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SSB REGIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, CHITRADA, MAYURBHANJ

LESSON PLAN

BRANCH: MECHANICAL ENGINEERING				SESSION: WINTER	SEMESTER: 5TH

NAME OF FACULTY:- TAPAS KUMAR GIRI	SUBJECT: Entrepreneurship and Management & Smart Technology

NO OF CLASSES/WEEK GIVEN AS PER SYLLABUS=60	DATE OF SEMESTER STARTING	DATE OF SEMESTER CLOSING
	01.07.2024	

NO OF CLASSES/WEEK GIVEN AS PER TIME TABLE=05	TOTAL NOS. OF WORKING DAYS AS PER SCTE&VT:

SL. NO.	CHAPTER	NAME OF TOPIC	AS PER SYLLABUS NUMBER OF CLASSES ALLOTTED	AS PER PLAN NO. OF CLASSES REQUIRED TO COMPLETE	DETAILS CONTENT OF THIS CHAPTER
1	1	Entrepreneurship	10	10	1.1 Concept /Meaning of Entrepreneurship 1.2 Need of Entrepreneurship 1.3 Characteristics, Qualities and Types of entrepreneur, Functions 1.4 Barriers in entrepreneurship 1.5 Entrepreneurs vrs. Manager 1.6 Forms of Business Ownership: Sole proprietorship, partnership forms and others 1.7 Types of Industries, Concept of Start-ups 1.8 Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc. 1.9 Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks
2	2	Market Survey and Opportunity Identification (Business Planning)	8	8	2.1 Business Planning 2.2 SSI, Ancillary Units, Tiny Units, Service sector Units 2.3 Time schedule Plan, Agencies to be contacted for Project Implementation 2.4 Assessment of Demand and supply and Potential areas of Growth 2.5 Identifying Business Opportunity 2.6Final Product selection

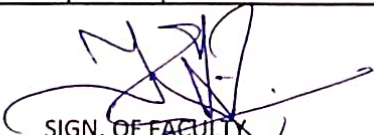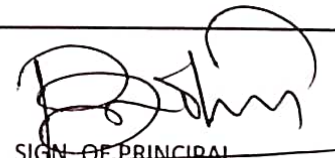SIGN. OF FACULTY   SIGN. OF H.O.D.   SIGN. OF PRINCIPAL

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BRANCH: MECHANICAL ENGINEERING					SESSION: WINTER	SEMESTER: 5TH

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3	3	Project report Preparation	4	4	3.1 Preliminary project report 3.2 Detailed project report, Techno economic Feasibility 3.3 Project Viability
4	4	Management Principles	5	5	4.1 Definitions of management 4.2 Principles of management 4.3 Functions of management (planning, organising, staffing, directing and controlling etc.) 4.4 Level of Management in an Organisation

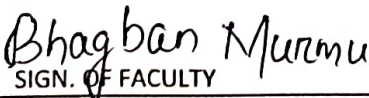SIGN. OF FACULTY   SIGN. OF H.O.D.   SIGN. OF PRINCIPAL

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5	5	Functional Areas of Management	10	10	a) Production management (a.1) Functions, Activities (a.2) Productivity (a.3) Quality control (a.4) Production Planning and control b) Inventory Management (b.1) Need for Inventory management (b.2) Models/Techniques of Inventory management c) Financial Management (c.1) Functions of Financial management (c.2) Management of Working capital (c.3) Costing (only concept) (c.4) Break even Analysis (c.5) Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts) d) Marketing Management (d.1) Concept of Marketing and Marketing Management (d.2) Marketing Techniques (only concepts) (d.3) Concept of 4P s (Price, Place, Product, Promotion) e) Human Resource Management (e.1) Functions of Personnel Management (e.2) Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

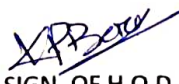SIGN. OF FACULTY   SIGN. OF H.O.D.   SIGN. OF PRINCIPAL

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6	6	Leadership and Motivation	6	6	a) Leadership (a.1.) Definition and Need/Importance (a.2) Qualities and functions of a leader (a.3) Manager Vs Leader (a.4) Style of Leadership (Autocratic, Democratic, Participative) b) Motivation (b.1) Definition and characteristics (b.2) Importance of motivation (b.3) Factors affecting motivation (b.4) Theories of motivation (Maslow) (b.5) Methods of Improving Motivation (b.6) Importance of Communication in Business (b.7) Types and Barriers of Communication
7	7	Work Culture, TQM & Safety	5	5	7.1 Human relationship and Performance in Organization 7.2 Relations with Peers, Superiors and Subordinates 7.3 TQM concepts: Quality Policy, Quality Management, Quality system 7.4 Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)

