BHAVNAGAR UNIVERSITY

B.E. SEM VI (Elec.)

E.601 Electrical Power Utilization

THEORY	PRAC.	TOTAL	EXAM MARKS	SESSIONAL	TERM W0RK	PRAC.	TOTAL MARKS
4	2	6	100	NIL	25	50	175

1. **Electric Drives**:
   Factors effecting selection of motors – running starting, speed control,breaking–mechanical features enclosures, bearing noise–load
   Equalization – temp. rise, size of motor applications.
2. **Electrical Traction** :
   Types–various traction system–track electrification–traction motors
   – locomotives – tramways and trolleys – types of speed time
   characteristics – mechanism of train movement – tractive effect specific energy consumption–control of a.c.and d.c. motors starting
   – series parallel control–regenerative breaking– methoding control.
3. **Electric Heating and Welding** :
   Types of heating–requirements– resistance heating–induction heating – Arc furnaces – dielectric heating – type of welding – resistance and arc Welding.
4. **Electrolytic Process**:
   Principles – applications – types refining of metals, electrode position chemical and power supply.
5. **Illumination** :
   Nature of light – production of light – difference types of lamps – lighting calculations – reflectors – factory lighting, street lighting – flood lighting.
6. **Economic Aaspects** :
   load factors, maximum demand, diversity, utilization factor– load curves– base load and peak load – fixed and running cost – depreciation – tariffs – types and problems – causes of lows pf – methods of pf improvement – economics of pf improvement choice of equipments.

   Reference of books :

1. Utilization of electric energy – By E.D. Taylor Orient Lang man
2. Electric power – By – Soni,Gupta and Bhattnager

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B.E. SEM VI (Elec.)

E.602 Electrical Machines – II

Theory	Prac.	Total	Exam Marks	Sessional	Term work	Prac.	Total Marks
4	4	8	100	NIL	25	50	175

1. **Transformers** :

   Polyphone transformers – Polarity – star/star,star/delta. delta/ delta,delta/zigzag,terminal marking,nomenclatures, vector diagram, phase groups,parallel operation,Scott connection,tertiary winding, auto transformers–testing of transformers–efficiency–transients in transformers–voltage Regulation–off load and on load top changers.
2. **Induction Motors** :
   Principle of operation – basic equations – vector diagram – exact equivalent circuit – torque/slip characteristics – performancecalculations – circle diagram – high torque motors – speed control and starting of 3–ph. Induction motors – testing of I.M.as per IS–325 submersible motors–linear induction motor and stepper motors.
3. **A.C. Commutator motors** :
   Types of winding emf by transformer and rotation action–action of Commutator as frequency converter. Effect of emf injection – sources pf emf injection – T/S relation with injected emf equi. circuit and vector diagram.Regulating shunt and series commutator machines, Scharge Commutator motor, its characteristics and performance.
4. **Single Phase Commutator Motor** :
   Types – torque and mech. power equ. – vector diagram and compensated series motors – operation on a.c. and d.c.
5. **Repulsion Motors** : General principle – brush position vector diagram – starting and speed control.
6. **Single Phase Induction Motor**:
   Double field theory equivalent circuit experimental determination
   of motor parameters – methods of starting.
   Term work will be based on syllabus. Will be engaged for practical aspects.

Reference books:

1. A.C. M/CS by – M.G. Say
2. Elects Comm. motors by – Wiaylor
3. Elect. Technology Vol. II by B.L. Theraja
4. A.C.Machines by – Oarik

Bhavnagar
ELECTRICAL ENGINEERING DEPARTMENT
B.E.SEMESTER – VI
E – 603 MICROPROCESSOR FUNDAMENTALS

Theory	Prac.	Total	Exam Marks	Sessional	Term work	Prac.	Total Marks
4	2	6	100	NIL	25	50	175

1. **INTRODUCTION TO DIGITAL COMPUTERS: Block diagram of digital computer, Classification of computer languages, High level and low level languages.**

2. **MICROPROCESSOR ARCHIETECTURE AND MICROCOMPUTER SYSTEM: Microprocessor architecture and its operation, Memory, input, output, interfacing devices.**

