carries 13 marks **4 X 13 = 52 Marks**

9 (a) A question from Unit I
(b) A question from Unit I
(OR)
(c) A question from Unit I
(d) A question from Unit I

10. (a) A question from Unit II
(b) A question from Unit II
(OR)
(c) A question from Unit II
(d) A question from Unit II

11.(a) A question from Unit III
(b) A question from Unit III
(OR)
(c) A question from Unit III
(d) A question from Unit III

12.(a) A question from Unit IV
(b) A question from Unit IV
(OR)
(c) A question from Unit IV
(d) A question from Unit IV

30/11/22 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Prof. M. SRINIVAS M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007, T.S.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

2.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44. T.S.

Head of the Department
Department of Physics
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD

(AUTONOMOUS)
DEPARTMENT OF PHYSICS
PANEL OF EXAMINERS

S.NO	NAME OF THE EXAMINER	MOBILE NUMBER
1.	Dr. Y. Mallaiah Asst. Professor, (HOD) Department of Physics. University College of PG, Secunderabad, Hyd	9394025552
2.	Dr. P. Sakuntala Asst. Professor, (HOD) Department of Physics. RBVRR Women's College, Narayanaguda, Hyd.	9849885589
3.	Dr. M. Satish Asst. Professor, Department of Physics Govt. Degree College, Khairatabad, Hyd.	9676512412
4.	Dr.Komala Asst. Professor, (HOD) Department of Physics. St.pious X Degree& PG College, Nacharam, Hyd.	9989740735
5.	Dr.Chinnababu Asst. Professor, Department of Physics. Govt. Degree College, Vidyanagar, Hyd.	9394801744
6.	Dr.Vinodini Asst. Professor, Department of Physics. Govt. City College, Hyderabad.	9949214767
7.	Smt. V. R. Manjula Asst. Professor, Department of Physics. Bhavan's New Science College, Narayanaguda, Hyd.	9676499011
8.	Dr.Sarala Asst. Professor, Department of Physics. St. Ann's Degree College for Women, Mehedipatnam, Hyderabad.	9440750244
9.	Dr. N. V. Prasad Asst. Professor, Department of Physics. Osmania University.	9849553669
10.	Dr. D. Aparna Asst. Professor, Department of Physics. Osmania University (OU Engineering), Hyderabad.	810667887
11.	Smt. UshaPraveena Asst. Professor, Department of Physics. St. Francis, Hyderabad.	8106265680

B. Sreedevi 30/11/22

HEAD 30/11/2022
Department of Physics
University College of Science
Osmania University,
Hyderabad-500 007. T.S.

Department of Physics
Hindi Mahavidyalaya
(Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

Dr. M. PRASAD
Professor
Department of Physics
Osmania University
Hyderabad-500 007. T. S.

B. Sreedevi 30/11/22

Chairperson **University Nominee** **Chairperson** **Members** **Principal**

(BOS, Dept of Physics , OU)

Department of Physics
Hindi Mahavidyalaya
Autonomous & NAAC REACCREDITED)
Nallakunta, Hyderabad-500 044.

Prof. M. SRINIVAS
M.Sc., Ph.D.
Chairperson, Board of Studies
Department of Physics
Osmania University
Hyderabad-500 007, T.S

1.

2.

PRINCIPAL
HINDI MAHA VIDYALAYA
(AUTONOMOUS)
Arts, Commerce & Science
Nallakunta, Hyderabad-44, T.S.

Head of the Department
Department of Physic s
St. Pious X P.G. College For Women
Snehapuri Colony, Nacharam, Hyd-76.