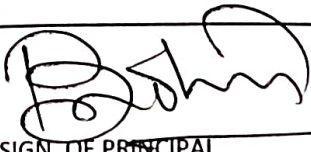SIGN. OF FACULTY   SIGN. OF H.O.D.   SIGN. OF PRINCIPAL

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8	8	Legislation	6	6	a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights b) Features of Factories Act 1948 with Amendment (only salient points) c) Features of Payment of Wages Act 1936 (only salient points)
9	9	Smart Technology	6	6	9.1 Concept of IOT, How IOT works 9.2 Components of IOT, Characteristics of IOT, Categories of IOT 9.3 Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

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LESSON PLAN

BRANCH: MECHANICAL ENGINEERING				SESSION: WINTER		SEMESTER: 5TH
NAME OF FACULTY:- BHAGBAN MURMU				SUBJECT: HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER		
NO OF CLASSES/WEEK GIVEN AS PER SYLLABUS=				DATE OF SEMESTER STARTING	DATE OF SEMESTER CLOSING	
				01.07.2024		
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1	1	HYDRAULIC TURBINES	15	15	1.1 Definition and classification of hydraulic turbines 1.2 Construction and working principle of impulse turbine. 1.3 Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine. 1.4 Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine. 1.5 Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine 1.6 Numerical on above 1.7 Distinguish between impulse turbine and reaction turbine.
2	2	CENTRIFUGAL PUMPS	5	5	2.1 Construction and working principle of centrifugal pumps 2.2 work done and derivation of various efficiencies of centrifugal pumps. 2.3 Numerical on above

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LESSON PLAN

BRANCH: MECHANICAL ENGINEERING					SESSION: WINTER	SEMESTER: 5TH
NAME OF FACULTY:- BHAGBAN MURMU					SUBJECT: HYDRAULIC MACHINES & INDUSTRIAL	FLUID POWER
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3	3	RECIPROCATING PUMPS	7	7	3.1 Describe construction & working of single acting reciprocating pump. 3.2 Describe construction & working of double acting reciprocating pump. 3.3 Derive the formula foe power required to drive the pump (Single acting & double acting) 3.4 Define slip. 3.5 State positive & negative slip & establish relation between slip & coefficient of discharge. 3.6 Solve numerical on above	
4	4	PNEUMATIC CONTROL SYSTEM	13	13	4.1Elements –filter-regulator-lubrication unit 4.2 Pressure control valves 4.2.1 Pressure relief valves 4.2.2 Pressure regulation valves 4.3 Direction control valves 4.3.1 3/2DCV,5/2 DCV,5/3DCV 4.3.2 Flow control valves 4.3.3. Throttle valves 4.4 ISO Symbols of pneumatic components 4.5. Pneumatic circuits 4 .5.1 Direct control of single acting cylinder 4.5.2 Operation of double acting cylinder 4.5.3 Operation of double acting cylinder with metering in and metering out control	

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LESSON PLAN

BRANCH: MECHANICAL ENGINEERING				SESSION: WINTER	SEMESTER: 5TH

NAME OF FACULTY:- BHAGBAN MURMU				SUBJECT: HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER	

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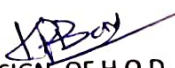| NO OF CLASSES/WEEK GIVEN AS PER TIME TABLE=				TOTAL NOS. OF WORKING DAYS AS PER SCTE&VT:	
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5	5	HYDRAULIC CONTROL SYSTEM	20	20	5.1 Hydraulic system, its merit and demerits 5.2 Hydraulic accumulators 5.2.1 Pressure control valves 5.2.2 Pressure relief valves 5.2.3 Pressure regulation valves 5.3 Direction control valves 5.3.1 3/2DCV,5/2 DCV,5/3DCV 5.3.2 Flow control valves 5.3.3 Throttle valves 5.4 Fluid power pumps 5.4.1 External and internal gear pumps 5.4.2 Vane pump 5.4.3 Radial piston pumps 5.5 ISO Symbols for hydraulic components. 5.6 Actuators 5.7 Hydraulic circuits 5.7.1 Direct control of single acting cylinder 5.7.2 Operation of double acting cylinder 5.7.3 Operation of double acting cylinder with metering in and metering out control 5.8 Comparison of hydraulic and pneumatic system

