Q. Code:774227

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

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

Third Semester

ME18302 – MANUFACTURING PROCESSES

(Mechanical Engineering)

(Regulation 2018 / 2018A)

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

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Select a suitable casting process for a given engineering component.	**3**
CO 2	Given a material, the students will Apply a suitable joining process.	**3**
CO 3	Given a part diagram & its application, students will justify a suitable bulk deformation process.	**3**
CO 4	Students will identify the necessary operations to be performed on a sheet metal and will select a suitable process for a given application.	**3**
CO 5	Students will justify a suitable process for thermoplastics, thermosetting plastics and for cutting tools.	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Justify why machine tool beds of lathe, milling machine and shaper are manufactured only by casting process.	**1**	**3**
2.	Pattern dimensions are entirely different when compared to the cast product. Why?	**1**	**3**
3.	A mild steel plate of 5 mm thickness has to be welded by gas welding. Justify whether rightward or leftward welding will be preferred.	**2**	**3**
4.	Tungsten Inert Gas welding has to be selected for welding non ferrous alloys. Suggest whether DCSP or DCRP will be used as a power supply. Provide proper justification for your selection.	**2**	**3**
5.	What is the difference between a cast and wrought iron?	**3**	**2**
6.	What is a seamless pipe? How seamless pipes are manufactured? List them.	**3**	**2**
7.	The double punch which is used for making holes in the paper has its end face curved and not flat. Why?	**4**	**3**
8.	How the stand off distance in Explosive forming will affect the formability of the sheet metal?	**4**	**3**
9.	How the overhead tanks from thermoplastics are manufactured? Justify the most	**5**	**3**

economical process for low volume production.

			Marks	CO	RBT LEVEL
10.		Whether products manufactured by powder metallurgy will possess superior mechanical strength? Justify.	**5**	**3**	

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	The casting shown in Figure 1 has to be manufactured in cast iron using wood as a pattern material. Perform the calculations required to determine the dimensions of the pattern. The shrinkage allowance for external dimensions – 1 mm/100 mm Shrinkage allowance for cored – hole is – 0.8 mm/ 100 mm Machining allowance is 3 mm / side	**(10)**	**1**	**3**

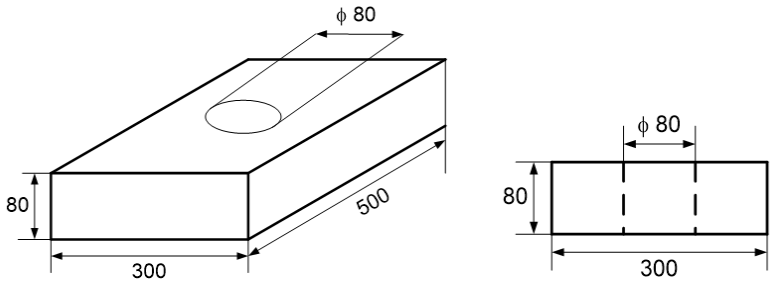

Figure 1 (All Dimensions are in millimeter)

	(ii)	A mould has to be prepared whose shape is cylinder with a dimension's of Ø300 x 300 mm. Suggest a most economical pattern for making this mould and draw the simple diagram.	**(4)**	**1**	**3**

(OR)

(b)	**(i)**	Engine blocks for 1500 cc passenger cars has to be manufactured? Suggest the suitable material which are currently being used in the passenger cars and explain with a simple diagram the suitable casting process.	**(10)**	**1**	**3**
	(ii)	When to select a semi centrifugal and true centrifugal casting process? Explain with suitable examples.	**(4)**	**1**	**3**
12. (a)	**(i)**	What welding process was used for repairing the rails in the olden days? Explain the process with a suitable diagram and justify why other welding was not suitable?	**(10)**	**2**	**3**
	(ii)	When to use single carbon and twin carbon arc electrodes? Validate with an example.	**(4)**	**2**	**3**

(OR)

(b)	**(i)**	When will you select either plasma arc or electron beam welding process? Explain any one process with a neat diagram. Also justify why these processes are not grouped under conventional welding process?	**(10)**	**2**	**3**
	(ii)	Differentiate between spot and project welding with a simple diagram	**(4)**	**2**	**3**
13. (a)	**(i)**	Why connecting rods are manufactured by cold forging process Explain with a simple diagram.	**(10)**	**3**	**3**
	(ii)	What will be the effect of recrystallization temperature on hot working and cold working?	**(4)**	**3**	**3**
		(OR)			
(b)	**(i)**	How a hollow cylindrical tube from metals are manufactured using extrusion process. Explain the process with a simple diagram.	**(10)**	**3**	**3**
	(ii)	Draw the diamond pass rolling process for converting the blooms into billets.	**(4)**	**3**	**3**
14. (a)	**(i)**	A circular washer from C45 steel of outside diameter 40 mm, inside diameter 15 mm, thickness 0.75 mm has to be manufactured in mass production. The shear strength of the C45 steel is 230 N/mm^2. Determine the press tonnage capacity. Also determine the press tonnage capacity if staggered punches are selected.	**(10)**	**4**	**3**
	(ii)	How to calculate the blank size for a U-shape product that undergoes bending operation?	**(4)**	**4**	**3**
		(OR)			
(b)	**(i)**	Explain the sheet metal manufacturing process in which the material is subjected to simultaneous tensile and bending stresses? Give an example where this process can be used.	**(10)**	**4**	**3**
	(ii)	Do all the materials possess superplasticity? Why?	**(4)**	**4**	**3**
15. (a)	**(i)**	PVC pipes used for irrigation purpose has to be manufactured in a mass production. Explain a suitable manufacturing process with a neat diagram stating the material type, temperature and other process parameters.	**(10)**	**5**	**3**

	(ii)	List down the various methods available for processing thermoplastics.	**(4)**	**5**	**2**

(OR)

(b)	**(i)**	Why Powder Metallurgy enables the processing of materials with very high melting points, including refractory metals such as tungsten, molybdenum and tantalum? Explain the process and also justify why these materials cannot be processed by other manufacturing process.	**(10)**	**5**	**3**
	(ii)	When will you select rotational moulding process to manufacture a product?	**(4)**	**5**	**2**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

			Marks	CO	RBT LEVEL
16.		A component shown in the figure has low yield strength and is symmetry about the axis. Suggest the suitable manufacturing process and explain the process in detail.	**(10)**	4	**3**

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