

I & II Semester
B.E./B.Tech. (Chemical Engg.)/
B.Text.E. Exams.

Prospectus No. 10171

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

PRESCRIBED FOR
Bachelor of Engineering
Four Year Degree Course
Common for all branches of Engineering,
B.Tech. (Chem.Engg.) and B.Text E.
Semester I & II Examinations,
2009-2010
Semester Pattern



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1S3**APPLIED CHEMISTRY - I**

Unit I : Electrochemistry, Corrosion and Corrosion Control :-

A) Nernst Theory of Single Electrode potential, Nernst equation, Electrochemical series, Galvanic series. Batteries-Principle of Batteries, Types of Batteries-Lead Storage cell, Zn-C dry cell and Silveroxide battery. Fuel cell-H₂-O₂ type. Solar Cells and production of electricity using solar energy.

B) Corrosion : Dry & Wet corrosion and its mechanism, Types of corrosion-Pitting corrosion, waterline corrosion, intergranular corrosion, soil corrosion and stress corrosion.

C) Corrosion control - Design and material selection, Anodic and cathodic protection, hot dipping :- galvanizing, and tinning. (10 Hrs.)

Unit II : Water treatment and analysis :-

Hardness of water, Units of Hardness, Experimental determination by EDTA method, Softening of water and processes like - Lime-Soda, Ion exchange and Zeolite, Numerical problems based on L-S & Zeolite process. Potable Water-Disinfection by Cl₂ & O₃.

Boiler feed water & Boiler troubles :- Requirement and treatment of Boiler feed water, Boiler corrosion, Caustic embrittlement, Priming and foaming & Scale and sludge formation and Internal treatment for boiler feed water {Carbonate conditioning, phosphate conditioning.} (10 Hrs.)

Unit III : Phase rule and Cement :-

A) Phase rule and its applications :- Phase rule, Study of terms phase, components and degrees of freedom. Application of Phase rule to one component system (Water System) & two component systems (Cd-Bi, Fe-C).

B) Cement :- Raw materials, Classification of cement, Portland cement, Manufacture of cement by wet process, setting and hardening of cement, heat of hydration, soundness of cement. (10 Hrs.)

PRACTICAL EXAMINATION

1. Determination of NaOH and Na₂CO₃ in given alkali mixture.
2. Determination of hardness of water by EDTA titration method.
3. Determination of chloride ions in water sample.
4. Determination of chlorine in water sample.

5. Determination of DO in water sample.
6. Determination of % Fe₂O₃ in given cement sample.
7. Determination of % CaO in given cement sample.
8. Determination of pH of a solution by pH-meter.
9. To draw phase diagram of Lead-Tin binary system and determination of the eutectic temperature and composition at any temperature.
10. Determination of conductivity of a given sample using conductometer.

(Minimum of Seven experiments from above)

1 S 4**COMPUTER SCIENCE-I**

UNIT I: Computer Fundamentals:

Organization of PC, Introduction to DOS and Windows Operating Systems, Number Systems: Decimal, Binary, Octal, Hexadecimal, Conversion to each other. Binary addition, Negative number representation, Binary Subtraction, De Morgan's theorem, Boolean algebra, Logic gates, S-R Flipflop, Truth tables, Organization of Von Neumann's Stored Program Computer. (8hr)

UNIT II: C Fundamentals: Introduction to C language, First C program, Program execution,

Keywords, Character set, Built-in Data Types, Variables, Expressions, Operators & their precedence. Single character I/O, String I/O, Format specifiers for scanf() and printf() functions. (10hr)

UNIT III: C Control Structures:

Decision-making using if, if-else and switch-case statements, Loops using for, while, do-while statements, break and continue statements. Functions: declaration, definition and parameter passing mechanism. (6hr)

BOOKS :-

1. Schildt Herbert – C Made Easy (Osborne-McGraw Hill)
2. Tim Grady – Turbo C Programming (McGraw Hill)
3. Kochan S. G. – Programming in C (Hyden)
4. Kalicharan – C By Example (Cambridge)

COMPUTER SCIENCE LABORATORY :-

The objective of this lab is not only to provide a Hands-on Experience to C programming, but also to expose the candidates to the latest tools of the trade. This lab is based on DOS, Windows, MS-Word, MS-Powerpoint, MS-Access and Internet Explorer and it is expected that the candidate demonstrates adequate to high skills with these tools and programming with C.

