Q. Code: 563218

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Third Semester

MN22303 – MANUFACTURING TECHNOLOGY

(Mechanical and Automation Engineering)

(Regulation 2022)

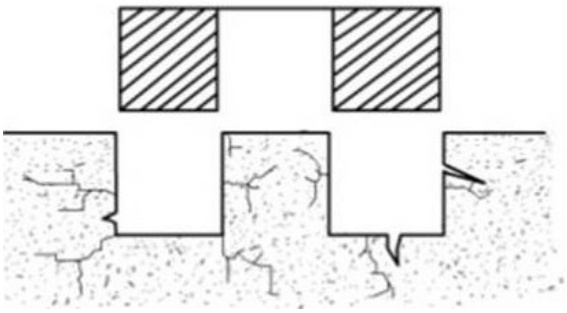
TIME: 3 HOURS **MAX. MARKS: 100**

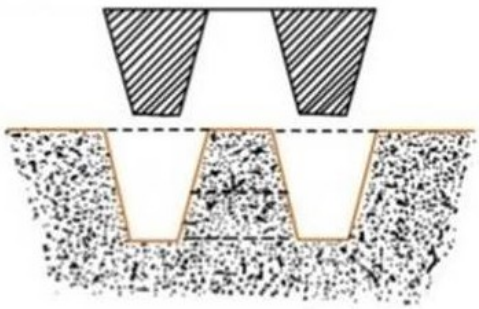
COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Classify the different types of casting process and select a suitable casting process for a given application.	**3**
CO 2	Categorize welding processes according to welding principle and will apply a suitable welding process for a suitable material.	**3**
CO 3	Select a suitable deformation and powder metallurgy processes for a given application.	**3**
CO 4	Analyze the tool life, MRR during machining and will develop a process planning sheet for a given component.	**3**
CO 5	Select a proper Non-Traditional Machining method for a given component.	**3**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What do you infer from the following diagram? Where this concept can be applied?	**1**	**3**





2.	A cylindrical specimen of dimensions Ø 60 x 100 mm with a through hole of Ø20 mm has to be manufactured from cast iron. Suggest the most economical method and draw the pattern profile to make a mould.	**1**	**3**
3.	In which die casting process aluminium alloys can be used to manufacture the product? Validate.	**1**	**3**
4.	What is the advantage of shell moulding process?	**1**	**2**
5.	A mild steel plate of 4mm thick has to be welded by gas welding technique. Will you choose rightward or leftward welding technique? Justify your answer with proper	**2**	**3**

statements.

6.	Whether resistance welding is a solid state or fusion welding process? How will you determine the heat input in resistance welding?	**2**	**3**
7.	What is the main source of heat input in Thermit welding? List down the applications of thermit wedling.	**2**	**3**
8.	Differentiate between non transferred and transferred arc plasma arc welding process with respect to their application.	**2**	**3**
9.	Whether all the engineering materials will undergo plastic deformation only at elevated temperature? Justify.	**3**	**3**
10.	Why low strength alloys alone can be extruded by direct or indirect extrusion process?	**3**	**3**
11.	Differentiate between the shearing and forming operations with respect to the type of stress the material undergoes.	**3**	**3**
12.	When the powder metallurgy process will be a cost-effective process? Justify.	**3**	**3**
13.	Why clearance angle should be given to the single point cutting tools? What will happen if relief angle is not given to the cutting tool while machining the larger diameter workpieces?	**4**	**3**
14.	Why center lathe is called as manual operated lathe and turret lathe as semi automats?	**4**	**3**
15.	In what way the cutting speed and feed will affect the Material Removal Rate (MRR)?	**4**	**3**
16.	List down the machine tools that makes use of multipoint cutting tools. For the maximum material removal rate which machine tool you will select and justify your selection?	**4**	**3**
17.	What prompted the development of unconventional machining and forming processes?	**5**	**3**
18.	What are the various types of energy sources used in non-traditional machining techniques?	**5**	**2**
19.	List some abrasive powders commonly used in Ultrasonic Machining.	**5**	**2**
20.	List the advantages of Electro Chemical Grinding over conventional grincing.	**5**	**2**

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	A cylindrical specimen of dimensions Ø 60 x 100 mm with a through hole of Ø20 mm has to be manufactured by from cast iron. Design and draw the pattern along with the necessary dimensions if the following allowances are	**(10)**	**1**	**3**

considered. The pattern material is wood.

