MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR
TECHNICAL EDUCATION QUALITY IMPROVEMENT PROGRAMME III
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Discipline wise list of topics for presentation during interview for the post of Assistant Professor (On contract) in TEQIP institutions.

I. Chemical Engineering/ Ceramics/ Textile Chemistry/ Textile Engineering/ Textile Technology/ Bio Chemical Engineering/ Bio Tech Engineering

1. Chemical Engineering Thermodynamics
2. Chemical Process Calculations
3. Modeling and Simulation
4. Heat Transfer
5. Momentum Transfer Operations
6. Chemical Reaction Engineering
7. Industrial Pollution Abatement
8. Fluid and Particle Mechanics
9. Mass Transfer
10. Process Dynamics and Control
11. Transport Phenomena
12. Chemical Technology
13. Petroleum Refining
14. Petrochemical Technology
15. Polymer Science and Technology
16. Nanotechnology
17. Advanced Separation Processes
18. Catalytic Processes
19. Highly Conductive Ceramics
20. Enameling
21. Thermal properties of Ceramic Materials
22. Carbon Nanostructures
23. Glass Ceramics
24. Ceramic Coatings
25. Plastic Raw Materials
26. Refractory Raw Materials
27. Fluxing agents
28. Whitewares
29. Fluxing agents
30. Condensation Polymerization
31. Co-polymerization
32. Techniques of polymerization
33. Polymer Degradation
34. Fibre Spinning
35. Polyester Fibre
36. Carding
37. Sizing
38. Grey Inspection
39. Bleaching
40. Mercerization
41. Finishing
42. Apparel Manufacturing Processes
43. Yarn Formation
44. Fabric Formation
45. Chemical Processing of Textile
46. Textile Testing & Instrument

47. Design and Structure of Fabric
48. New Generation Fibres
49. Theory and Design of Textile Machines
50. Textile Mill Management
51. Garment Technology
52. Specialty Yarn & Sewing Thread
53. Technologies for clean water
54. Advanced Bioprocess Engineering
55. Membrane Filtration Processes
56. Biogas Production & Anaerobic Digestion
57. Bio-filtration
58. Microbial Contamination Control
59. Polymer Science & Engineering
60. Bioprocessing Strategies
61. Microbial Cells
62. Kinetics of Enzyme Catalysis
63. Immobilized Enzymes
64. Bioenergetics
65. Biosynthesis
66. Microbial Growth
67. Stoichiometry of microbial growth
68. Bioreactors
69. Receptor-Ligand Binding
70. Bio-product Recovery
71. Bio-separations
72. Biochemical Products
73. Recombinant DNA Technology
74. DNA Structure and Replication
75. Genetic Engineering
76. Microbial Biotechnology
77. Biosafety
78. Environmental Biotechnology
79. Classification of textile fibres
80. Physical and chemical methods of fibre
81. Plasticization
82. Polymerization of nylon-6
83. Melt Spinning processes
84. Methods of investigating fibre structure
85. Drafting operation
86. Principles of cotton combing
87. Recent developments in comber
88. Sampling techniques
89. Sample size and sampling errors
90. Classification of dyes

II. Civil Engineering
1. Hydrology
2. Ductile design of RC Structures
3. GIS and Remote Sensing
4. Photogrammetry and Astronomical Surveys
5. Construction Material/ Building Technology
6. Fluid Mechanics
7. Pipe & Channel Hydraulics
8. Irrigation Engineering
9. Surveying

10. Highway Engineering
11. Soil Mechanics and Foundation Engineering
12. Water Supply Engineering
13. Wastewater Engineering
14. Structural Analysis
15. Design of RC Structure
16. Design of Steel Structures
17. Turbulent flow and Boundary layer Theory
18. Flow through Unsaturated porous media
19. Design of Earthen Dams/ stability of slopes
20. Construction Planning and Management

III. Geology
1. Plate tectonics
2. Origin and Types of Rocks
3. Igneous Rocks- Formation and Characteristics
4. Sedimentary Rocks- Formation and Characteristics
5. Metamorphic Rocks- Formation and Characteristics
6. Rock Cycle
7. Faults and Joints: Origin and Types
8. Folds: Nomenclature, Classification and Geometry
9. Effects of Folds on Major Engineering Projects
10. Excavation Methods in Rocks
11. Index Properties Rock and Rock Mass
12. Subsurface Exploration
13. Geological Maps
14. Tunneling in Weak Rock Mass
15. Remote Sensing in Engineering Geology
16. Sediment Transport and Deposition
17. Stress-Strain Behaviour of Rocks and Soils
18. Geological Hazards
19. Identification of Minerals and Rock Samples
20. Earthquake Hazard Assessment