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1. Basic commands of DOS
2. Using Windows
3. Using MS-Word
4. Using MS-Powerpoint
5. Using MS-Access
6. Introduction to Internet, Explorer & Web Browsing
7. Programming in C"

1 S 5 ENGINEERING MECHANICS-I

UNIT-I 1. FUNDAMENTALS:

Concept of force, moment of a force about a point and about an axis, couple, resolution and compositions of co-planar force system, reduction of system of forces into a force and a couple-equivalent force system.

2. EQUILIBRIUM:

Free-body diagrams, equations of equilibrium, problems of equilibrium involving co-planar force systems acting on particle, rigid body and system of rigid bodies, problems of equilibrium of non-co-planar concurrent force system. (10)

UNIT-II 1. TRUSSES & FRAMES:

a) Analysis of simple plane trusses, Method of joints, Method of sections (b) analysis of frames involving ideally connected members.

2. FRICTION

Friction : Coulomb's laws of dry friction, static belt friction. (10)

UNIT-III: 1. PROPERTIES OF AREAS:

Centroid of plane areas, second moment of area and product of inertia, transfer theorems, polar moment of inertia, radius of gyration, definition of principle axes and principle moment of inertia.

2. PROPERTIES OF SOLIDS:

C.G.Ixx, Iyy, Izz for Solids like sphere, cylinder, cube parallel piped. (10)

Practicals:

(For 1 S 5 Engg. Mechanics-I & 2 S 5 Engg. Mechanics-II)

Four compulsory graphical solutions to the problems of statics,

1. Law of Polygon of forces
2. Reactions at the supports of simple beam.
3. Jib crane/shear leg.
4. Determination of coefficient of friction on inclined plane.
5. Determination of Coefficient of coil friction.
6. Determination of mass moment of inertia of fly wheel
7. Determination of gravitational acceleration by compound pendulum.
8. Determination of velocity ratio, law of machine, simple screw jack, differential wheel axle, worm and worm wheel, single and double purchase crab

A journal/ report on experiment conducted shall be submitted by each student. Practical examination shall be viva – voce based on Engineering Mechanics I and Engineering Mechanics II practical and the syllabus of the course.

BOOKS RECOMMENDED:

1. Singer, F. L., Engineering Mechanics
2. Timoshenko and Young, Engineering Mechanics
3. Beer and Johnston, Engineering Mechanics, McGraw Hill
4. Shames, I. H., Engineering Mechanics, Prentice Hall
5. Haug, I. C., Engineering Mechanics
6. Thadani, Engineering Mechanics

1 S 6 ELECTRICAL ENGINEERING-I

Unit I: Basic concept of Voltage, Current, Power and Energy, relationship between them. Resistance, Resistivity, Conductivity. Temperature coefficient of resistance. Series Parallel circuits, Star-Delta transformations.

Ohm's Law, Kirchoff's laws, Superposition theorem, Thevenin's Theorem.

Unit II: Magnetic fluxes, Flux density, MMF, Reluctance, Magnetic field intensity, Leakage and Fringing of flux, Series Parallel Magnetic circuits.

Principles of electromagnetic induction, self and mutual induction, coefficient of coupling. Energy store in magnetic field.

Unit III: Measuring Instrument, classification, deflecting, controlling, damping and breaking torques. Basic principles of operation of Ammeter, Voltmeter, Wattmeter and Energymeter.

Electric Wiring. Types of Wires and Cables, Designation of wires, various types of wiring, accessories, wiring diagram, domestic installation, testing of domestic wiring, earthing, safety measures.

PRACTICALS:

Minimum Six experiments based on above syllabus.

BOOKS RECOMMENDED:

- 1) Basic Electrical Engineering : V.N.Mittle, TMGH.
- 2) Electrical Technology : Edward Hughes, ELBS.
- 3) A Text Book of Basic Electrical Engineering : B.H.Deshmukh, (Nirali Publication).

1 S 7 ENGINEERING DRAWING-I

UNIT I : Loci of Points, Engineering Curves.

