

ME-106-MANUFACTURING TECHNOLOGY

Course Title:	MANUFACTURING TECHNOLOGY	Course Code	ME-106
Semester	I YEAR	Course Group	Core
Teaching Scheme in Periods (L:T:P)	4:1:0	Credits	3
Methodology	Lecture+ Tutorials	Total Contact Periods	150
CIE		SEE	

COURSEOUTCOMES	
CO1	To impart knowledge of hand tools and develop skills in fitting, sheet metal, and forging operations, including the correct use of measuring and inspection tools.
CO2	To understand various mechanical working processes of metals and distinguish between hot working and cold working processes with applications.
CO3	To attain knowledge of lathe machine construction, types, and various lathe operations for producing high-quality machined components used in manufacturing industries, and to acquire the necessary knowledge for the effective selection and use of cutting fluids in machining operations..
CO4	To develop knowledge of milling, drilling, and grinding operations, related machines and cutters, and to apply appropriate surface finishing processes in manufacturing industries.
CO5	To attain knowledge of various types of welding methods, operations and perform them safely and efficiently in accordance with industry standards, thereby preparing students for careers in welding and fabrication across various sectors.
CO6	To impart fundamental knowledge of foundry practices, foundry equipment and types of pattern, moulding sands and their properties, and various moulding procedures and processes, along with the importance of gating systems, cores, and their applications, and to understand special casting methods.

BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R		U	A	
1	Tools used in carpentry, forging, fitting, and sheet metal, measuring and checking tools.	25	Q4	Q1		Q9(a)	Q13(a)
2	Mechanical working of metals and press tools	25					
3	Lathe and Lathe Work and Cutting Fluids	25		Q2		Q10(a)	Q14(a)
4	Milling, Drilling, Grinding, and Finishing Operations	25					
5	Welding and Joining Processes	25		Q3	Q5,Q5	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
5	Foundry and Casting	25			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q15(a), Q15(b)
Total		150	08		08	08	

CO – PO Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapping POs
CO1	3	3	3	2	-	1	1	1, 2,3,4,6,7
CO2	3	3	3	2	1	-	1	1, 2,3,4,5,7
CO3	3	3	3	2	-	-	2	1, 2,3,4,7
CO4	3	3	3	2	-	2	1	1,2 4,6, 7
CO5	3	3	3	2	-	1	2	1,2, 4,6,7
CO6	3	3	3	2	1	1	3	1,2,3,4,5,6,7

COURSE CONTENT

UNIT 1

FORGING, FITTING AND SHEET METAL TOOLS:

DURATION:25 HOURS

FITTING TOOLS:

Holding Devices: Vices- Bench vice, Leg-vice, Hand vice, Pin vice, Tool makers vice, Pipe vice.

Cutting tools: Hand hacksaws, Files-Chisels-Scrapers-Drill Bits-Reamers-Taps & Dies – specifications and uses.

Marking Tools: Surface plate, V-block, Angle plate, Try square, Scriber, Punch, Prick punch, Centre punch, Number punch, and Letter punch.

FORGING TOOLS: Anvil, Swage block, Hand hammers - types; Sledge hammer - specifications and uses. Tongs – types and uses, Chisels - hot & cold chisels - uses. Swages - types, Fullers, Flatters, set hammer, Punch and Drift - uses. Advantages and disadvantages of forging- forging operations

SHEET METAL TOOLS:

Cutting and Striking Tools –Snips, Straight snip, Bent or curved snip, Double shears, Bench Shear, riveting hammer, setting hammer, Raising hammer, Mallet.

Stakes- Double seaming stake, Break horn stake, Bevel edged square stake, Funnel Stack, Half-moon stack, Hatches stake, Needle stake, Blow Horn stake, Hollow mandrel stake.

Hems: Single hem, double hem, wired edge hem, Seam and types of seams.

Checking instruments: Callipers: Outside &Inside callipers, Hermaphrodite (odd leg) calliper, with firm joint, Spring caliper, Transfer caliper, Dividers - vernier caliper, vernier height gauge, vernier depth gauge, micrometer.