1. Shrinkage allowance of 2mm/m
2. Machining allowance if 2 mm / side has to be machined
3. Draft allowance of 1^0 per side

(OR)

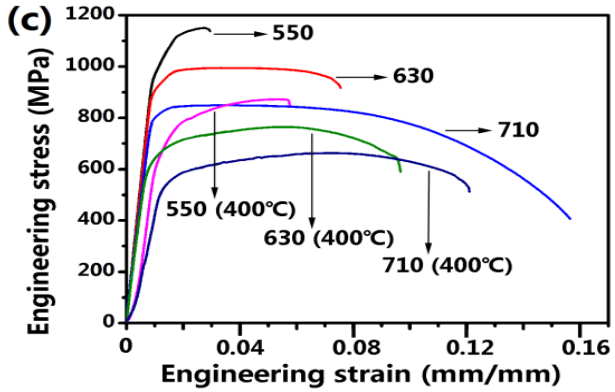
(b)	Medical implants from titanium alloy for knee joints has to be manufactured. Suggest and explain the best suitable and most economical casting process with a neat diagram.	**(10)**	**1**	**3**

22. (a)	Two mild steel plates of thickness 500 mm have to be butt welded in a single stretch and the plates are not edge prepared. Select a most suitable welding process and explain the process with a neat diagram.	**(10)**	**2**	**3**

(OR)

(b)	**(i)**	When will you choose the solid state welding process? Explain any one solid state welding process with a neat diagram and list down its major applications.	**(8)**	**2**	**3**
	(ii)	Which weld positions are not suitable for MIG welding that uses globular mode of metal transfer? Justify.	**(2)**	**2**	**3**

23. (a)	**(i)**	Refer the following graph and write your inference with respect to the yield strength, tensile strength and percentage elongation. Also state the application of your inference in the bulk deformation process.	**(6)**	**3**	**3**



	(ii)	Differential between hot working and cold working with respect to the working temperature, total energy consumed and strength of the deformed product.	**(4)**	**3**	**3**

(OR)

(b)	**(i)**	A sheet metal undergoes simultaneous bending and tensile stress. Name the process and explain the process with a simple diagram. List down its advantages and applications.	**(8)**	**3**	**3**
	(ii)	How will be blank size in the conventional and shear spinning	**(2)**	**3**	**3**

process? Schematically show the process.

24. (a)	**(i)**	A component shown in the figure 1 has to be manufactured in a small quantity. The initial raw material size is Ø25 X 52mm. Identify the operations to be performed and list down the operations as per the operational sequence and also state how a conventional lathe will be selected for manufacturing this component.	**(8)**	**4**	**3**

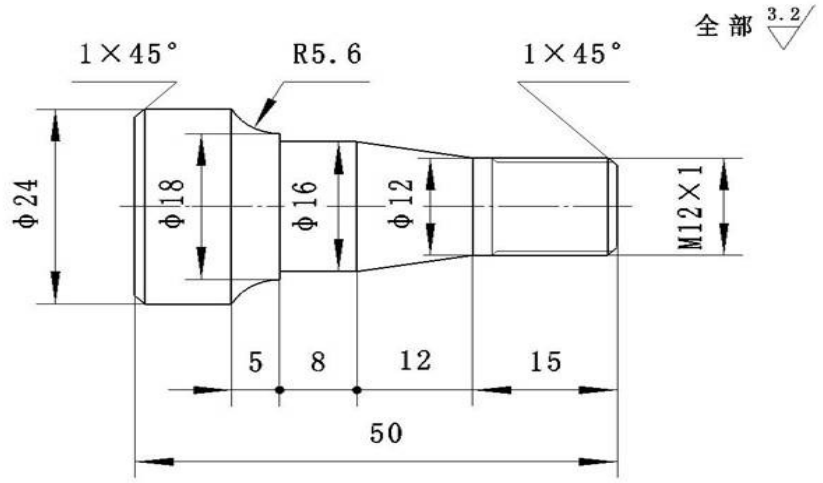


Figure 1 (All Dimensions are in millimeter)

	(ii)	How to calculate the material removal rate and explain its importance with respect to the machine tool selection.	**(2)**	**4**	**3**

(OR)

(b)	**(i)**	Draw the nomenclature of the single point cutting tool and show the various angles. Explain in detail why rake angle has to be provided and when to select positive, negative and zero rake angle?	**(8)**	**4**	**3**
	(ii)	When will you select counter boring and counter sinking operation? Draw the two operations.	**(2)**	**4**	**3**
25. (a)	**(i)**	With the help of a neat sketch, explain the working of a Electro Chemical machining Process. List down its advantages and limitations.	**(8)**	**5**	**2**
	(ii)	List down the functions of dielectric fluid in an Electric Discharge Machining?	**(2)**	**5**	**2**

(OR)

(b)	**(i)**	With a neat sketch explain the Electron Beam Machining process?	**(8)**	**5**	**2**
	(ii)	List down the process variables that affects the performance in the abrasive jet machining process.	**(2)**	**5**	**2**

PART- C (1 x 10 = 10 Marks)
(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
26.	Window panels and channels are to be made from pure aluminium metal. Suggest a suitable and the most economical manufacturing process for manufacturing this panel and explain the process with a simple diagram.	**(10)**	**3**	**3**

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