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LESSON PLAN

BRANCH: MECHANICAL ENGINEERING			SESSION: WINTER		SEMESTER: 5TH
NAME OF FACULTY:- SAUBHAGYA MOHANTY			SUBJECT: MECHATRONICS		
NO OF CLASSES/WEEK GIVEN AS PER SYLLABUS=60			DATE OF SEMESTER STARTING		DATE OF SEMESTER CLOSING
			01. 07. 2024		

NO OF CLASSES/WEEK GIVEN AS PER TIME TABLE=04 | TOTAL NOS. OF WORKING DAYS AS PER SCTE&VT:

SL. NO.	CHAPTER	NAME OF TOPIC	AS PER SYLLABUS NUMBER OF CLASSES ALLOTTED	AS PER PLAN NO. OF CLASSES REQUIRED TO COMPLETE	DETAILS CONTENT OF THIS CHAPTER
1	1	INTRODUCTION TO MECHATRONICS	5	5	1.1 Definition of Mechatronics 1.2 Advantages & disadvantages of Mechatronics 1.3 Application of Mechatronics 1.4 Scope of Mechatronics in Industrial Sector 1.5 Components of a Mechatronics System 1.6 Importance of mechatronics in automation
2	2	SENSORS AND TRANSDUCERS	10	10	2.1 Defination of Transducers 2.2 Classification of Transducers 2.3 Electromechanical Transducers 2.4 Transducers Actuating Mechanisms 2.5 Displacement &Positions Sensors 2.6 Velocity, motion, force and pressure sensors. 2.7 Temperature and light sensors.

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LESSON PLAN

BRANCH: MECHANICAL ENGINEERING			SESSION: WINTER		SEMESTER: 5TH

NAME OF FACULTY:- SAUBHAGYA MOHANTY	SUBJECT: MECHATRONICS

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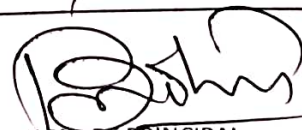| SL. NO.	CHAPTER	NAME OF TOPIC	AS PER SYLLABUS NUMBER OF CLASSES ALLOTTED	AS PER PLAN NO. OF CLASSES REQUIRED TO COMPLETE	DETAILS CONTENT OF THIS CHAPTER
3	3	ACTUATORS- MECHANICAL, ELECTRICAL	10	10	3.1 Mechanical Actuators 3.1.1 Machine, Kinematic Link, Kinematic Pair 3.1.2 Mechanism, Slider crank Mechanism 3.1.3 Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear 3.1.4 Belt & Belt drive 3.1.5 Bearings 3.2 Electrical Actuator 3.2.1 Switches and relay 3.2.2 Solenoid 3.2.3 D.C Motors 3.2.4 A.C Motors 3.2.5 Stepper Motors 3.2.6 Specification and control of stepper motors 3.2.7 Servo Motors D.C & A.C
4	4	PROGRAMMABLE LOGIC CONTROLLERS (PLC)	15	15	4.1 Introduction 4.2 Advantages of PLC 4.3 Selection and uses of PLC 4.4 Architecture basic internal structures 4.5 Input/output Processing and Programming 4.6 Mnemonics 4.7 Master and Jump Controllers

Saubhagya Mohanty

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SUBJECT: MECHATRONICS

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5	5	ELEMENTS OF CNC MACHINES	15	15	5.1 Introduction to Numerical Control of machines and CAD/CAM 5.1.1 NC machines 5.1.2 CNC machines 5.1.3.CAD/CAM 5.1.3.1 CAD 5.1.3.2 CAM 5.1.3.3 Software and hardware for CAD/CAM 5.1.3.4 Functioning of CAD/CAM system 5.1.3.4 Features and characteristics of CAD/CAM system 5.1.3.5 Application areas for CAD/CAM 5.2 elements of CNC machines 5.2.1 Introduction 5.2.2 Machine Structure 5.2.3 Guideways/Slide ways 5.2.3.1 Introduction and Types of Guideways 5.2.3.2 Factors of design of guideways 5.2.4 Drives 5.2.4.1 Spindle drives 5.2.4.2 Feed drive 5.2.5 Spindle and Spindle Bearings
6	6	ROBOTICS	5	5	6.1 Definition, Function and laws of robotics 6.2Types of industrial robots 6.3 Robotic systems 6.4 Advantages and Disadvantages of robots