- a) Locus problem on simple Links mechanism.
- b) Conic sections, Normal and Tangent to conic section, cycloid, epicycloids and hypocycloid, involute, to draw an archimedean, logarithmic or equiangular spiral.

Unit II : Projection of points, lines and planes.

- a) Projection of Points.
- b) Projection of lines inclined to both planes, separately to HP and VP.
- c) Projection of planes inclined to both planes.

(10 Hrs)

Unit III : Orthographic Projections

Introduction to orthographic projections, first and third angle method of projection, conversion of simple pictorial views into orthographic views, Dimensioning Technique.

PRACTICALS : Each candidate will submit a set of at least five drawing sheets on above syllabus evenly distributed as per list attached.

The practical examination will consist of oral on the topics based on above syllabus.

LIST OF SHEETS:

- 1 Loci of points on link mechanism.
- 2 Various Curves from Unit I of syllabus
- 3 Projection of Straight lines.
- 4 Projections of Planes.
- 5 Minimum two problems for orthographic projection (First & Third angle projection).
- 6 Free hand sketches of simple machine elements. [Screw threads (ISI thread profiles). Types of studs & set screws, washers, etc.]

REFERENCES:

1. Engineering Drawing : N.D.Bhatt
2. Machine Drawing : N.D.Bhatt
3. Engineering Drawing : P.J.Shah.

1 S 8**WORK SHOP - I**

- I) Smithy - Introduction to various smithy tools & Equipments, their use, forging operations.
One job on upsetting, drawing down, flatterring
- II) Fitting and Taps & dies :- Introduction to different fitting tools, their use, different measuring tools, introduction to Taps & Dies.
 - a) One job on fitting.
 - b) Demonstration showing basic operations like plain turning facing, step turning etc.

* Journal should be prepared and submitted based on the jobs prepared by using various tools, equipments, machines in the above shops, information of tools and equipments.

SEMESTER : SECOND**2 S 1****MATHEMATICS-II****SECTION-A**

- Unit I : Complex numbers - Demoivre's theorem and its applications. Hyperbolic and inverse hyperbolic functions. Separations of real and imaginary parts. Logarithm of complex numbers. (10 Hrs.)
- Unit II : Matrices : Inverse of matrix by adjoint matrix method, inverse of matrix by partitioning, Rank of a matrix. Solution of simultaneous equations. Characteristic roots, characteristic vectors. Cayley Hamilton theorem (statement and verification), Reduction of matrix to diagonal form. (10 Hrs.)
- Unit III : Fourier Expansions - periodic function, Fourier expansion of periodic function in $(C, C+2L)$. Even and odd functions. Half range Fourier expansion, Harmonic analysis. (10 Hrs.)

SECTION-B

- Unit IV : a) Scalar & Vector products of three vectors & their properties, multiple products.
b) Double integration, change of order of integration and transformation to polar co-ordinates. (10 Hrs.)
- Unit V : Triple integration, Transformation to spherical polar co-ordinates and Differentiation under integral sign. (10 Hrs.)
- Unit VI : Evaluation of areas by double integration, volume of solids by triple integration, Mean and root mean square values. (10 Hrs.)

Books Recommended :-

- 1) Elements of Applied Mathematics by P.N. Wartikar & J.N. Wartikar.
- 2) A Text Book of Applied Mathematics by P.N. Wartikar & J.N. Wartikar.
- 3) A Text Book of Differential Calculus by Gorakh Prasad.
- 4) Engg. Mathematics by Chandrika Prasad.
- 5) Advancing Engg. Mathematics by E.K. Kreyzig.
- 6) Higher Engg. Mathematics by B.S. Grewal.
- 7) Text Book of Engg. Mathematics, Vol. II by D.T. Deshmukh.
- 8) Engineering Mathematics, Vol. II by N.A. Patil, S.S.G.M.C.O.E., Shegaon.
- 9) Engineering Mathematics -II by Thakare S.V., Das Ganu Prakashan, Nagpur.

