SYLLABUS FOR COMPUTER BASED TEST (CBT) FOR RECRUITMENT OF JUNIOR MANAGEMENT TRAINEE (TELECOM)

A. Subject Knowledge (80%): 160 Nos. of Multiple Choice Questions (MCQs)

SN	Subject	Topics
1	**ELECTRONIC COMPONENTS AND MATERIALS**	DIODE, TRANSISTORS AND CIRCUITS. WORKING PRINCIPLE, OF DIODE & ITS CURRENT EQUATION, SPECIFICATION AND USE OF P-N JUNCTION DIODE. BREAKDOWN OF DIODE (AVLANCE & ZENER BREAKDOWN) AND CONSTRUCTION, WORKING, CHARACTERISTICS, CLASSIFICATION OF RECTIFIERS AND WORKING OF DIFFERENT TYPES OF RECTIFIERS-HALF-WAVE RECTIFIER, FULL-WAVE RECTIFIER (CT & BRIDGE TYPE). WORKING PRINCIPLE OF P-N-P AND N-P-N TRANSISTOR, DIFFERENT TYPES OF TRANSISTOR CONNECTION (CB, CE AND CC) & INPUT AND OUTPUT CHARACTERISTICS OF TRANSISTOR IN DIFFERENT CONNECTIONS. DEFINE ALPHA, BETA AND GAMMA OF TRANSISTORS IN VARIOUS MODES. ESTABLISH THE MATHEMATICAL RELATIONSHIP BETWEEN THEM. BASIC CONCEPT OF BIASING, TYPES OF BIASING, H-PARAMETER MODEL OF BJT, LOAD LINE (AC & DC) AND DETERMINE THE Q-POINT. TYPES OF COUPLING, WORKING PRINCIPLE AND USE OF R-C COUPLED AMPLIFIER & FREQUENCY RESPONSES OF R-C COUPLED AMPLIFIER & DRAW THE CURVE
2	**ELECTRONIC DEVICES AND CIRCUITS**	BASIC CONCEPT OF ELECTRONICS, ELECTRON EMISSION & DIFFERENT TYPES., CLASSIFICATION OF MATERIAL ACCORDING TO ELECTRICAL CONDUCTIVITY (CONDUCTOR, SEMICONDUCTOR & INSULATOR) WITH RESPECT TO ENERGY BAND DIAGRAM ONLY, INTRINSIC & EXTRINSIC SEMICONDUCTOR, DIFFERENCE BETWEEN VACUUM TUBE & SEMICONDUCTOR, PRINCIPLE OF WORKING AND USE OF PN JUNCTION DIODE, ZENER DIODE AND LIGHT EMITTING DIODE (LED), LIQUID CRYSTAL DIODE(LCD) & BIPOLAR JUNCTION TRANSISTOR (BJT), BASIC CONCEPT OF MANUFACTURING INTEGRATED CIRCUITS (I.C) & ITS USES. DEFINE RECTIFIER & ITS USE, PRINCIPLES OF WORKING OF DIFFERENT TYPES OF RECTIFIERS AND THEIR MERITS AND DEMERITS, FUNCTIONS OF FILTERS AND CLASSIFICATION OF FILTER CHARACTERISTICS, D.C POWER SUPPLY SYSTEM WITH HELP OF BLOCK DIAGRAMS ONLY, DIFFERENT TYPES OF TRANSISTOR CONFIGURATION AND STATE OUTPUT AND INPUT CURRENT GAIN RELATIONSHIP IN CE, CB AND CC CONFIGURATION. , NEED OF BIASING AND DIFFERENT TYPES OF BIASING WITH CIRCUIT DIAGRAM. (CE CONFIGURATION), AMPLIFIERS AND HOW AMPLIFICATION OF SIGNAL IS ACHIEVED BY THE HELP OF TRANSISTOR, WORKING OF A SINGLE PHASE RC COUPLED AMPLIFIER & DISCUSS ITS FREQUENCY RESPONSE & GAIN VERSES BANDWIDTH RELATIONSHIP. , BASIC FUNCTION OF OSCILLATION, ESSENTIALS OF TRANSISTOR OSCILLATORS AND ITS CLASSIFICATIONS. CONCEPT OF TRANSDUCER & PRIMARY SENSOR. , DIFFERENT TYPE OF TRANSDUCERS & CONCEPT OF ACTIVE AND PASSIVE TRANSDUCER.
3	**BASIC ELECTRICAL ENGINEERING**	CONCEPT OF CURRENT FLOW, CONCEPT OF SOURCE AND LOAD, STATE OHM'S LAW AND CONCEPT OF RESISTANCE, RELATION OF V, I & R IN SERIES CIRCUIT, RELATION OF V, I & R IN PARALLEL CIRCUIT, DIVISION OF CURRENT IN PARALLEL CIRCUIT, EFFECT OF POWER IN SERIES & PARALLEL CIRCUIT, KIRCHHOFF'S LAW, SIMPLE PROBLEMS ON KIRCHHOFF'S LAW. STATE OHM'S LAW AND CONCEPT OF RESISTANCE. , RELATION OF V, I & R IN SERIES CIRCUIT, RELATION OF V, I & R IN PARALLEL CIRCUIT, DIVISION OF CURRENT IN PARALLEL CIRCUIT, EFFECT OF POWER IN SERIES & PARALLEL CIRCUIT, KIRCHHOFF'S LAW, SIMPLE PROBLEMS ON KIRCHHOFF'S LAW. DIFFERENCE BETWEEN D.C. & A.C.

