ANNEXURE I
ELECTRONICS AND INSTRUMENTATION ENGINEERING

UNIT-1: Electrical Engineering: Ohm's law- Kirchhoff's law- star –delta transformation-basics of D.C Machines, motors and generators-A.C. machines.

UNIT-2: Industrial electronics and control engineering:.-Photo transistor, photo conductive device, photo multiplier , solar cell , opto-coupler, dot matrix and seven segment displays, bar graph, basic principles of induction heating, dielectric heating and resistance welding, generation and applications of ultrasonics.- basics of open loop and closed loop control systems-Transfer functions-signal flow graphs-Time response of first order and Second order system-concept of stability (Routh Hurwitz criterion) – frequency response by bode plot.

UNIT-3: Electronics: Resistor, capacitor and inductor specifications and applications of transformers, basics of switches , fuses , relays and microphones , Semi conductor materials, PN junction formation, forward and reverse biasing voltages, formation ,working and configurations of PNP and NPN transistors , Zener diode , FET , MOSFET , UJT , diode as rectifier ,C,LC and CLC filter circuits , RC coupled amplifier , transformer coupled amplifier , Darlington and cascaded amplifier , Class-A and Class-B push-pull amplifier , complementary type power amplifier, oscillator principle , RC phase shift and wien bridge oscillator , Boot strap sweep circuit , miller sweep circuit , bistable , astable and monostable multivibrator using transistor.

UNIT-4: Digital Electronics: Number systems , logic gates , half adder and subtractor , full adder , RS, T , D and Master-slave JK type flip-flops , counters, up/down counter , ring counter , Registers , shift registers , universal shift register , basic memories (RAM and ROM) , ADC (Counter method, Successive approximation method) and DAC.(R-2R method, Binary weighted method)

UNIT-5 Electronic Measuring instruments: Analog Instruments – Extension of range of Ammeter, Voltmeter and Ohmmeter – FET voltmeter – Differential voltmeter – Digital instruments – Ramp – Dual Slope integration – successive approximation – digital frequency meter. CRO – CRT – time basegenerator – deflection sensitivity – triggered sweep circuits – CRO applications -AF Oscillator – RF Signal generator – AF and RF Power meters – Q meter – Distortion Factor Meter – Digital IC tester – Logic Analyzer.

UNIT-6: Process Instrumentation: Fundamentals of instrumentation , basic transducer theory forthe measurement of displacement(LVDT, Potentiometer, inductive, capacitive,), angular velocity, temperature (Thermometers, RTD, Thermo couple,thermister,Pyrometers), pressure (elastic elements, Strain gauge,piezo electric) , Flow (Head type flow meters, rotameter, Electromagnetic flow meter, anemometers, Ultrasonic flow meter) , PH , conductivity , weight , humidity , level , viscosity and density , detection of alpha, Beta and Gamma particles ,

UNIT-7: Process Control: On-off Control, Proportional, Integral and Derivative Controllers, PID Controller, Tuning of PID Controller, Actuators (Pneumatic, electro-pneumatic Hydraulic) basics of control valves, Cascade Controller, Ratio Controller, Adaptive Control, Line Diagrams, Letter Codes,Basic of CNC Machine, Basics of Robot.

UNIT-8: Communications and Linear IC Applications: Need and Types of Modulation, SSB, DSBand VSB transmission, AM and FM Transmitters, AM and FM Detectors, Basics of Pulse Modulation and Applications, Optical Fibre Communication, , Characteristics of Operational Amplifier, Applications of Operational Amplifier like (Summer, Integrator, Differentiator, Inverter, Voltage Follower, V to I Converter, I to V Converter, Comparator, Square wave Generator, Mono Stable Multivibrator, Astable multivibrator, Wienbridge

Oscillator, Instrumentation Amplifier, Schmitt Trigger, Applications of 555 timer, Phase locked loop.

UNIT-9: Analytical and biomedical instrumentation: Electromagnetic Spectrum, Beer Lamberts Law, Mono Chromator, Light Sources and Detectors, Spectrophotometer (UV, Visible, IR), Flame Photometer, Spectroflourometer, Polarimeter, Gas Analyzer, Mass Spectrometer, Liquid Chromatography and Gas Chromatography, Basics of Diagnostic Equipment ECG , EEG,EMG Blood flow measurement, Pace Maker, Defibrillator, X-Ray Equipment., CAT

UNIT-10: **Microcontroller & PLCs:** Architecture and Instruction set of 8051 Micro controller, interfacing peripherals (8255, 8251, 8257) and applications of 8051.Basics of PLC-Architecture and instruction set of PLC and applications.

ANNEXURE II
Number of questions to be set
APPLIED ELECTRONICS & INSTRUMENTATION ENGG

UNIT NO	TOPICS	MARKS
I	Electrical engineering	06
II	Industrial electronics & Control Engg (5+4)	09
III	Electronics	12
IV	Digital Electronics	10
V	Electronic Measuring Instruments	08
VI	Process Instrumentation	14
VII	Process Control	14
VIII	Communication & Linear IC applications	08
IX	Analytical & Biomedical Instrumentation (6+5)	11
X	Micro controllers & PLC’s (5+3)	08
		100

ANNEXURE III
MODEL QUESTIONS FOR
ELECTRONICS AND INSTRUMENTATIONENGINEERING

1. Which of the following is the Bi-Directional flow meter?
   1) Orifice
   2) Venturi meter
   3) Electromagnetic Flow meter
   4) Pitot tube

2. Neutral Zone is equal to
   1) Δ e
   2) Δ e/2
   3) 2Δ e
   4) Δ^2 e

3. Mass spectroscopy deals with
   1) Mass of ions
   2) m/e ratio of ions
   3) charge of ions
   4) nuclear charge