Measuring instruments: Combination set, bevel protractor, universal bevel protractor, sine bar, scribing block, universal scribing block, engineer's parallels, slip gauges, feeler gauge, plug gauge, ring gauge, taper gauge, snap gauges, thread gauges, screw pitch gauge, wire gauge, plate gauge, radius and fillet gauges, template gauge, telescopic gauge, - outside & inside, depth micrometer, screw thread micrometer.

Marking & Measuring Tools - Cutting Tools - Forging Tools and Fitting Tools- Holding Devices, Marking Tools, cutting tools and Sheet Metal Tools, - Checking instruments - Measuring instruments

UNIT 2 -MECHANICAL WORKING OF METALS AND PRESS TOOLS

DURATION:25 HOURS

Hot Working Processes: Rolling - types of rolling, two high mill, three high mills, four high mills, piercing or seamless tubing, reeling, drawing or cupping, spinning, Extrusion - direct or forward extrusion, indirect or backward extrusion, tube extrusion, Impact

extrusion. Effects of hot working of metals, advantages & limitations of hot working of metals.

Cold Working Processes: Rolling, drawing- wire drawing, tube drawing, stretch forming, Cold extrusion, **Squeezing Operations**-Cold Heading, Cold reeling, Cold swaging, Stamping, Cold hobbing, shot peening, Thread rolling, **Shearing Operations**- Blanking, Piercing, Notching, **Bending**-Roll bending, Angle bending, Cold spinning, Effects of cold working of metals, advantages & limitations of cold working

Press tools: -Introduction - Types of Presses – hand, power, gap, inclinable, adjustable, horn, straight side, pillar presses - Constructional details of a power press-Press size. Press Tools – Punch and die-. Press working operations- blanking, piercing and forming, lancing, cutting off and parting, notching, shaving, trimming, embossing, beading and curling, bulging, twisting, coining, swaging, hole flanging or extruding – line sketches

UNIT 3 -LATHE AND LATHE WORKS AND CUTTING FLUIDS

DURATION:25 HOURS

Working Principle of Lathe, Types of Lathes - Engine lathe – construction details– Lathe components: Bed, Headstock, Tailstock, Carriage, Lead screw, Feed rod, Tool post. specifications, geometry and nomenclature of single point cutting tool, tool signature, Cutting speed, feed, depth of cut, cutting tool materials, General and special operations – (Turning, facing, taper turning thread cutting, knurling, forming, drilling, boring, reaming, key way cutting). Explanation Lathe accessories viz., Work holding devices: Chuck (three-jaw, four-jaw), faceplate, centres, collets and tool holding devices. Lathe Accessories - Tailstock attachments: Drill chuck, live centre, dead centre - Steady rest and follower rest

Cutting Fluids and coolants: Properties and functions of fluids and coolants and their uses, Types of cutting fluids, Fluids and coolants required in turning, drilling, shaping, sawing & broaching; Selection of cutting fluids, methods of application of cutting fluid

UNIT 4: MILLING DRILLING, GRINDING AND FINISHING OPERATIONS

DURATION:25 HOURS

Milling: Milling cutter - Purpose – Working principal - Classification – Applications - Column and knee type-plain universal milling machine-vertical milling machine-specification of milling machines - principles of operation-work and tool holding devices-arbor-stub arbor spring collet-adapter- various milling operations – plain – face – straddle milling-gang milling-form milling-profile –end –saw - keyway –gear cutting –flute –cam milling

Drilling: Introduction, classification of drills, twist drills, straight flute drills, common forms of parallel shank drills, taper shank twist drills, drill size and specifications, Working principle of drilling, Type of drilling machines: sensitive drilling machine, upright drilling machine (single spindle), radial drilling machine. Operations-Drilling, reaming, boring, counterboring, counter sinking, tapping, spot facing and trepanning

