**BRANCH: ELECTRONICS & TELECOMMUNICATION ENGINEERING**

Paper: COMPUTER APPLICATION

Code: Co-301 Theory: 70 marks L – T – P:

Total Marks: 100 Sessional: 30 2 – 0 – 6

1. Computer Fundamentals: Brief history – Babbage machine, Von Neumann. Architecture – Block diagrams, Role of Operating Systems, concept of language and language translators, editors. Memory – different types, functions, concept of I/O devices.
2. Number System: Number system and codes: Decimal, binary, octal, hexadecimal number systems and conversion from one system to another, arithmetic operations using these numbers. Representation of a negative number in the different number systems. Complement and complement subtraction. Different codes: ASCII, 8421, Ex-3, 2421, gray, Alpha-numeric, BCD, Seven segment codes etc. and code conversion.
3. Introduction to Operating System: Concept of resource management, single user and multi user OS, Various popular OS (DOS, Windows, Unix/ Linux), elementary commands.
4. Introduction to Internet: Fundamentals of networking – need of network topology, concept of LAN, WAN, MAN, network devices – NIC, hub, bridge, switch, repeaters, gateway, modem, transmission media. Internet services, concept of global net, different browsers, search engine.
5. MS – Office: Various products, their introduction and uses.

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COMPUTER APPLICATION PRACTICAL

Code: Co-301 (P) Practical: 25

Total Marks: 50 Sessional: 25

1. Introduction to MS Office: Basic feature of MS Office, Overview of different Office Tools.
2. Introduction to MS Word: Creating and editing document, formatting documents, working with Tables, Spell checking, Mail Merging, Importing Graphics into word Document.
3. Introduction to MS Excel: Creating a new work book, entering labels, values and formulas, formatting the layout, working with functions, creating chart from data writing macros.
4. Introduction to Power Point: Creating a presentation, adding/ editing text, working with objects, formatting the presentation, placing the chart in slide, slide show and printing.
5. Introduction to MS Access: Creation of database. Creation of tables – field declaration, data type declaration, constraint declaration, working with records, querying the data base, joining tables, designing the form, the report.

Reference Books:

1. DOS quick reference: Rajib Mathur
2. Learning Word for Windows : Rajib Mathur
3. Learning Windows step by step: Rajib Mathur
4. Microsoft office unleashed: Techmedia
5. ABC of Office: Han
6. Mastering Excel: Chester
7. Excel 97 Bible: John Walkenbach
8. Teach yourself MS Access in 24 hours: Eddy and Buchanan
9. Microsoft Access 2000 fast and easy: Primatech BBP
10. Unix: S. Das

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ENGINEERING ECONOMICS & ACCOUNTANCY

Code: Hu-302 Theory: 70 L – T – P:

Total Marks: 100 Sessional: 30 3 – 0 – 0

PART A: ENGINEERING ECONOMICS

1. Introduction to Economics and its utility and scope of study.
2. Meaning and definition of utility, consumption, want value, price of goods, national income.
3. Meaning of wealth and its characteristics, classification of wealth.
4. Basic laws of demand and supply and its limitations.
5. Meaning and factors of production, land labour, capital and organisation, factors determining efficiency of labour.
6. Scale of Industries: types, advantages and disadvantages of large and small scale industries.
7. Unemployment: causes of unemployment in India and its remedies.

PART B: ACCOUNTANCY

1. Definitions, objects and principles of double entry book-keeping.
2. Transactions, classification of accounts, rules of credit and debit.
3. Journal and Ledger: Definition, posting and balance of accounts.
4. Cash Book: Single column, double column, triple column cashbook, impress system of petty cash book.
5. Trial Balance: Object of Trial balance preparation, types of errors.
6. Final accounts: preparation of trading account, profit and loss account and balance sheet.