IV. Computer Science/ Technology Engineering
1. C-Programming
2. Computer Organization and Microprocessors
3. Discrete Structures
4. Formal Languages and Automata Theory
5. Design and Analysis of Algorithms
6. Systems Programming
7. Operating System
8. Embedded Systems
9. Object Oriented Analysis and Design
10. Computer and Network Security
11. Computer Graphics
12. Data Mining and Data Warehousing
13. Logic in Computing
14. Data Structures and Algorithms
15. Digital Logic Design
16. Programming Methodology
17. Computer Architecture
18. Concurrent and Parallel Programming
19. Computer Networks
20. Compiler Design

V.   Information Technology
1. C-Programming
2. Computer Organization and Microprocessors
3. Discrete Structures
4. Design and Analysis of Algorithms
5. Systems Programming
6. Operating System
7. Computer and Network Security
8. Computer Graphics
9. Data Structures and Algorithms
10. Digital Logic Design
11. Programming Methodology
12. Concurrent and Parallel Programming
13. DBMS
14. Computer Networks
15. Software Engineering
16. Natural Language Processing
17. Real Time Systems
18. Digital Image Processing
19. Computer Human Interaction
20. Multimedia Technology

VI.   Electrical Engineering/ Electrical and Electronics Engineering
1. Synchronous Machines
2. Induction Machines
3. Power quality
4. Insulation coordination
5. Reactive Power Compensation
6. Power System Protection
7. Parallel operation of transformer
8. Magnetic circuit of electrical machines
9. Two-port networks
10. Design of passive filters
11. Norton's and Thevenin's theorem
12. Resonance in electrical circuits
13. DC/AC measuring instruments
14. Unit commitment
15. Unbalanced fault analysis
16. Instrument transformers
17. Lead-Lag compensators
18. Underground cables
19. Armature reaction
20. PID Controllers
21. Current-fed Inverters
22. Distance protection
23. Voltage stability
24. Power amplifiers
25. MOSFETs
26. Boolean function
27. Two stage OPMP design
28. Sequential circuits
29. Transistor at low frequencies
30. Combinational and sequential logic
31. Random Processes

32. Waveform Generators
33. Amplitude modulation
34. 8085 Microprocessor
35. Economic load dispatch

VII. **Electronics & Telecommunication/ Communication Engineering/ Electronics Engineering/ Electronics & Instrumentation Engineering/ Electronics, Instrumentation & Control Engineering**
1. Two-port networks
2. Design of passive filters
3. Sampling of low-pass and band-pass signals and signal reconstruction techniques
4. S-parameter analysis of microwave components
5. Synthesis of R-C, R-L and L-C immittance functions
6. Design of FIR & IIR digital filters
7. State variable approach for control system
8. Design of lag, lead and lag-lead networks
9. BCH codes and convolution codes
10. Optical fibers
11. Satellite link analysis
12. MIMO OFDM technique
13. Wireless network protocol standards
14. Power amplifier design
15. Virtual memory
16. Scaling of MOSFETs
17. ASIC design flow
18. Boolean function
19. Two stage OPMP design
20. Static and dynamic CMOS circuit design
21. Digital system design using FPGA
22. Timing issues in sequential circuits
23. SRAM memory architectures and design
24. VLSI design
25. High level synthesis
26. Standards of measurement and theory of errors
27. Magnetic measurements
28. Transfer function and its properties
29. Routh's stability criterion
30. Nyquist stability criterion
31. Transistor at low frequencies
32. Combinational and sequential logic
33. Random Processes
34. Waveform Generators
35. Amplitude modulation
36. 8085 Microprocessor
37. State transition matrix and its properties
38. Feedback Amplifiers
39. Telemetry
40. 8085 Microprocessor
41. Optical Fiber Measurements
42. Stability analysis on Bode plot
43. Power amplifiers
44. MOSFETs
45. Boolean function

VIII.   Mechanical Engineering
1. Material Science
2. Thermodynamics
3. Vapour Power Cycle
4. Fluid Engineering
5. Fluid Kinematics
6. Hydraulic Systems
7. Turbines
8. Metal Cutting
9. Operations Research
10. Thermal Engineering
11. Heat Transfer
12. Refrigeration
13. Air Conditioning
14. Industrial Engineering
15. I C Engines
16. Supercharging
17. Engineering Mechanics
18. Thermodynamics
19. Supply Chain Management
20. Theory of Machines