APPLIED PHYSICS-II**2 S 2**

- Unit I : Atomic Models : Bohr's H-atom model, energy level diagram and spectral lines, Frank-Hertz experiment, Vector atom model, Quantum numbers of electron in atom, Pauli's principle and electronic configuration, Physical concept of electron wave, wave packet, definition and physical significance of wave function. Introduction to LASER, working of LASER using three level and its applications.
- Unit II : Electric and Magnetic fields : Basic concepts of electric and magnetic fields, motion of charge particles in electric and magnetic fields (Uniform electric field, uniform magnetic field, transverse electric and magnetic fields), Thomson's method for measurement of e/m of electron, Positive rays, q/m of positive rays by Thomson's parabola method, Study of isotopes and Bainbridge mass spectrograph, Cyclotron, Cathode ray oscilloscope and its applications.
- Unit III : Optics : Interference Coherent Sources and conditions for interference, Thin film interference, Newton's rings.
Diffraction : Introduction to Fresnel's diffraction, Fraunhofer's diffraction, Plane diffraction grating, determination of wavelength of a spectral line by using plane diffraction grating, electron microscope.
Polarization : Polarization by reflection, Brewster's law, law of Malus. Polarization by double refraction, Nicol's prism (construction, working and application as an analyser), Elliptically and circularly polarized light, Quarter wave plate and half wave plate, Production of plane, circularly and elliptically polarized light. Introduction to optical fibers and applications.

PRACTICAL : At list Six experiments based on the theory syllabus.**Reference Books :**

- 1) Modern Physics by S.L. Gupta and S. Gupta.
- 2) Text Book of Engg. Physics by Dr. (Mrs.) S.D. Wakde and J.S. Bakre.
- 3) Modern Physics by J.B. Rajam.
- 4) Optics by Ajay Ghatak.
- 5) Optics by S.L. Kakani and K.C. Bhandari.
- 6) Engineering Physics, Theory & Practical by Prakash Manikpure & others.
- 7) A Text Book of Engg. Physics, Theory & Practical by R.S. Bobde & Dr. Anwane, Nirali Pub.

L: Theory Lecture
 T: Tutorial
 P: Practical
 D: Drawing/Design Work

APPENDIX-'A'
EIGHT SEMESTER B.E. DEGREE COURSE
COMMON FOR ALL BRANCHES OF
ENGINEERING INCLUDING B.TECH.
(CHEMICAL ENGG.) AND B. TEXT. ENGG.
SEMESTER PATTERN
SEMESTER : FIRST

Abbreviations :-
 S : Semester Pattern

Sr. No.	Subject No.	SUBJECT	TEACHING SCHEME				EXAMINATION SEHEME								
			L	T	P/D	Total	Theory			Practical					
					periods/ Week	Dura- tion of Papers (Hrs.)	Max. Marks Theory Papers	Maximum Marks College Assess- ment	T O T A L	Min. Pass Marks	Max. Marks	Max. Marks College Assess- ment	T O T A L	Min. Pass Marks	
1.	1S1	Mathematics-I	4	1	-	5	3	80	20	100	40	--	--	--	--
2.	1S2	Applied Physics-I	2	1	2	5	2	40	10	50	20	--	25	25	12
3.	1S3	Applied Chemistry-I	2	1	2	5	2	40	10	50	20	--	25	25	12
4.	1S4	Computer Science-I	2	1	2	5	2	40	10	50	20	--	25	25	12
5.	1S5	Engineering Mechanics-I	2	1	2	5	2	40	10	50	20	--	25	25	12
6.	1S6	Electrical Engineering-I	2	1	2	5	2	40	10	50	20	--	25	25	12
7.	1S7	Engineering Drawing-I	2	-	2	4	3	40	10	50	20	--	25	25	12
8.	1S8	Workshop-I	-	-	2	2	-	--	--	--	--	--	50	50	25
TOTAL			16	6	14	36				400				200	

GRAND TOTAL : 600

L: Theory Lecture
 T: Tutorial
 P: Practical
 D: Drawing/Design Work

Abbreviations :-
 S : Semester Pattern

**EIGHT SEMESTER B.E. DEGREE COURSE
 COMMON FOR ALL BRANCHES OF
 ENGINEERING INCLUDING B.TECH.
 (CHEMICAL ENGG.) AND B. TEXT. ENGG.
 SEMESTER PATTERN
 SEMESTER : SECOND**