4	**ELECTRICAL MATERIAL**	PROPERTIES & USES OF DIFFERENT CONDUCTING MATERIAL. PROPERTIES & USE OF VARIOUS INSULATING MATERIALS USED ELECTRICAL ENGINEERING. VARIOUS MAGNETIC MATERIALS & THEIR USES.
5	**VLSI**	FABRICATION OF MOSFET , SIMPLIFIED PROCESS SEQUENCE FOR FABRICATION , BASIC STEPS IN FABRICATION PROCESSES FLOW , FABRICATION PROCESS OF NMOS TRANSISTOR , CMOS N-WELL FABRICATION PROCESS FLOW , MOS FABRICATION PROCESS BY N-WELL ON P-SUBSTRATE , CMOS FABRICATION PROCESS BY P-WELL ON N-SUBSTRATE , LAYOUT DESIGN RULES , STICK DIAGRAMS OF CMOS INVERTER. STATIC COMBINATIONAL, SEQUENTIAL, DYNAMICS LOGIC CIRCUITS & MEMORIES , DEFINE STATIC COMBINATIONAL LOGIC ,WORKING OF STATIC CMOS LOGIC CIRCUITS (TWO-INPUT NAND GATE) , CMOS LOGIC CIRCUITS (NAND2 GATE), CMOS TRANSMISSION GATES(PASS GATE) , COMPLEX LOGIC CIRCUITS - BASICS , CLASSIFICATION OF LOGIC CIRCUITS BASED ON THEIR TEMPORAL BEHAVIOUR , SR FLIP LATCH CIRCUIT, CLOCKED SR LATCH ONLY. CMOS D LATCH. BASIC PRINCIPLES OF DYNAMIC PASS TRANSISTOR CIRCUITS, DYNAMIC RAM, SRAM, FLASH MEMORY.
6	**DIGITAL ELECTRONICS**	**BASICS OF DIGITAL ELECTRONICS:** NUMBER SYSTEM-BINARY, OCTAL, DECIMAL, HEXADECIMAL - CONVERSION FROM ONE SYSTEM TO ANOTHER NUMBER SYSTEM, ARITHMETIC OPERATION-ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION, 1'S & 2'S COMPLEMENT OF BINARY NUMBERS& SUBTRACTION USING COMPLEMENTS METHOD , DIGITAL CODE & ITS APPLICATION & DISTINGUISH BETWEEN WEIGHTED & NON-WEIGHT CODE, BINARY CODES, EXCESS-3 AND GRAY CODES. **LOGIC GATES:** AND,OR,NOT,NAND,NOR, EXCLUSIVE-OR, EXCLUSIVE-NOR--SYMBOL, FUNCTION, EXPRESSION, TRUTH TABLE & TIMING DIAGRAM , UNIVERSAL GATES& ITS REALIZATION , BOOLEAN ALGEBRA, BOOLEAN EXPRESSIONS, DEMORGAN'S THEOREMS, REPRESENT LOGIC EXPRESSION: SOP & POS FORMS , KARNAUGH MAP (3 & 4 VARIABLES)&MINIMIZATION OF LOGICAL EXPRESSIONS ,DON'T CARE CONDITIONS. **COMBINATIONAL LOGIC CIRCUITS :** HALF ADDER, FULL ADDER, HALF SUBTRACTOR, SERIAL AND PARALLEL BINARY 4 BIT ADDER, MULTIPLEXER (4:1), DE- MULTIPLEXER (1:4), DECODER, ENCODER, DIGITAL COMPARATOR (3 BIT) , SEVEN SEGMENT DECODER (DEFINITION, RELEVANCE, GATE LEVEL OF CIRCUIT LOGIC CIRCUIT, TRUTH TABLE, APPLICATIONS OF ABOVE). **SEQUENTIAL LOGIC CIRCUITS**: PRINCIPLE OF FLIP-FLOPS OPERATION, ITS TYPES,SR FLIP FLOP USING NAND,NOR LATCH (UN CLOCKED) , C L O C K E D SR,D,JK,T,JK MASTER SLAVE FLIP-FLOPS-SYMBOL, LOGIC CIRCUIT, TRUTH TABLE AND APPLICATIONS , CONCEPT OF RACING AND HOW IT CAN BE AVOIDED. **REGISTERS, MEMORIES & PLD:** SHIFT REGISTERS-SERIAL IN SERIAL - OUT, SERIAL- IN PARALLEL-OUT, PARALLEL IN SERIAL OUT AND PARALLEL IN PARALLEL OUT, UNIVERSAL SHIFT REGISTERS-APPLICATIONS. , TYPES OF COUNTER & APPLICATIONS, BINARY COUNTER, ASYNCHRONOUS RIPPLE COUNTER (UP & DOWN), DECADE COUNTER. SYNCHRONOUS COUNTER, RING COUNTER, CONCEPT OF MEMORIES-RAM, ROM, STATIC RAM, DYNAMIC RAM, PS RAM, BASIC CONCEPT OF PLD & APPLICATIONS.
7	**COMPUTER PROGRAMMING**	SOFTWARE CONCEPT, SYSTEM SOFTWARE, APPLICATION SOFTWARE OVERVIEW OF OPERATING SYSTEM OBJECTIVES AND FUNCTIONS OF O.S , TYPES OF OPERATING SYSTEM: BATCH PROCESSING, MULTIPROGRAMMING, TIME SHARING, PROGRAMMING LANGUAGES COMPILER, INTERPRETER COMPUTER VIRUS DIFFERENT TYPES OF

