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| Discipline<br>Mechanical<br>Engineering                                    | 5th Semester  | Name Of The Faculty:<br>K. Satyanarayan Achary (Lect. In English)  |
| Subject :<br>Entrepreneurship<br>and Management<br>and Smart<br>Technology | No of Days<br>per week<br>class allotted<br>(4 nos) | Semester from 01.10.2021 to 08.01.2022   |
| <b>Week</b>  | <b>Class days</b>                                   | <b>Theory Topic</b>  |
| 1st  | 1st   | Entrepreneurship : Concept /Meaning of Entrepreneurship & Need of Entrepreneurship   |
|  | 2nd   | Barriers in entrepreneurship and their possible solutions  |
|  | 3rd   | Entrepreneurs vrs. Manager; Characteristics, Qualities and Types of entrepreneur, Functions  |
|  | 4th   | Entrepreneurial support agencies at National, State, District Level( Sources) & Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks |
| 2nd  | 1st   | Definition of Business and its basic components  |
|  | 2nd   | Meaning, Features and Charactrestics of different forms of Business based on ownership   |
|  | 3rd   | Definition and Types of Industries & Concept of Start-ups  |
|  | 4th   | Business planning: Market Survey and Opportunity Identification  |
| 3rd  | 1st   | SSI, Ancillary Units, Tiny Units, Service sector Units   |
|  | 2nd   | Time schedule Plan, Agencies to be contacted for Project Implementation  |
|  | 3rd   | Assessment of Demand and supply and Potential areas of Gro   |
|  | 4th   | Identifying Business Opportunity and selection of final product  |
| 4th  | 1st   | Meaning and Concept of Business Report (Project)   |
|  | 2nd   | Project report Preparation   |
|  | 3rd   | Preliminary project report & Detailed project report   |
|  | 4th   | Techno economic Feasibility & Project Viability  |
| 5th  | 1st   | Definitions and Principles of management   |
|  | 2nd   | Functions and importance of management (planning, organising,  |
|  | 3rd   | Production management, Functions, Activities   |
|  | 4th   | Production Planning and control: Productivity & Quality control  |
| 6th  | 1st   | Inventory Management: Meaning and Necessity  |
|  | 2nd   | Models/Techniques of Inventory management  |
|  | 3rd   | Financial Management: Meaning & Functions  |
|  | 4th   | Management of Working capital  |
| 7th  | 1st   | Break even Analysis  |
|  | 2nd   | Costing : concept  |
|  | 3rd   | Accounting Terminologies: Book Keeping, Journal entry,   |
|  | 4th   | Petty Cash book, P&L Accounts, Balance Sheets (only Concepts)  |
| 8th  | 1st   | Concept of Market and Marketing Management   |
|  | 2nd   | Marketing Techniques : Concept of 4P s (Price, Place, Product, Promotion)  |
|  | 3rd   | Human Resource Management: Meaning and Functions   |
|  | 4th   | Manpower Planning, Recruitment, Sources of manpower, Selection process.  |
| 9th  | 1st   | Method of Testing, Methods of Training & Development, Payment of Wages   |
|  | 2nd   | Leadership: Definition and Need/Importance   |
|  | 3rd   | Manager Vs Leader; Qualities and functions of a leader   |
|  | 4th   | Style of Leadership (Autocratic, Democratic, Participative)  |
| 10th   | 1st   | Motivation: Definition, importance and its Theories  |
|  | 2nd   | Methods of Improving Motivation  |
|  | 3rd   | Importance of Communication in Business  |

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|--|---|--|
| Discipline<br>Mechanical<br>Engineering                                    | 5th Semester  | Name Of The Faculty:<br>K. Satyanarayan Achary (Lect. In English)                                      |
| Subject :<br>Entrepreneurship<br>and Management<br>and Smart<br>Technology | No of Days<br>per week<br>class allotted<br>(4 nos) | Semester from 01.10.2021 to 08.01.2022   |
|  | 4th   | Types and Barriers of Communication and ways to overcome them  |
| 11th   | 1st   | Human relationship and Performance in Organization<br>Relations with Peers, Superiors and Subordinates |
|  | 2nd   | TQM concepts: Quality Policy, Quality Management, Quality system                                       |
|  | 3rd   | Accidents and Safety, preventive measures, General Safety Rules ,                                      |
|  | 4th   | Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights                                     |
| 12th   | 1st   | Factories Act 1948 (with Amendment)  |
|  | 2nd   | Payment of Wages Act 1936 (only salient features and amendemnets)                                      |
|  | 3rd   | Smart Technology and concept of IOT  |
|  | 4th   | Methodology of IOT and its advantages  |
| 13th   | 1st   | Components of IOT, Characteristics of IOT, Categories of IOT   |
|  | 2nd   | Applications of IOT- Smart Cities, Smart Transportation, Smart Home                                    |
|  | 3rd   | Application of IOT: Smart Healthcare, Smart Industry, Smart Agriculture,                               |
|  | 4th   | Revision 1 (Unit I to III)   |
| 14th   | 1st   | Revision 2 (Unit IV to V)  |
|  | 2nd   | Revision 3 (Unit 7 to 9)   |
|  | 3rd   | REVISION, MOCK TESTS, ASSESSMENT   |
|  | 4th   | PREVIOUS YEAR QUESTION PAPER DISCUSSION, DOUBT CLEAR, DRILLING   |

  