Sr. No.	Subject No.	SUBJECT	TEACHING SCHEME				EXAMINATION SEHEME								
			L	T	P/D	Total	Theory			Practical					
						periods/ Week	Dura- tion of Papers (Hrs.)	Max. Marks Theory Papers	Maximum Marks College Assess- ment	T O T A L	Min. Pass Marks	Max. Marks	Max. Marks College Assess- ment	T O T A L	Min. Pass Marks
1.	2S1	Mathematics-II	4	1	-	5	3	80	20	100	40	--	--	--	--
2.	2S2	Applied Physics-II	2	1	2	5	2	40	10	50	20	15	10	25	12
3.	2S3	Applied Chemistry-II	2	1	2	5	2	40	10	50	20	15	10	25	12
4.	2S4	Computer Science-II	2	1	2	5	2	40	10	50	20	15	10	25	12
5.	2S5	Engineering Mechanics-II	2	1	2	5	2	40	10	50	20	15	10	25	12
6.	2S6	Electrical Engineering-II	2	1	2	5	2	40	10	50	20	15	10	25	12
7.	2S7	Engineering Drawing-II	2	-	2	4	3	40	10	50	20	15	10	25	12
8.	2S8	Workshop-II	-	-	2	2	-	--	--	--	--	25	25	50	25
TOTAL			16	6	14	36				400				200	

GRAND TOTAL : 600

LIST OF EXPERIMENTS

- 1) To study the characteristics of semi-conducting diode.
- 2) To study the characteristics of Zener diode and voltage regulation.
- 3) Energy band-gap of semiconductor material by using reverse biased P-N junction.
- 4) To study the characteristics of light-emitting diode and determine Eg.
- 5) To study the characteristics of photo-diode.
- 6) To study the characteristics of LDR.
- 7) Resistivity of Four Probe Method and determination of energy band gap.
- 8) Study of Hall effect.
- 9) Study of CRO.
- 10) e/m by Thomson's method.
- 11) Study of transistor in C.B. mode.
- 12) Study of transistor in C.E. mode.
- 13) Study of photo-cell and determination of Planck's constant.
- 14) Study of semiconducting diode as a rectifier.
- 15) Determination of wavelength of a spectral line using diffraction grating.
- 16) Interference of light in thin films.
To determine the wavelength of sodium light from diameter of Newton's rings.
- 17) To calibrate a spectrograph and to determine Rydberg constant.
- 18) Determination of extraordinary refractive index, using Nicol prism and spectrometer.
- 19) Determination of divergence of LASER beam.
- 20) Determination of grating element of a diffraction grating using LASER beam.

2S3**APPLIED CHEMISTRY-II**

- Unit I : Fuels and Lubricants :- A) Fuels :- Definition of Chemical fuel, Classification, Calorific value-gross and net, Analysis of coal, Proximate and ultimate analysis and its significance, Cracking of petroleum fractions, Use of gasoline and diesel in internal combustion engines, Knocking, Chemical constitution and knocking properties, Octane number, Cetane number, Antiknocking agents, Combustion and numerical problems based on this, Flue gas analysis by Orsat apparatus.
- B) Lubricants :- Classification of lubricants, mechanism of lubrication, testing of lubricants for i) Viscosity and Viscosity index ii) Flash point and fire point iii) Carbon residue & iv) Cloud & Pour point, Criteria for selection of lubricants for I.C. engines, cutting tools, gears and transformers. (10 Hrs.)

- Unit II : Polymers, Resins, Plastics and Rubbers :- Classification of polymers on the basis of their structure and composition. Types of polymerization, Mechanism of Addition polymerization {Free radical cationic & Anionic}, Thermoplastic and thermosetting resins, Preparation, properties and uses of polyvinyl chloride, polytetrafluoro ethylene, bakelite. Silicone resin, preparation, properties and application of linear chain silicone, silicone fluids, greases & solid silicone. Natural rubber, processing of latex & compounding of rubber, vulcanization, properties and uses of Synthetic rubber :- styrene rubber, nitrile rubber, butyl rubber, acrylic rubber and silicon rubber. Stress-strain relationship of plastics and rubbers in comparison with metal. (10 Hrs.)

- Unit III : Environmental Chemistry and Pollution :-

A) Environmental Chemistry :- Segments of environment : Lithosphere, Hydrosphere, Bio-sphere & Atmosphere.