IX.   Automobile Engineering
1. Heat Transfer
2. Refrigeration
3. Air Conditioning
4. Automotive Systems
5. Transmission System
6. Suspension System
7. Steering System
8. Auto Emission
9. Pollution Control
10. Emission Standards
11. Vehicle Body and Dynamics
12. Aerodynamic Fundamental
13. Aerofoils and Wings
14. Aerodynamics of Vehicle
15. Industrial Robotics
16. Quality Control and DOE
17. Quality Management
18. Auto Maintenance and Management
19. Engine Maintenance
20. Chasis and Drive Line Maintenance

X.   Production Engineering/ Industrial and Production Engineering
1. Material Science
2. Heat Treatment Processes
3. Crystal Structure
4. Thermodynamics
5. Vapour Power Cycle
6. Metal Forming
7. Machining Process and Machine Tools
8. Quality Control and DOE
9. Quality Management
10. Breakeven Analysis

11. Manufacturing Process
12. Operations Research
13. Queuing Theory
14. Inventory Control Models
15. Operations Planning and Control
16. Supply Chain Management
17. Thermal Engineering
18. Heat Transfer
19. Refrigeration
20. Air Conditioning
21. Total Quality Management
22. Lean and Six Sigma
23. QFD
24. Total Productive Maintenance
25. Project Management

XI. **Metallurgical Engineering/ Mining Engineering**
1. Crystal structure
2. Equilibrium diagrams
3. Crystal imperfections
4. Production of pig iron in Iron blast furnace
5. Steel making by L.D. Converter
6. Flash smelting of copper
7. Hydrometallurgy of zinc
8. Plain carbon steels
9. Effect of alloying elements in steels
10. Surface hardening of steels
11. Sintering of iron ore
12. Heat treatment of steels
13. Iron-carbon phase diagram
14. Plastics
15. Strengthening mechanisms in crystalline solids
16. Composites
17. Non-destructive testing
18. Destructive testing
19. Materials characterization
20. Corrosion and its types
21. Mining methods for coal and non-coal deposits
22. Surface Mining
23. Trenching & Pitting
24. Boring: Principles of boring
25. Properties of drilling muds
26. Diamond drilling
27. Drillability of rocks
28. Drilling accessories
29. Properties of Explosives
30. Modern Explosives
31. Principles of blasting
32. Loading
33. Transportation
34. Drifting
35. Tunneling

XII.   English
1. Tenses
2. Word Order
3. Subject-Verb Agreement
4. Common Errors in English
5. Passive Voice
6. Writing Resumès
7. Pronunciation
8. Developing Vocabulary
9. Phrasal Verbs
10. Prepositions
11. Basic Sentence Patterns
12. Modals
13. Paragraph/Essay Writing
14. Writing Job Applications
15. Reading Skills
16. Importance and Meaning of Communication
17. Conditional Sentences
18. Barriers to Communication
19. Summary Writing
20. Report Writing

XIII.   Physics
1. Curl, divergence and gradient
2. Maxwell's Equations and electromagnetic waves
3. Wave phenomena- interference, diffraction and polarization
4. Coherence-temporal and spatial
5. Einstein coefficients and concept of stimulated emission
6. Lasers
7. Optical fibers
8. Concept of group and phase velocity - concept of wave packet
9. Wave-particle duality
10. Origin of quantum mechanics
11. Heisenberg's uncertainty relation
12. Schroedinger equation
13. Classification of metals, semiconductors and insulators
14. Effective mass and its significance
15. Free electron theory of solids
16. Intrinsic and extrinsic semiconductors
17. Fermi level in semiconductors
18. Hall Effect in Metals and semiconductors
19. Superconductivity
20. Low temperature versus high temperature superconductors

XIV.   Chemistry
1. Corrosion and its corrosion control
2. Water Treatment
3. Fuels
4. Chemical equilibrium
5. Kinetics of chemical reactions
6. Chemical Bonding
7. Spectroscopy
8. Nuclear Chemistry
9. Surface Chemistry
10. Thermodynamics

11. Solid state Chemistry
12. Corrosion
13. Viscosity
14. Lubricants
15. Fuel Cell
16. Glass
17. Explosives
18. Boiler water treatment
19. Knocking
20. Catalytic Cracking

XV.   Mathematics
1. Numerical Methods
2. Complex Analysis
3. Laplace Transform
4. Ordinary Differential Equation
5. Partial Differential Equation
6. Vector Calculus
7. Random Process
8. Differential Calculus
9. Integral Calculus
10. Fourier Transform
11. Z Transform
12. Eigen Values & Eigen Vectors
13. Cayley Hamilton theorem
14. Asymptotes
15. Euler's theorem
16. Curve tracing
17. Improper integrals
18. Stokes's theorems
19. Volume integral
20. Fourier series