Grinding Introduction – working Principles of Metal Removal by Grinding-Purpose of grinding – advantages –disadvantages - types of abrasives - bonding materials types – binding processes: Vitrified, silicate, shellac, rubber, -grit ,grade and structure of wheels - Standard marking systems: Meaning of letters numbers sequence of marking – Grades of letters. Grinding machines – classification: Cylindrical, Surface, Principle of centre less grinding, Advantages & limitations of centre less grinding - Dressing and trimming of grind wheels

Other Finishing processes Honing, Lapping, Super finishing, Electroplating–Basic principles–Plating metals–applications, Hot dipping: Galvanizing, Tin coating, Parkerizing, Anodizing

UNIT 5 -WELDING AND JOINING PROCESS

DURATION:25 HOURS

Introduction & classification of welding processes. Applications, Advantages and limitations of welding, Principles of arc welding, Arc welding equipment, types of electrodes -welding positions- selection of electrodes for different metals and sizes, - Shielded Metal Arc Welding (SMAW) - Submerged Arc Welding (SAW) - Gas Metal Arc Welding (GMAW / MIG) - Gas Tungsten Arc Welding (GTAW / TIG) - Principle of gas (oxy – acetylene) welding. Equipment of gas welding. Types of flames - Principle of resistance welding - Types: Spot welding - Seam welding - Projection welding - Butt welding – applications of resistance welding - Advantages and limitations - Forge welding - Friction welding - Diffusion welding - Ultrasonic welding - Laser beam welding - Electron beam welding - Plasma arc welding - Applications and limitations of special welding processes

Principles of brazing and soldering Difference between brazing and soldering -Types of welding defects - Causes and prevention - Destructive testing of welds - Non-destructive testing (NDT): - Visual inspection - Dye penetrant test - Radiographic testing - Ultrasonic testing

UNIT 6 - FOUNDRY AND CASTING

DURATION:25 HOURS

Foundry Equipment: Hand moulding tools: shovel, riddle, rammers, trowels, slick, lifter, strike off bar, sprue pin, bellow, swab, gate cutter, mallet, vent rod, draw spike, rapping plate or lifting plate, pouring weight, gagger, clamps, spirit level, moulding boxes and types of moulding Boxes.

Pattern – Making: Materials for pattern such as wood, cast iron, aluminium, brass, plastics, their uses and relative advantages, Sequence in pattern making, pattern allowances, classification of patterns such as solid (one piece), two piece and three pieces, split patterns, gate patterns, shell patterns, etc.

Types of Moulding Sand : Green sand, dry sand, loam sand, facing sand, backing sand, parting sand, core sand, system sand, binders and sand additives.

Sand Properties: Properties of moulding sand - porosity, flow ability, collapsibility, adhesiveness, cohesiveness and refractoriness.

Advantages and limitations of casting over other manufacturing processes.

Moldings: Moulding Procedure, Moulding Processes, Green sand, Dry sand moulding, Skin dry sand moulding, Loam moulding, Cement bonded moulding, Shell moulding, Ceramic moulding, Moulding a split pattern, Moulding with three parts flask.- elements of gating system – gates –runner –riser **Cores:** Definition of core, Need of cores

Special casting methods: Die casting- hot chamber and cold Chamber die casting, Vacuum die casting, permanent mould (Gravity die) casting, centrifugal casting, CO₂ process, Investment