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MATHEMATICS – III

Code: Sc-303 Theory: 70 L – T – P:

Total Marks: 100 Sessional: 30 3 – 2 – 0

GROUP A: DIFFERENTIAL EQUATIONS

1. Differential Equations: Definition and classification, order and degree, importance of differential equations in Engineering Field.
   1. Formation of ordinary differential equations.
2. Equation of the first order and of first degree with reference to Engineering.
   1. Separation of variables, equations reducible to variable separable form.
   2. Homogenous equations and its special form.
   3. Exact equation.
   4. Integrating factors – definition and rules of determining integrating factors.
   5. Linear equations and its solution.
   6. Bernoulli’s equation.
3. Equations of first order but not of the first degree.
   1. Left hand side resolvable into factors
   2. Left hand side not resolvable into factors
   3. Clairaut’s equation.
   4. Practice on units 3.1, 3.2, 3.3
4. DIFFERENTIAL EQUATIONS OF SECOND ORDER WITH CONSTANT CO-EFFICIENTS
   1. Linear equations with right hand number zero: introduction to operator D. Auxiliary equation having real and distinct roots, having equal roots, having a pair of complex roots.
   2. Equations with right hand member as an algebraic expression, trigonometric and exponential functions of X. Solution of linear equations: general and particular integral, complementary functions.
   3. Engineering application of differential equations such as L-R circuit, L-R-C circuit, Simple Harmonic Motion, Rate of growth and decay etc.

GROUP B: GRAPHICS

1. INTRODUCTION AND ITS CONCEPT
   1. Graphical solution of equations.
   2. Cubic equation (one part cubic and the other part linear)
   3. Quadratic equations
   4. Trigonometric equations
2. DETERMINATION OF LAWS OF FITTING OF CURVES

Linear, Quadratic, Exponential, Binomial etc.

GROUP C: STATISTICS

1. INTRODUCTION AND ITS APPLICATIONS IN ENGINEERING FIELD
2. MEASURES OF CENTRAL TENDENCY

2.01 Mean, median and mode (with illustration)

2.02 Relation between them, the empirical formula.

3.0 MEASURES OF DISPERSION

3.01 Range, Mean Deviation and Standard deviation (with illustration)

3.02 Variation and coefficient of variation

4.0 CORRELATION

4.01 Meaning of correlation as a bi-variate relation, scatter diagram.

4.02 Karl Pearson’s correlation formula for two variables

4.03 Determination of correlation by Karl Pearson’s formula with reference to engineering applications.

5.0 PROBALITY

5.01 Introduction to Probability

5.02 Events: mutually exclusive events, exhaustive events etc.

5.03 Definition of probability

5.04 Addition and Multiplication laws of probability

5.05 Examples on probability.

GROUP D: ANALYTICAL GEOMETRY OF 3-DIMENSIONS AND INTRODUCTION TO VECTOR ANALYSIS

1. INTRODUCTION AND DEFINITIONS
   1. Three dimensional rectangular Cartesian co-ordinates, co-ordinates of a point in space with reference to vectors, addition and subtraction formula.
   2. Coordinates of a point which divides a straight line in a given ratio.
   3. Distance between two points.
2. DIRECTION RATIOS AND DIRECTION COSINES WITH REFERENCE TO VECTORS
   1. Definition of direction ratios and direction cosines
   2. Properties of direction ratios and direction cosines
   3. Relation between direction ratios and direction cosines
   4. Angle between two lines in vector form
   5. Condition of perpendicularity and parallelism.

Recommended books:

1. Integral calculus: Das & Mukherjee
2. Engineering Mathematics: Shanti Narayan
3. An Introduction to Statistics (Vol. I&II): L. Choudhury
4. An easy approach to statistics: S.P. Gupta
5. Analytical Solid Geometry: Misra & Misra
6. Higher Secondary Mathematics: B.S. Grewal
7. Vector & Mechanics: Mena & Mishra

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ELEMENTS OF ELECTRICAL ENGINEERING

Code: El-304 Theory: 70 L – T – P:

Total Marks: 100 Sessional: 30 3 – 0 – 3

1.0 CONDUCTORS – INSULATORS: Types, properties, uses. Concept of current, voltage, capacitance, resistance and inductance.

2.0 WORK, POWER AND ENERGY: Definition and units, relation between different units, simple problems.

3.0 KIRCHOFF’S LAW: Kirchhoff’s Law – Point law and Mesh law, determination of sign with problems.

4.0 BATTERIES: Primary dry cell and secondary cell, lead acid cell, construction of lead acid cell. Chemical reactions and uses, indication of fully charged battery, maintenance, method of charging.

5.0 DC GENERATOR: Principle, construction, types and uses, E.M.F. equation.

6.0 DC MOTORS: Working principles – construction, types, circuit diagram with problems.

7.0 AC FUNDAMENTALS: Definition, representation, maximum value, average value, RMS value, from factor, power factor, simple problems.