B) Pollution :- Definition and classification of air pollutants, Causes and effects of major air pollutants like-CO₂, CO, SO₂, NO₂, HC, Fuel additives, Toxic metals - Pb, As, Zn, Cr & Hg. Green House Effect, Acid rain, Ozone depletion and Photochemical Smog.

C) Pollution control :- Method and equipment used for controlling Particulate emissions :- Wet scrubber, Fabric filters, Cyclone separators, Electrostatic precipitators. Method and equipment used to control gaseous pollutants :- Combustion, Adsorption, Absorption. (10 Hrs.)

PRACTICAL EXAMINATION

1. Preparation of phenol formaldehyde resin
2. Preparation of urea formaldehyde resin
3. Determination of molecular weight of a polymer
4. Determination of viscosity of lubricating oil by Redwood viscometer No. 1 and / or No. 2.
5. Determination of flash point of lubricating oil by Pensky-Marten's apparatus or Abel's apparatus.
6. To carry out proximate analysis of coal
7. Determination of acid value of a lubricating oil
8. Determination of Fe²⁺ and Fe³⁺ in given solution.
9. Determination of Zn by complexometric titration.
10. Determination of Adiabatic compressibility of ions by ultrasonic interferometer.

(MINIMUM OF SEVEN EXPERIMENTS FROM ABOVE)

2 S 4 COMPUTERSCIENCE-II**UNIT-I: Scope Rules and Arrays :-**

Storage classes : automatic, static, extern, register type.
Introduction to arrays : single dimensional and multi-dimensional.
Strings, Arrays of strings and string related functions.

UNIT-II: Pointers :-

Definition and uses of pointers. Address of operator, pointer arithmetic, Pointers and functions. Pointers and Arrays, Arrays of pointers. Pointers and Strings.

UNIT-III: Structures and Files :-

Declaring and using the structures. Operation on structures. Arrays of structures, Pointers to structures. Introduction to Files. File types. File handling functions. Command line arguments.

BOOKS :-

1. Schildt Herbert - C Made Easy (Osborne-McGraw Hill)
2. Tim Grady - Turbo c Programming (McGraw Hill)
3. Kochan S.G. - Programming in C (Hyden)
4. Kalicharan - C By Example (Cambridge)

COMPUTER SCIENCE LABORATORY :-

Minimum twelve programs based on the syllabus. The programs should cover Arrays, Functions, Pointers, Structures Files and the Command-line arguments.

2 S 5 ENGINEERING MECHANICS-II**Unit-I KINEMATICS :**

1. Kinematics: Definitions of displacement, velocity and acceleration and their relations, rectilinear motion under variable & constant accelerations, motion curves, simple relative motion between two particles, curvilinear motion using rectangular co-ordinates, normal and tangential components.
2. Kinematics of rigid body motion in rectilinear translation: rotation about a fixed axis and plane motion.

Unit-II KINETICS :

1. Kinetics of rectilinear and circular motion of a particle acted upon by constant and variable force system, D'Alembert's principle concept of dynamic equilibrium, rectilinear motion of several interconnected particles
2. Kinetics of rigid body rectilinear translation, rotation about a fixed axis of rigid body.

Unit-III WORK ENERGY METHOD :

1. Work, power and energy: work-energy equation for a motion of a particles, system of particles, work energy equation for rigid bodies rectilinear translation.
2. IMPULSE AND MOMENTUM METHOD: Linear impulse. linear momentum, momentum equation for a particle and a system of particles, direct central, impact, collision of two particles, coefficient of restitution.

Practicals:

(For 1S5 Engineering Mechanics – I & 2S5: Engineering Mechanics – II)

Four compulsory graphical solutions to the problems of statics.

1. Law of polygon of forces
2. Reactions at the supports of simply supported beam
3. Jib crane/ shear leg
4. Determination of coefficient of friction on inclined plane
5. Determination coefficient of coil friction
6. Determination of mass moment of inertia of fly – wheel
7. Determination of gravitational acceleration by compound pendulum
8. Determination of velocity ratio, law of machine, simple screw jack, differential wheel axle, worm and worm wheel, single and double purchase crab

A journal/ report on experiment conducted shall be submitted by each student. Practical examination shall be viva – voce based on Engineering Mechanics I and Engineering Mechanics II practical and the syllabus of the course.