SUGGESTED LEARNING OUTCOMES

CO1 FITTINGF, SEET METAL AND FORGING TOOLS

- 1.1 Identify and know the purpose of various holding devices used in fitting operations, including bench vice, leg vice, hand vice, pin vice, tool maker's vice, and pipe vice.
- 1.2 Explain the specifications, uses, and selection criteria of cutting tools such as hand hacksaws, files, chisels, scrapers, drill bits, reamers, taps, and dies.
- 1.3 Describe marking tools, including surface plates, V-blocks, angle plates, try squares, scribes, punches (prick, centre, number, letter), and their applications in fitting work.
- 1.4 Identify forging tools including anvils, swage blocks, hand hammers, sledge hammers, tongs, chisels (hot & cold), swages, fullers, flatters, set hammers, punches, and drifts.
- 1.5 Explain the specifications, types, and uses of forging tools.
- 1.6 Describe the advantages, limitations, and applications of forging.
- 1.7 Demonstrate basic forging operations using appropriate tools such as Drawing out - Upsetting - Bending – Punching – Fullering – Swaging – Flattening.
- 1.8 Identify cutting and striking tools such as straight and curved snips, double shears, bench shears, riveting hammers, setting hammers, raising hammers, and mallets.
- 1.9 Describe stakes and their applications, including double seaming stake, break horn stake, bevel-edged square stake, funnel stake, half-moon stake, hatches stake, needle stake, blow horn stake, and hollow mandrel stake.
- 1.10 Explain hems (single, double, wired edge) and types of seams used in sheet metal work.

C02 LATHE AND LATHE WORKS AND CUTTING FLUIDS

- 1.11 Explain the working principle of a lathe machine.
- 1.12 Classify different types of lathes, including engine lathe, speed lathe, turret lathe, capstan lathe, and automatic lathe and know the specific purpose of it.
- 1.13 Describe the construction and functions of engine lathe components: bed, headstock, tailstock, carriage, lead screw, feed rod, and tool post.
- 1.14 Identify the specifications of a lathe, such as swing, distance between centers, and bed length.
- 1.15 Explain general turning operations such as plain turning, step turning, and facing.
- 1.16 Perform special operations including taper turning, thread cutting, knurling, forming, drilling, boring, reaming, and keyway cutting.
- 1.17 Identify work holding devices, such as three-jaw, four-jaw chucks, faceplates, centres, and collets.
- 1.18 Explain the function of tailstock attachments: drill chuck, live centre, and dead centre.
- 1.19 Describe the use of steady rest, follower rest, lathe dog, and driving plate.
- 1.20 Explain the properties and functions of cutting fluids and coolants.
- 1.21 Identify suitable cutting fluids for turning, drilling, shaping, sawing, and broaching operations.
- 1.22 Select appropriate methods of applying cutting fluids such as flooding, misting, brushing, or dipping.
- 1.23 Analyze the effect of cutting fluids on tool life, surface finish, and machining efficiency.
- 1.24 Explain the geometry and nomenclature of single-point cutting tools.

- 1.25 Interpret the tool signature and identify various tool angles.
- 1.26 Select appropriate cutting tool materials based on workpiece material and machining operation.
- 1.27 Determine cutting parameters such as cutting speed, feed, and depth of cut for different operations.

CO3 WELDING AND JOINING PROCESS

- 1.28 Explain the introduction, classification, applications, advantages, and limitations of welding processes.
- 1.29 Describe the principles of arc welding and identify various arc welding equipment.
- 1.30 Identify and classify different types of welding electrodes and select suitable electrodes for different metals and thicknesses.
- 1.31 Explain welding positions and their significance in welding operations.
- 1.32 Describe the principles, equipment, applications, advantages, and limitations of Shielded Metal Arc Welding (SMAW)
- 1.33 Describe the principles, equipment, applications, advantages, and limitations of Submerged Arc Welding (SAW)
- 1.34 Describe the principles, equipment, applications, advantages, and limitations of Gas Metal Arc Welding (GMAW / MIG)
- 1.35 Describe the principles, equipment, applications, advantages, and limitations of Gas Tungsten Arc Welding (GTAW / TIG)
- 1.36 Explain the principle of gas (oxy-acetylene) welding and identify gas welding equipment.
- 1.37 Differentiate between neutral, carburizing, and oxidizing flames and select suitable flames for different welding applications.
- 1.38 Explain the principle of resistance welding and describe its types: spot, seam, projection, and butt welding.
- 1.39 State the applications, advantages, and limitations of resistance welding processes.
- 1.40 Understand the working principle of Forge welding, Friction welding and Diffusion welding
- 1.41 Explain the principles, applications, and limitations of Laser beam welding, Electron beam welding, Plasma arc welding
- 1.42 Explain the principles of brazing and soldering and differentiate between them.
- 1.43 Identify common welding defects and explain their causes and prevention methods.
- 1.44 Describe destructive testing methods used for evaluating weld quality.
- 1.45 Explain and apply non-destructive testing (NDT) methods such as Visual inspection, Dye penetrant testing, Radiographic testing, Ultrasonic testing