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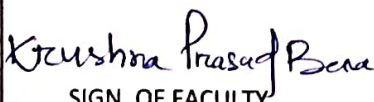
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SSB REGIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, CHITRADA, MAYURBHANJ

LESSON PLAN

BRANCH: MECHANICAL ENGINEERING				SESSION: WINTER		SEMESTER: 5TH

NAME OF FACULTY:-KRUSHNA PRASAD BERA	SUBJECT:	REFRIGERATION & AIR CONDITIONING

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1	1	AIR REFRIGERATION CYCLE.	5	5	1.1 Definition of refrigeration and unit of refrigeration. 1.2 Definition of COP, Refrigerating effect (R.E) 1.3 Principle of working of open and closed air system of refrigeration. 1.3.1 Calculation of COP of Bell-Coleman cycle and numerical on it.
2	2	SIMPLE VAPOUR COMPRESSION REFRIGERATION SYSTEM	10	10	2.1 schematic diagram of simple vapors compression refrigeration system' 2.2 Types 2.2.1 Cycle with dry saturated vapors after compression. 2.2.2 Cycle with wet vapors after compression. 2.2.3 Cycle with superheated vapors after compression. 2.2.4 Cycle with superheated vapors before compression. 2.2.5 Cycle with sub cooling of refrigerant 2.2.6 Representation of above cycle on temperature entropy and pressure enthalpy diagram 2.2.7 Numerical on above (determination of COP,mass flow)

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BRANCH:MECHANICAL ENGINEERING				SESSION: WINTER	SEMESTER: 5TH
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3	3	VAPOUR ABSORPTION REFRIGERATION SYSTEM	7	7	3.1 Simple vapor absorption refrigeration system 3.2 Practical vapor absorption refrigeration system 3.3 COP of an ideal vapor absorption refrigeration system 3.4.Numerical on COP.
4	4	REFRIGERATION EQUIPMENTS	8	12	4.1 REFRIGERANT COMPRESSORS 4.1.1 Principle of working and constructional details of reciprocating and rotary compressors. 4.1.2 Centrifugal compressor only theory 4.1.3 Important terms. 4.1.4 Hermetically and semi hermetically sealed compressor. 4.2 CONDENSERS 4.2.1 Principle of working and constructional details of air cooled and water cooled condenser 4.2.2 Heat rejection ratio. 4.2.3 Cooling tower and spray pond. 4.3 EVAPORATORS 4.3.1 Principle of working and constructional details of an evaporator. 4.3.2 Types of evaporator. 4.3.3 Bare tube coil evaporator, finned evaporator, shell and tube evaporator.

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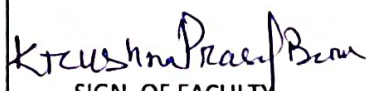## SSB REGIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, CHITRADA, MAYURBHANJ

LESSON PLAN

BRANCH:MECHANICAL ENGINEERING				SESSION: WINTER		SEMESTER: 5TH

NAME OF FACULTY: KRUSHNA PRASAD BERA	SUBJECT	REFRIGERATION & AIR CONDITIONING

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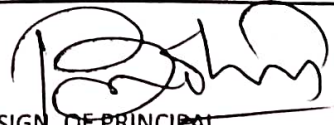| NO OF CLASSES/WEEK GIVEN AS PER TIME TABLE=	TOTAL NOS. OF WORKING DAYS AS PER SCTE&VT:

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5	5	REFRIGERANT FLOW CONTROLS, REFRIGERANTS & APPLICATION OF REFRIGERANTS	10	12	5.1 EXPANSION VALVES 5.1.1 Capillary tube 5.1.2 Automatic expansion valve 5.1.3 Thermostatic expansion valve 5.2 REFRIGERANTS 5.2.1 Classification of refrigerants 5.2.2 Desirable properties of an ideal refrigerant. 5.2.3 Designation of refrigerant. 5.2.4 Thermodynamic Properties of Refrigerants. 5.2.5 Chemical properties of refrigerants . 5.2.6 commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717 5.2.7 Substitute for CFC 5.3 Applications of refrigeration 5.3.1 cold storage 5.3.2 dairy refrigeration 5.3.3 ice plant 5.3.4 water cooler 5.3.5 frost free refrigerator
6	6	PSYCHOMETRICS &COMFORT AIR CONDITIONING SYSTEMS	10	10	6.1 Psychometric terms 6.2 Adiabatic saturation of air by evaporation of water 6.3 Psychometric chart and uses. 6.4 Psychometric processes 6.4.1 Sensible heating and Cooling 6.4.2 Cooling and Dehumidification 6.4.3 Heating and Humidification 6.4.4 Adiabatic cooling with humidification 6.4.5 Total heating of a cooling process 6.4.6 SHF, BPF, 6.4.7 Adiabatic mixing 6.4.8 Problems on above. 6.5 Effective temperature and Comfort chart