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| Discipline Mechanical Engineering    | 5th Semester                               | Name Of The Faculty: Er. Bipin Kumar Dash.Lect,Mech                                   |
|--------------------------------------|--|---|
| Subject : Design Of Machine Elements | No of Days per week class allotted (4 nos) | Semester from 01/10/2021 01.10.2021   |
| Week                                 | Class days                                 | Theory Topic  |
| 1st                                  | 1st  | Introduction to Machine Design  |
|                                      | 2nd  | Classification of Machine Design  |
|                                      | 3rd  | Different mechanical engineering materials used in design                             |
|                                      | 4th  | Engineering materials Physical Properties   |
| 2nd                                  | 1st  | Engineering materials Mechanical Properties   |
|                                      | 2nd  | Define Working Stress   |
|                                      | 3rd  | Define yield Stress   |
|                                      | 4th  | Define Ultimate Stress  |
| 3rd                                  | 1st  | Factor of Safety  |
|                                      | 2nd  | Modes of Failure (By elastic deflection, general yielding & fracture)                 |
|                                      | 3rd  | State the factors governing the design of machine elements.                           |
|                                      | 4th  | Describe design procedure.  |
| 4th                                  | 1st  | Joints and their classification.  |
|                                      | 2nd  | State types of welded joints  |
|                                      | 3rd  | State advantages of welded joints over other joints                                   |
|                                      | 4th  | Design of welded joints for eccentric loads.  |
| 5th                                  | 1st  | State types of riveted joints   |
|                                      | 2nd  | Describe failure of riveted joints.   |
|                                      | 3rd  | Determine strength riveted joint  |
|                                      | 4th  | Design riveted joints for pressure vessel   |
| 6th                                  | 1st  | Solve numerical on Welded Joint   |
|                                      | 2nd  | Solve numerical on Riveted Joint  |
|                                      | 3rd  | Solve numerical on Welded Joint and Riveted Joints.                                   |
|                                      | 4th  | Solve numerical on Welded Joint and Riveted Joints.                                   |
| 7th                                  | 1st  | State function of shafts.   |
|                                      | 2nd  | State materials for shafts  |
|                                      | 3rd  | Design solid & hollow shafts to transmit a given power at given rpm based on Strength |
|                                      | 4th  | Design solid & hollow shafts to transmit a given power at given rpm based on Rigidity |
| 8th                                  | 1st  | State standard size of shaft as per I.S.  |
|                                      | 2nd  | State function of Keys & Types of Keys  |
|                                      | 3rd  | Materials of Keys   |
|                                      | 4th  | Describe failure of key, effect of key way  |
| 9th                                  | 1st  | Design rectangular sunk key considering its failure against shear & crushing.         |
|                                      | 2nd  | Design rectangular sunk key by using empirical relation for given diameter of shaft.  |
|                                      | 3rd  | State specification of parallel key, gib-head key, taper key as per                   |
|                                      | 4th  | Solve numerical on Design of Shaft and keys.  |
| 10th                                 | 1st  | Introduction to Design of Shaft Coupling  |
|                                      | 2nd  | Requirements of a good shaft coupling   |
|                                      | 3rd  | Types of Coupling.  |
|                                      | 4th  | Design of Sleeve or Muff-Coupling   |
| 11th                                 | 1st  | Design of Sleeve or Muff-Coupling   |
|                                      | 2nd  | Design of Clamp or Compression Coupling.  |
|                                      | 3rd  | Design of Clamp or Compression Coupling.  |
|                                      | 4th  | Revision  |
| 12th                                 | 1st  | Solve simple Numerical on Sleeve  |
|                                      | 2nd  | Solve simple Numerical on Sleeve  |
|                                      | 3rd  | Solve simple Numerical on Compression Coupling  |
|                                      | 4th  | Solve simple Numerical on Compression Coupling  |
| 13th                                 | 1st  | Introduction to Helical Springs   |
|                                      | 2nd  | Materials used for helical spring.  |
|                                      | 3rd  | Standard size spring wire. (SWG).   |