CO4 FOUNDRY AND CASTING

- 4.1 Identify various hand moulding tools used in foundry practice, such as shovels, rammers, trowels, lifters, sprue pins, bellow, swabs, mallets, and spirit levels.
- 4.1 Describe the function and application of moulding boxes and their types.
- 4.2 Classify pattern materials such as wood, cast iron, aluminium, brass, and plastics, and explain their relative advantages and applications.
- 4.3 Explain the sequence of pattern making and apply pattern allowances.
- 4.4 Differentiate types of patterns, including solid (one-piece), two-piece, three-piece, split, gate, and shell patterns.
- 4.5 Classify types of moulding sand such as green sand, dry sand, loam sand, facing sand, backing sand, parting sand, core sand, and system sand.

- 4.6 Explain the purpose of binders and sand additives in moulding.
- 4.7 Describe the properties of moulding sand, including porosity, flowability, collapsibility, adhesiveness, cohesiveness, and refractoriness.
- 4.8 Explain the advantages and limitations of casting compared to other manufacturing processes.
- 4.9 Demonstrate basic moulding procedures and apply various moulding processes, such as green sand, dry sand, skin-dry sand, loam, cement-bonded, shell, and ceramic moulding.
- 4.10 Explain moulding with split patterns and three-part flasks.
- 4.11 Identify and explain elements of gating systems, including gates, runners, and risers.
- 4.12 Explain the definition, purpose, and necessity of cores in casting.
- 4.13 Explain the principles, equipment, and applications of die casting (hot chamber and cold chamber).
- 4.14 Describe vacuum die casting, permanent mould (gravity die) casting, and centrifugal casting processes.
- 4.15 Explain the CO₂ process, investment casting, and their applications in industries.
- 4.16 Compare different special casting methods in terms of advantages, limitations, and industrial applications.

CO5 MECHANICAL WORKING OF METALS AND PRESS TOOLS

- 4.17 Explain the principles of hot working of metals and its industrial significance.
- 4.18 Identify various hot working processes such as two-high, three-high, four-high mills - Piercing or seamless tubing - Reeling, drawing, and cupping – Spinning – Direct and indirect, tube extrusion - Impact extrusion
- 4.19 Describe the effects of hot working on metals, including changes in microstructure, mechanical properties, and dimensional accuracy.
- 4.20 Explain the advantages and limitations of hot working processes.
- 4.21 Explain the principles of cold working and its significance in manufacturing.
- 4.22 Identify and describe various cold working operations such as Rolling, wire drawing, tube drawing, stretch forming – cold extrusion
- 4.23 Identify and describe various squeezing operations such as cold heading, reeling, swaging – Stamping, cold hobbing, shot peening, thread rolling
- 4.24 Explain Bending operations (roll bending, angle bending, cold spinning)
- 4.25 Explain the effects of cold working on metals, including strain hardening, dimensional accuracy, and surface finish.
- 4.26 Discuss the advantages and limitations of cold working processes.
- 4.27 Explain the construction, types, and applications of presses such as Hand press, power press, gap press, inclinable press, adjustable press, horn press, straight-side press, pillar press
- 4.28 Identify and describe press tools, including punches and dies, and their selection criteria.
- 4.29 Explain common press working operations with line sketches such as Blanking, piercing, forming, lancing, cutting off and parting, notching, Shaving, trimming, embossing, beading, curling, bulging, twisting, coining, swaging, Hole flanging or extruding