8.0 AC CIRCUITS: Inductive reactance, capacitance reactance, definition. AC through R-L, R-C, R-L-C circuits.

9.0 TRANSFORMERS: Working principle, construction, type, EMF equation, transformation ratio, calculation of primary, secondary current, preliminary idea of on C.T.P.T. and zero transformer, losses of transformer, transformer rating.

10.0 INDUCTION MOTOR: Three Phase induction motor, principle, construction, uses, synchronised speed, full load speed.

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ELEMENTS OF ELECTRICAL ENGINEERING LAB

Code: El-304 (P)

Total Marks: 50 (Practical/Viva: 12/25; Sessional: 13/25)

1. Measurement of lamp resistance.
2. Measurement of 1-phase power by Wattmeter.
3. Testing of fuse.
4. Study of DC machine parts.
5. Study of shunt.
6. Study of multifier.
7. Measurement of energy by 1-phase energy meter.
8. Determination of magnetisation curve of DC shunt generator.
9. Starting, reversing and speed adjustment of DC shunt motor.
10. Open circuit test of single phase transformer.
11. Short circuit test of single phase transformer.
12. Study of different parts of single phase alternator.

NB: Any nine experiments.

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ANALOG ELECTRONICS-I

Code: Et-305

Total Marks: 100 Theory: 28/70 Sessional: 15/30

L – T – P: 3 – 0 – 3

1.0 VALVES: Vacuum Diode, Triode, Tetrode and Pentode – construction, operation and characteristics.

2.0 SEMICONDUCTOR DEVICES:

2.1 Review of atomic structure, Intrinsic and Extrinsic semiconductors, current carriers in semiconductors, P-type and N-type materials, P-N junction, biasing, characteristic curve, zener diode.

2.2 Special semiconductor devices – tunnel diode, backward diode, varactor and PIN diode, their construction, operation and applications.

2.3 Opto-electro devices: LDR, LED, photo diode, photo voltaic cell, solar cells, their construction, operation and applications.

2.4 Bipolar transistor: Construction and schematic representation of PNP and NPN transistors, different types of biasing system, bias stabilisation, analysis of CE, CB & CC configuration, their I/P & O/P characteristics, transistor rating and specifications.

3.0 RECTIFIER CIRCUITS

3.1 Half wave and full wave rectifier, ripple factor, rectification efficiency, Peak Inverse Voltage.

3.2 Filtering and voltage regulation: Capacitor filter, induction filter, ‘T’ filter, ‘H’ filter.

3.3 Zener voltage regulator.

4.0 AMPLIFIERS

4.1 Concept of Amplification, classification criteria of amplifiers and their classifications, Class A, B, C and AB amplifiers.

4.2 Amplifiers coupling – RC coupled, transformer coupled, direct coupled and tuned coupled amplifiers and their comparison with reference to frequency response.

4.3 Power amplifiers, push-pull amplifiers.

5.0 FEEDBACK AMPLIFIERS

5.1 Concept of feedback, positive and negative feedback. Their comparison with reference to gain, distortion noise, bandwidth, phase shift, input/output resistance and stability.

6.0 OSCILLATORS

6.1 Concept of oscillation, condition for oscillation, Barkhausen criterion, different types of oscillators, their expression for oscillating frequency and their comparison. (R-C shift oscillator, Hearty Oscillator, Crystal Oscillator)

Suggested Books:

1. Principle of Electronics: V.K. Mehta
2. Electronic Devices & Circuits: Sanjeev Gupta/Millman & Halkias/ Allen Mottershead
3. Electronic Principles: Malvino

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ANALOG ELECTRNICS-I LAB

Code: ET-305

Total marks: 50 Practical: 12/25 Sessional: 13/25

1. Familiarisation with Analog / Digital Multimeters, CRO and Signal Function Generator.
2. Study of characteristics of semiconductor diode.
3. Study of half wave and full wave rectifier circuit and filtering.
4. Study of Zener voltage regulator circuit.
5. Study of Input/ Output characteristics and gain of BJT for different configuration.
6. Verification of frequency response and bandwidth of RC and transformer coupled amplifiers.
7. Determination of efficiency of Class A, B, C and AB amplifiers and hence their comparison.
8. Determination of effect of negative feedback of gain, distortion, bandwidth, stability and input/ output of an amplifier.
9. Determination of gain and distortion of push-pull amplifier with: (a) single ended, (b) complementary pair, (c) transformer coupled.
10. Determination of waveform and frequency of Hartley, Colpitt, R-C coupled, Wein Bridge and Crystal Oscillators (Transistorised).

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