|                                      | 4th  | Standard size spring wire. (SWG).   |
| 14th                                 | 1st  | Terms used in Compression Spring  |
|                                      | 2nd  | Stress in helical spring of a circular wire.  |
|                                      | 3rd  | Deflection of helical spring of circular wire.  |
|                                      | 4th  | Surge in spring.  |
| 15th                                 | 1st  | Solve numerical on design of closed coil helical compression spring.                  |
|                                      | 2nd  | Solve numerical on design of closed coil helical compression spring.                  |
|                                      | 3rd  | Solve numerical on design of closed coil helical compression spring.                  |
|                                      | 4th  | Solve numerical on design of closed coil helical compression spring.                  |

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| Discipline Mechanical Engineering | 5th Semester                                  | Name Of The Faculty  | Sri |
|-----------------------------------|---|--|-----|
| Subject :<br>Mechatronics         | No of Days per week<br>class allotted (4 nos) | Manoj kumar das,PTGF,Lect,Mech                             |     |
|                                   |   | Semester from 01/10/2021                                   |     |
| Week                              | Class days                                    | Theory Topic   |     |
| 1st                               | 1st   | Definition of Mechatronics                                 |     |
|                                   | 2nd   | Advantages & disadvantages of Mechatronics                 |     |
|                                   | 3rd   | Application of Mechatronics                                |     |
|                                   | 4th   | Scope of Mechatronics in Industrial Sector                 |     |
| 2nd                               | 1st   | Importance of mechatronics in automation                   |     |
|                                   | 2nd   | Introduction to Transducers                                |     |
|                                   | 3rd   | Defination of Transducers                                  |     |
|                                   | 4th   | Classification of Transducers                              |     |
| 3rd                               | 1st   | Electromechanical Transducers                              |     |
|                                   | 2nd   | Transducers Actuating Mechanisms                           |     |
|                                   | 3rd   | Displacement & Positions Sensors                           |     |
|                                   | 4th   | Velocity, motion, force and pressure sensor                |     |
| 4th                               | 1st   | Velocity, motion, force and pressure sensor                |     |
|                                   | 2nd   | Temperature and light sensors.                             |     |
|                                   | 3rd   | Mechanical Actuators                                       |     |
|                                   | 4th   | Machine, Kinematic Link, Kinematic Pair                    |     |
| 5th                               | 1st   | Mechanism, Slider crank Mechanism                          |     |
|                                   | 2nd   | Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear |     |
|                                   | 3rd   | Belt & Belt drive  |     |
|                                   | 4th   | Bearings   |     |
| 6th                               | 1st   | Electrical Actuator  |     |
|                                   | 2nd   | Switches and relay   |     |
|                                   | 3rd   | Solenoid   |     |
|                                   | 4th   | D.C Motors   |     |
| 7th                               | 1st   | A.C Motors   |     |
|                                   | 2nd   | Stepper Motors   |     |
|                                   | 3rd   | Specification and control of stepper motors                |     |
|                                   | 4th   | Servo Motors D.C & A.C                                     |     |
| 8th                               | 1st   | PROGRAMMABLE LOGIC CONTROLLERS(PLC)                        |     |
|                                   | 2nd   | Advantages of PLC  |     |
|                                   | 3rd   | Selection and uses of PLC                                  |     |
|                                   | 4th   | Architecture basic internal structures                     |     |
| 9th                               | 1st   | Input/output Processing and Programming                    |     |
|                                   | 2nd   | Mnemonics  |     |
|                                   | 3rd   | Master and Jump Controllers                                |     |
|                                   | 4th   | Master and Jump Controllers                                |     |
| 10th                              | 1st   | Introduction to Numerical Control of machines and CAD/CAM  |     |