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LESSON PLAN

BRANCH: MECHANICAL ENGINEERING			SESSION: WINTER	SEMESTER: 5TH	
NAME OF FACULTY:- DIBYAJYOTI DAS			SUBJECT: DESIGN OF MACHINE ELEMENTS		
NO OF CLASSES/WEEK GIVEN AS PER SYLLABUS=			DATE OF SEMESTER STARTING	DATE OF SEMESTER CLOSING	
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SL. NO.	CHAPTER	NAME OF TOPIC	AS PER SYLLABUS NUMBER OF CLASSES ALLOTTED	AS PER PLAN NO. OF CLASSES REQUIRED TO COMPLETE	DETAILS CONTENT OF THIS CHAPTER
1	1	Introduction	12	12	1.1 Introduction to Machine Design and Classify it. 1.2 Different mechanical engineering materials used in design with their uses and their mechanical and physical properties. 1.3 Define working stress, yield stress, ultimate stress & factor of safety and stress–strain curve for M.S & C.I. 1.4 Modes of Failure (By elastic deflection, general yielding & fracture) 1.5 State the factors governing the design of machine elements. 1.6 Describe design procedure.
2	2	Design of fastening elements	12	12	2.1 Joints and their classification. 2.2 State types of welded joints. 2.3 State advantages of welded joints over other joints. 2.4 Design of welded joints for eccentric loads. 2.5 State types of riveted joints and types of rivets. 2.6 Describe failure of riveted joints. 2.7 Determine strength & efficiency of riveted joints. 2.8 Design riveted joints for pressure vessel. 2.9 Solve numerical on Welded Joint and Riveted Joints.

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LESSON PLAN

BRANCH: MECHANICAL ENGINEERING				SESSION: WINTER		SEMESTER: 5TH
NAME OF FACULTY:- DIBYAJYOTI DAS				SUBJECT: DESIGN OF MACHINE ELEMENTS		
NO OF CLASSES/WEEK GIVEN AS PER SYLLABUS=				DATE OF SEMESTER STARTING		DATE OF SEMESTER CLOSING
NO OF CLASSES/WEEK GIVEN AS PER TIME TABLE=				TOTAL NOS. OF WORKING DAYS AS PER SCTE&VT:		
SL. NO.	CHAPTER	NAME OF TOPIC	AS PER SYLLABUS NUMBER OF CLASSES ALLOTTED	AS PER PLAN NO. OF CLASSES REQUIRED TO COMPLETE	DETAILS CONTENT OF THIS CHAPTER	
3	3	Design of shafts and Keys	12	12	3.1 State function of shafts. 3.2 State materials for shafts. 3.3 Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity 3.4 State standard size of shaft as per I.S. 3.5 State function of keys, types of keys & material of keys. 3.6 Describe failure of key, effect of key way. 3.7 Design rectangular sunk key considering its failure against shear & crushing. 3.8 Design rectangular sunk key by using empirical relation for given diameter of shaft. 3.9 State specification of parallel key, gib-head key, taper key as per I.S. 3.10 Solve numerical on Design of Shaft and keys.	

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4	4	Design of Coupling	12	12	4.1 Design of Shaft Coupling 4.2 Requirements of a good shaft coupling 4.3 Types of Coupling. 4.4 Design of Sleeve or Muff-Coupling. 4.5 Design of Clamp or Compression Coupling. 4.6 Solve simple numerical on above.
5	5	Design a closed coil helical spring	12	12	5.1 Materials used for helical spring. 5.2 Standard size spring wire. (SWG). 5.3 Terms used in compression spring. 5.4 Stress in helical spring of a circular wire. 5.5 Deflection of helical spring of circular wire. 5.6 Surge in spring. 5.7 Solve numerical on design of closed coil helical compression spring.

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