		COMPUTER VIRUS DETECTION AND PREVENTION OF VIRUS. BASIC DOS COMMANDS (CLS, DIR, DATE, TIME, VERSION, MD, CD, RD, DEL, COPY, REN, USE OF WILD CARDS, PATH) BASIC WINDOWS OS OPERATIONS (DESKTOP, ICONS,, START BUTTON, TASK BAR) MOUSE OPERATIONS- SINGLE CLICK, DOUBLE CLICK, DRAG MAXIMIZE, MINIMIZE, RESTORE WINDOWS EXPLORER, MY COMPUTER FILES AND FOLDERS, COPY, CUT, PASTE UTILITIES: WORD, NOTEPAD, PAINT, CALCULATOR ETC. BASIC OPERATIONS OF WORD PROCESSING PACKAGE. (MS-WORD) BASIC OPERATIONS OF ELECTRONIC SPREAD SHEET PACKAGE. (MS-EXCEL) BASIC OPERATIONS OF PRESENTATION PACKAGE (MS- POWER POINT) (CREATE, EDIT, FORMAT, SAVE, PRINT/VIEW IN THE ABOVE THREE PACKAGES).
8	**ELECTRONIC MEASUREMENTS**	INTRODUCTION TO MEASURING INSTRUMENTS. TORQUES IN INSTRUMENTS. DIFFERENT USES OF PMMC TYPE OF INSTRUMENTS (AMMETER & VOLTMETER). DIFFERENT USES OF MI TYPE OF INSTRUMENTS (AMMETER & VOLTMETER). DRAW THE CONNECTION DIAGRAM OF A.C/ D.C AMMETER, VOLTMETER, ENERGY METER AND WATTMETER. (SINGLE PHASE ONLY). MULTIMETER, TYPES AND APPLICATIONS. OSCILLOSCOPE , BASIC PRINCIPLE OF OSCILLOSCOPE& ITS BLOCK DIAGRAM , BASIC PRINCIPLE & BLOCK DIAGRAM OF CRO, DUAL TRACE OSCILLOSCOPE & ITS SPECIFICATION , CRO MEASUREMENTS, LISSAJOUS FIGURES , APPLICATIONS OF OSCILLOSCOPE (VOLTAGE PERIOD & FREQUENCY MEASUREMENT) , OPERATION OF DIGITAL STORAGE OSCILLOSCOPE & HIGH FREQUENCY OSCILLOSCOPE.
9	**TRANSDUCERS AND MEASURING INSTRUMENTS**	CONCEPT OF TRANSDUCER AND PRIMARY SENSOR. DIFFERENT TYPE OF TRANSDUCERS & CONCEPT OF ACTIVE AND PASSIVE TRANSDUCER. MECHANICAL PRIMARY TRANSDUCERS, DEVICES, SPRINGS AND BOURDEN TUBE DIAPHRAGM, WORKING PRINCIPLE AND APPLICATION OF LVDT. WORKING PRINCIPLE OF PHOTO EMISSIVE, PHOTOCONDUCTIVE, PHOTOVOLTAIC TRANSDUCER AND ITS APPLICATION, MULTIMETER, TYPES AND APPLICATIONS.
10	**COMMUNICATION ENGINEERING**	BASIC COMMUNICATION SYSTEM WITH HELP OF BLOCK DIAGRAM, MODULATION, NEED OF MODULATION, DIFFERENT TYPES OF MODULATION (AM, FM & PM), AMPLITUDE MODULATION & FREQUENCY MODULATION (SIGNAL, CARRIER WAVE & MODULATED WAVE) (NO MATHEMATICAL DERIVATION.), DEMODULATION, WORKING OF SUPER HETERODYNE RADIO RECEIVER, BLOCK DIAGRAM OF RADIO TRANSMITTER & RECEIVER.

B. NUMERICAL / GK & REASONING (10%): 20 NOS. OF MULTIPLE CHOICE QUESTIONS (MCQS)

C. ENGLISH KNOWLEDGE (10%): 20 NOS. OF MULTIPLE CHOICE QUESTIONS (MCQS)

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