|                                   | 2nd   | NC machines  |     |
|                                   | 3rd   | CNC machines   |     |
|                                   | 4th   | CAD/CAM  |     |
| 11th                              | 1st   | Software and hardware for CAD/CAM                          |     |
|                                   | 2nd   | Functioning of CAD/CAM system                              |     |
|                                   | 3rd   | Features and characteristics of CAD/CAM system             |     |
|                                   | 4th   | Application areas for CAD/CAM                              |     |
| 12th                              | 1st   | elements of CNC machines                                   |     |
|                                   | 2nd   | Guideways/Slide ways                                       |     |
|                                   | 3rd   | Introduction and Types of Guideways                        |     |
|                                   | 4th   | Factors of design of guideways                             |     |
| 13th                              | 1st   | Spindle drives   |     |
|                                   | 2nd   | Spindle and Spindle Bearings                               |     |
|                                   | 3rd   | Definition, Function and laws of robotics                  |     |
|                                   | 4th   | Types of industrial robots                                 |     |
| 14th                              | 1st   | Robotic systems  |     |
|                                   | 2nd   | Advantages and Disadvantages of robots                     |     |
|                                   | 3rd   | REVISION   |     |
|                                   | 4th   | REVISION   |     |
| 15th                              | 1st   | REVISION   |     |
|                                   | 2nd   | REVISION   |     |
|                                   | 3rd   | REVISION   |     |
|                                   | 4th   | REVISION   |     |

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| Discipline Mechanical Engineering                    | 5th Semester                               | Name Of The Faculty<br>Sri Sagar Achary,PTGF,mech                             |
|--|--|---|
| Subject : Hydraulic Machine & Industrial Fluid Power | No of Days per week class allotted (4 nos) | Semester from 01/10/2021  |
| Week   | Class days                                 | Theory Topic  |
| 1st  | 1st  | Introduction to Hydraulic Turbines  |
|  | 2nd  | Defination of Hydraulic Turbines  |
|  | 3rd  | Classification of Hydraulic Turbines  |
|  | 4th  | Construction of Impulse Turbine   |
| 2nd  | 1st  | Working Principle of Impulse Turbine  |
|  | 2nd  | Velocity Diagram of Working blades  |
|  | 3rd  | Workdone of Impulse Turbine   |
|  | 4th  | derivation of various efficiencies of impulse turbine                         |
| 3rd  | 1st  | Velocity Diagram of Moving blades   |
|  | 2nd  | Workdone of Francis Turbine   |
|  | 3rd  | d derivation of various efficiencies of Francis turbine                       |
|  | 4th  | Velocity diagram of moving blades   |
| 4th  | 1st  | Workdone of Kaplan Turbine  |
|  | 2nd  | Derivations of various Efficiencies of Kaplant Turbine                        |
|  | 3rd  | Revision  |
|  | 4th  | Introduction to Centrifugal Pump  |
| 5th  | 1st  | Construction and working principle of centrifugal pumps                       |
|  | 2nd  | Workdone of Centrifugal Pump  |
|  | 3rd  | Various efficiencies of centrifugal pumps                                     |
|  | 4th  | Numerical on Centrifugal Pump   |
| 6th  | 1st  | Introduction to Reciprocating Pump  |
|  | 2nd  | Describe Construction to Resiprocating Pump                                   |
|  | 3rd  | Working of single acting reciprocating pump                                   |
|  | 4th  | Describe Construction to Double acting Resiprocating Pump                     |
| 7th  | 1st  | Define formula for power required to drive the pump for single acting         |
|  | 2nd  | Define formula for power required to drive the pump for single acting         |
|  | 3rd  | Define formula for power required to drive the pump for double acting         |
|  | 4th  | Define formula for power required to drive the pump for double acting         |
| 8th  | 1st  | State positive &  |
|  | 2nd  | State negative slip &   |
|  | 3rd  | Relation between slip and coefficient of Discharge                            |
|  | 4th  | Numerical on Single acting and double acting                                  |
| 9th  | 1st  | Introduction to Pneumatic Control System                                      |
|  | 2nd  | 1Elements –filter-regulator-lubrication unit                                  |
|  | 3rd  | Pressure control valves   |
|  | 4th  | Pressure relief valves  |
| 10th   | 1st  | Pressure regulation valves  |
|  | 2nd  | Direction control valves  |
|  | 3rd  | 3/2DCV,5/2 DCV,5/3DCV   |
|  | 4th  | Flow control valves   |
| 11th   | 1st  | Throttle valves   |
|  | 2nd  | ISO Symbols of pneumatic components   |
|  | 3rd  | Pneumatic circuits  |