3. **ARCHITECTURE: Instruction set and timing diagrams of 8085 microprocessor, 8085 architecture, Instruction classification of 8085, Instruction timing and operation status.**
4. **ASSEMBLY LANGUAGE PROGRAMMING OF 8085: Programming techniques, Concepts and timing delays, Stack and subroutines, Code conversions.**
5. **PARALLEL INPUT/OUTPUT AND INTERFACING: Basic interface concepts, Interfacing input and output devices like keyboards and display; Memory mapped I/O, Interfacing memory.**
6. **INTERRUPTS: 8085 interrupts, Restart as software instructions, Study of programmable interrupt controllers 8259A.**
7. **PROGRAMMABLE PERIPHERAL INTERFACE: 8255 Programmable peripheral interface, Interface of A/D converter with microprocessors, 8253 programmable interrupt timer, 8279 keyboard and display controllers.**
8. **HARDWARE: Hardware system design using memory and peripheral controllers, Software requirements, Monitor design concepts, typical applications, Concept of single chip microprocessor. Study of 8031/8051, 8096, 7810 micro controllers. Micro controller application hardware's.**

BOOKS :

1. **Microprocessor architecture programming and application. By R.S.Gaonkar, Wiley Eastern**
2. **Microprocessor principles and applications By Ajit Pal, TMH Publications.**
3. **Fundamentals of Microprocessors & microcomputers By Dr. Badri Ram, Dhanpatrai & Sons.**
4. **Introduction to Microprocessors By A.P. Mathur, TMH Publications.**

BHAVNAGAR UNIVERSITY
B.E.SEMESTER – VI ELECTRICAL
E.604 High voltage Engineering.

Theory	Prac.	Total	Exam Marks	Term work	Prac.	Total Marks
4	2	6	100	25	50	175

1.Break down mechanism of gases :–townsends break down characteristic, gas discharge characteristic, townsend's criterion of breake down, streamer theory of break down, corona, Paschein's law.

2.Break down mechanism of liquids :- Various liquid dielectrics, reconditioning of dielectrics oil, theories for conduction and break down for commercial oil.

3.Break down mechanism of solids:- Intrinsic break down, Electro mechanical break down,thermal break down,erosion break down, electrochemical B.D. Treeing & tracking, internal discharges,various solid dielectrics;

4.Generation of high voltage : High voltage D – C & A–C generation at power frequency and high frequency – impulse voltage generation.

5.Measurement of H.V.D.C., HVAC and impulse voltages.

6.Testing :–non destructive testing–three electrode system for sold & liquid dielectric testing–Meas.of insulating resistance,dielectricconstant by schering bridge, Earthings and shielding – partial discharge meas.–R F measurement destructive testing of insulators, bushings, cables, transformers, CBs, LA impulse testing

Term work :- Lab. Practical & study will be based on syllabus.

Ref. books :- (1) High voltage engineering

(2) Extra high voltage AC transmission engineering – R.K. Begamudre (wiley Eastern)

(3) Elect. Measurement & Meas. instruments. – Golding E.W. (ELBS)

BHAVNAGAR UNIVERSITY

B.E. SEM VI (Elec.)

E-605 Electrical Switch gear

Theory	Prac.	Total	Exam Marks	Term work	Prac.	Total Marks
4	0	4	100	0	0	100

Switchgear :

(1) **Theory of Circuit Interruption :** Physics of arc phenomena properties of arc Arc interruption theories.

(2) **Circuit Constants in Relation to Circuit Breaking:** Circuit breaker rating - circuit constants and circuit conditions Restriking voltage – transient characteristics of restriking voltage - Expression for R.R.R.V. - Factors affecting the restriking voltage Characteristics, current chopping interruption of small inductive currents capacitor switching.

(3) **Theory and Practice of Conventional Circuit Breakers :** Automatic switching - Air break circuit breaker, oil circuit breakers, Single and multi-break construction - performance of circuit breakers - Minimum oil circuit breakers air - blast circuit breakers. Interruption Methods - voltage distribution in oil circuit breakers with arc control Devices - modification of circuit breaker duty by shunt resistors - Comparative merits of different type of conventional circuit breakers - Auto reclosures and fuses.

(4) **Recent Development in Circuit Breakers :** Modern trends - vacuum circuit breaker, SF6 circuit breaker and D.C. Circuit breakers.

(5) Testing of Circuit Breakers : High voltage testing - short circuit testing of C.B. – direct testing and Indirect testing of circuit breakers.

Note : The students should be taken to power stations and substations to show actual equipments used in field and their operation and performance.

Reference books :

(1) Power system protection and switchgear - B.Ravichranath
- M.Chander

(2) Switchgear and protection - S.S. Rao