CO6 MILLING DRILLING, GRINDING AND FINISHING OPERATIONS

- 6.1 Explain the purpose and working principle of milling machines and milling cutters.
- 6.2 Classify milling cutters and identify their applications in various machining operations.
- 6.3 Describe the construction and operation of column-and-knee type, plain universal, and vertical milling machines, including specifications.
- 6.4 Identify work and tool holding devices such as arbors, stub arbors, collets, and adapters.
- 6.5 Perform and differentiate various milling operations, such as Plain milling - Face milling - Straddle milling - Gang milling - Form milling - Profile milling - End milling - Saw milling - Keyway cutting - Gear cutting - Flute and cam - milling
- 6.6 Explain the working principle of drilling and the purpose of drills.
- 6.7 Classify drills such as twist drills, straight flute drills, parallel shank drills, and taper shank twist drills.
- 6.8 Identify drill sizes and specifications according to standards.
- 6.9 Describe different types of drilling machines, including sensitive, upright (single spindle), and radial drilling machines.
- 6.10 Explain drilling operations, such as Drilling – Reaming – Boring – Counterboring – Countersinking – Tapping - Spot facing - Trepanning
- 6.11 Explain the working principle of metal removal by grinding and the purpose of grinding operations.
- 6.12 Identify types of abrasives, bonding materials, and binding processes (vitrified, silicate, shellac, rubber).
- 6.13 Explain grit, grade, and structure of grinding wheels, including standard marking systems.
- 6.14 Describe the construction, operation, and applications of grinding machines, including cylindrical, surface, and centerless grinding machines.
- 6.15 Explain the advantages, limitations, and techniques of dressing and truing of grinding wheels.
- 6.16 Explain the principles and applications of advanced finishing processes such as Honing – Lapping – Superfinishing -
- 6.17 Describe electroplating, including the plating metals, basic principles, and industrial applications.
- 6.18 Explain hot dipping processes such as galvanizing, tin coating, Parkerizing, and anodizing, including their purpose and applications.

REFERENCE BOOKS

1. Production Technology by Jain & Gupta (Khanna Publishers)
2. Elementary Workshop Technology (Vol. I & II) by Hazra Chowdary
3. Manufacturing Technology (Vol. I) by P. N. Rao (McGraw Hill)
4. Workshop Technology (Vol. I & II) by Raghuvamshi
5. Production Technology by P. C. Sharma

Suggested E-Learning references

1. <http://www.asme.org>
2. www.ocw.mit.edu/courses/mechanical-engineering
3. www.nptel.ac.in

MIDSEM-I EXAM PATTERN BLUE PRINT

(Shown are Question numbers)

S. No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM PATTERN BLUE PRINT

(Shown are Question numbers)

S. No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SEMESTER END EXAMINATION (SEE) BLUEPRINT PATTERN

State Board of Technical Education and Training, Telangana

**Model Question paper
C-26; ME-106; MANUFACTURING TECHNOLOGY
Mid Semester-I Examination**

Time: 1 hour

Max. Marks: 20 Marks

PART-A

Answer all questions- Each Question carries ONE-mark

4x1 = 4 Marks

1. State one use of a bench vice in fitting work.
2. What is the purpose of a prick punch?
3. Define swing of a lathe.
4. Name any one work-holding device used on a lathe.

PART-B

Answer two questions- Each Question carries THREE marks

2x3 = 6 Marks

5(a) Explain the purpose and applications of any three holding devices used in fitting operations.

OR

5(b) Describe the specifications and uses of any three cutting tools used in fitting work.

6(a). Explain the working principle of a lathe machine.

OR

6(b). Describe the construction and functions of any three main parts of an engine lathe.

PART-C

Answer two questions- Each Question carries FIVE marks

2x5 = 10 Marks

7(a). Demonstrate the basic forging operations of drawing out, upsetting, and bending using suitable tools. Explain the purpose of each operation.

OR

7(b). Select suitable holding, marking, and cutting tools for preparing a fitting job and justify their selection.