|  | 4th  | Direct control of single acting cylinder                                      |
| 12th   | 1st  | Operation of double acting cylinder   |
|  | 2nd  | Operation of double acting cylinder with metering in and metering out control |
|  | 3rd  | Operation of double acting cylinder with metering in and metering out control |
|  | 4th  | Operation of double acting cylinder with metering in and metering out control |
| 13th   | 1st  | Hydraulic system, its merit and demerits                                      |
|  | 2nd  | Hydraulic accumulator   |
|  | 3rd  | Pressure control valves   |
|  | 4th  | Pressure relief valves  |
| 14th   | 1st  | Pressure regulation valves  |
|  | 2nd  | Direction control valves  |
|  | 3rd  | 3/2DCV,5/2 DCV,5/3DCV   |
|  | 4th  | Flow control valves   |
| 15th   | 1st  | Fluid power pumps   |
|  | 2nd  | ISO Symbols for hydraulic components.   |
|  | 3rd  | Actuators   |
|  | 4th  | Comparison of hydraulic and pneumatic system                                  |

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| Discipline Mechanical Engineering          | 5th Semester                               | Name Of The Faculty:Sri Sagar kumar behera,Lect,Mech                                     |
|--|--|--|
| Subject : Refrigeration & Air Conditioning | No of Days per week class allotted (4 nos) | Semester from 01/10/2021   |
| Week                                       | Class days                                 | Theory Topic   |
| 1st  | 1st  | Definition of refrigeration and unit of refrigeration.                                   |
|  | 2nd  | Definition of COP, Refrigerating effect (R E )   |
|  | 3rd  | Principle of working of open and closed air system of refrigeration                      |
|  | 4th  | Calculation of COP of Bell-Coleman cycle and numerical on it.                            |
| 2nd  | 1st  | Revision   |
|  | 2nd  | schematic diagram of simple vapors compression refrigeration system'                     |
|  | 3rd  | Cycle with dry saturated vapors after compression  |
|  | 4th  | Cycle with wet vapors after compression.   |
| 3rd  | 1st  | Cycle with superheated vapors after compression.   |
|  | 2nd  | Cycle with superheated vapors before compression   |
|  | 3rd  | Cycle with sub cooling of refrigerant  |
|  | 4th  | Representation of above cycle on temperature entropy and pressure enthalpy diagram       |
| 4th  | 1st  | Numerical on above (determination of COP,mass flow)                                      |
|  | 2nd  | Simple vapor absorption refrigeration system   |
|  | 3rd  | Practical vapor absorption refrigeration system  |
|  | 4th  | COP of an ideal vapor absorption refrigeration system                                    |
| 5th  | 1st  | Numerical on COP   |
|  | 2nd  | REFRIGERANT COMPRESSORS  |
|  | 3rd  | Principle of working and constructional details of reciprocating and rotary compressors  |
|  | 4th  | Centrifugal compressor only theory   |
| 6th  | 1st  | Important terms  |
|  | 2nd  | Hermetically and semi hermetically sealed compressor.                                    |
|  | 3rd  | Principle of working and constructional details of air cooled and water cooled condenser |
|  | 4th  | Heat rejection ratio   |
| 7th  | 1st  | Cooling tower and spray pond.  |
|  | 2nd  | Principle of working and constructional details of an evaporator.                        |
|  | 3rd  | Types of evaporator  |
|  | 4th  | Bare tube coil evaporator, finned evaporator, shell and tube evaporator                  |
| 8th  | 1st  | Capillary tube   |
|  | 2nd  | Automatic expansion valve  |
|  | 3rd  | Thermostatic expansion valve   |
|  | 4th  | Classification of refrigerants   |
| 9th  | 1st  | Desirable properties of an ideal refrigerant.  |
|  | 2nd  | Designation of refrigerant.  |
|  | 3rd  | Thermodynamic Properties of Refrigerants.  |
|  | 4th  | Chemical properties of refrigerants  |
| 10th                                       | 1st  | commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717                              |
|  | 2nd  | Psychometric terms   |
|  | 3rd  | Adiabatic saturation of air by evaporation of water                                      |
|  | 4th  | Psychometric chart and uses.   |
| 11th                                       | 1st  | Psychometric processes   |
|  | 2nd  | Sensible heating and Cooling   |
|  | 3rd  | Heating and Humidification   |
|  | 4th  | Adiabatic cooling with humidification  |
| 12th                                       | 1st  | Total heating of a cooling process   |
|  | 2nd  | SHF, BPF   |
|  | 3rd  | Adiabatic mixing   |
|  | 4th  | Factors affecting comfort air conditioning   |
| 13th                                       | 1st  | Equipment used in an air-conditioning.   |
|  | 2nd  | Classification of air-conditioning system  |
|  | 3rd  | Winter Air Conditioning System   |
|  | 4th  | Summer air-conditioning system   |
| 14th                                       | 1st  | Numerical on above   |
|  | 2nd  | Revision   |
|  | 3rd  | Revision   |
|  | 4th  | Revision   |
| 15th                                       | 1st  | Revision   |
|  | 2nd  | Revision   |
|  | 3rd  | Revision   |
|  | 4th  | Revision   |

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