BOOKS RECOMMENDED:

1. Singer, F. L., Engineering Mechanics
2. Timoshenko and Young, Engineering Mechanics
3. Beer and Johnston, Engineering Mechanics, McGraw Hill
4. Shames, I. H., Engineering Mechanics, Prentice Hall
5. Haug, I C., Engineering Mechanics
6. Thadani, Engineering Mechanics

2 S 6 ELECTRICAL ENGINEERING-II

Unit I: Single-phase A.C. circuits, (Sinusoidal Wave Form Only), RMS and average values, form factor, peak factor. Phasor diagram. Series Parallel A.C. circuit with resistances, inductances and capacitances. Impedance triangles. Active and reactive power.
Balanced three phase circuits, production of three phase EMF, Star-Delta balanced loads, Voltage and Current relationship between phase and line quantities, phasor diagram wave forms.

Unit II: Single phase transformer, principle of operation, construction, EMF equation, losses, efficiency, regulation, phasor diagram. Condition for maximum efficiency. Illumination. Importance and requirements of illumination, construction and working of incandescent, fluorescent, mercury vapour and neon lamps.

Unit III: D.C. Motors, Torque production, Types of Motors, (Series-Shunt, Compound), Characteristics of these motors, D.C. motors starters. Applications of D.C. motors.

Induction motors, (Single phase and Three phase), rotating magnetic fields, types of induction motors, constructional features, slip, induction motors starters. Applications.

(No Numericals on this Unit)

PRACTICALS:

Minimum Six experiments based on above syllabus.

BOOKS RECOMMENDED:

- 1) Basic Electrical Engineering : V.N.Mittle, TMGH.
- 2) Electrical Technology : Edward Hughes, ELBS.
- 3) A Text Book of Basic Electrical Engineering : B.H.Deshmukh, (Nirali Publication).

2 S 7 ENGINEERING DRAWING-II

- UNIT I Projection and section of Solids.
 a) Projections of Solids 1) Prisms 2) Pyramid 3) Cone 4) Cylinder.
 b) Projection on auxiliary planes.
 c) Section of solids keeping solids in different positions.
- UNIT II Development of Surfaces.
 Development of surfaces of Cubes, Prisms, Cylinders, Pyramids, Cones.
- UNIT III Isometric views and projections
 Isometric scales and isometric views of simple objects.
 Isometric views and projection of rectangular, cylindrical and spherical objects and representation of slots on sloping faces.

PRACTICALS: Each candidate will submit a set of at least five drawing sheets on above syllabus evenly distributed as per list attached.

The practical examination will consist of oral on the topics based on above syllabus.

LIST OF SHEETS:

- 1 Projections of Solids.
- 2 Section of Solids.
- 3 Development of surfaces based on Unit II.
- 4 Isometric drawing and Isometric projections.
- 5 Free hand sketches of simple machine elements. (Types of bolts, nuts, Locking arrangement of nuts and bolts. Foundation bolts-Rag foundation, Eye foundation, Lewis foundation, etc.)

REFERENCES:

- 1) Engineering Drawing: N. D. Bhatt
- 2) Machine Drawing: N. D. Bhatt
- 3) Engineering Drawing: P. J. Shah

2 S 8

WORK SHOP - II

- I) Sheet Metal :-
 Introduction to sheet metal tools, their use, different sheet metal joints, soldering, surface development.
 Three jobs on sheet metal joints including soldering operation in any one job.
- II) Welding :- Introduction to various welding tools, Equipments, different welding joints, Gas Welding, Electric arc welding, spot welding.
 One job on Electric arc welding. One job on spot welding.
 Demonstration on Gas welding & cutting.
 Carpentry :- Introduction to various carpentry tools
 One job on wood working joints.
 * Journal should prepared and submitted based on information of tools and equipments used, jobs prepared by using various tools, equipments, machines in the above three sections.
 Total internal marks for above three sections are 25.

Practical Examination :-

Practical examination will consists of actual preparation of one job from any of the above 3 sections.

Duration of exam. will be 3 hrs.

Total marks are 25, out of which 15 marks are for job preparation and 10 marks for viva voce which should be conducted when the students are on job.