8(a). Select suitable work-holding devices and tailstock attachments for a given turning job and justify your selection.

OR

8(b) Explain the procedure to perform taper turning or thread cutting on a lathe, mentioning the tools, work holding method, and cutting fluid used.

State Board of Technical Education and Training, Telangana
Model Question paper
C-26; ME-106; MANUFACTURING TECHNOLOGY
Mid Semester-II Examination

Time: 1 hour

Max. Marks: 20 Marks

PART-A

Answer **all** questions- Each Question carries **ONE**-mark

4x1 = 4 Marks

1. Name any one arc welding process.
2. State one type of welding electrode.
3. Name any one hand moulding tool used in foundry practice.
4. What is meant by green sand?

PART-B

Answer two questions- Each Question carries **THREE** marks

2x3 = 6 Marks

5(a) Explain the principle of arc welding and list the main equipment used..

OR

5(b) Describe different welding positions and state their significance.

6(a). Describe the functions and applications of moulding boxes..

OR

6(b). Classify pattern materials and state one advantage of each..

PART-C

Answer two questions- Each Question carries **FIVE** marks

2x5 = 10 Marks

7(a). Select a suitable welding process and electrode for welding mild steel plates of given thickness and justify your selection.

OR

7(b) Apply the Shielded Metal Arc Welding (SMAW) process to fabricate a butt joint and explain the procedure, equipment, and limitations.

8(a). Apply suitable pattern allowances and explain the sequence of pattern making for a given casting.

OR

8(b) Select and apply an appropriate gating system and core arrangement for a simple casting, justifying your choice.

State Board of Technical Education and Training, Telangana
Model Question paper
C-26; ME-106; MANUFACTURING TECHNOLOGY
Semester End Exam

Time: 2-hour

Max. Marks: 40 Marks

PART-A

Answer all questions- Each Question carries ONE-mark

8x1 = 8 Marks

1. Define a startup.
2. What is meant by a startup ecosystem?
3. What is cold working?
4. Name any one hot working process.
5. What is blanking in press working?
6. State the main purpose of a milling machine.
7. What is a twist drill?
8. Name any one type of abrasive used in grinding wheels.

PART-B

Answer all questions- Each Question carries THREE marks

4x3 = 12 Marks

9(a) Describe any three marking tools used in fitting work and state their applications.

OR

9(b) Explain the principles and industrial significance of hot working of metals.

10(a). Explain the functions of cutting fluids and their effect on machining performance

OR

10(b). Classify milling cutters and state one application of each.

11(a) Explain the advantages and limitations of hot working processes.

OR

11(b) Explain bending operations used in cold working.

12(a) Explain the working principle of metal removal by grinding and state its purpose.

OR

12(b) Explain the working principle of a milling machine and milling cutter.

PART-C

Answer all questions- Each Question carries FIVE marks

4x5 = 20 Marks

13(a). Apply suitable sheet-metal tools, stakes, and seams to fabricate a simple sheet-metal component, explaining the type of hem or seam used.

OR

13(b) Select suitable hot working processes for manufacturing seamless tubes and justify your selection.

14(a). Analyze the effect of cutting fluids on tool life, surface finish, and machining efficiency, and select a suitable method of application for a given operation.

OR

14(b) Select a suitable milling machine, cutter, and work-holding device to perform keyway cutting or gear cutting, and justify your selection.

15(a) Apply cold working operations such as rolling, drawing, and extrusion to manufacture a component, explaining the sequence and effects on material properties.

OR

15(b) Apply suitable press working operations to fabricate a sheet-metal component, explaining the operations involved with neat sketches.

16(a) Apply appropriate drilling and finishing operations (drilling, reaming, tapping, or boring) for producing a precision hole, explaining the sequence and tools used.

OR

16(b) Select a suitable grinding wheel by specifying abrasive, bond, grit, grade, and structure for a given grinding operation, and explain dressing and truing methods. Bottom of Form