

**VIT**Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SLOT: A2+TA2

REG. NO

**SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST (CAT) -I
FALL SEMESTER 2026-2027**

Programme Name & Branch	: B.Tech. Mechanical Engineering
Course Code	: BAMEE101
Course Name	: Manufacturing Processes
Faculty Names	: Prof. Kishore Kumar Mahato, Prof. Venkateshwarlu B, Prof. C Pandivelan, Prof. Shivani Gupta, Prof. Vivek Kumar Barnwal
Class Numbers	: VL2026270104883, VL2026270104891, VL2026270104896, VL2026270104902, VL2026270104955
Date of Examination	: 09 August 2026
Exam Duration	: 90 minutes
	Maximum Marks: 50

General Instructions:

- Answer **all**
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes Statements:
 - ❖ CO. 1: Explain the principles and steps involved in casting and particulate processing, including powder metallurgy and ceramic techniques

Q. No.	Question	M	CO	BL
1.	Briefly explain the steps involved in a sand-casting process with split pattern. Also, justify the statement ' <i>pattern cannot be termed as exact replica of final product</i> ' with suitable reasonings.	10	1	3
2.	A) Pure iron was poured at 1650°C in the mould cavity. If the freezing point of pure iron is 1538°C, draw a cooling curve and label it. Use any approximate time for the convenience.	5	1	3
	B) A cylindrical shaped part is to be cast out of iron. The radius of the cylinder is 5 cm and the height is 15 cm. How long will it take for the casting to solidify based on Chvorinov's rule, assuming $n = 2$ and the mold constant = 1.5 s/mm ² ?	5		
3.	For a sand-casting process, the mould was prepared with a sand having poor permeability. Moreover, pouring was performed at a very high temperature. For the given case, prepare a list of five possible casting defects and methods to overcome those defects.	10	1	3



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4.	A manufacturing industry is considering sand casting as well as powder metallurgy for producing a few pieces of gears using steel material. If the size of the gear is moderate, compare the suitability of both processes based on part quality, production volume, and material waste. (2+3+5) marks	10	1	3
5.	Recommend an appropriate metal casting process, which requires minimal post-process machining, for the mass production of thin-walled shapes of aluminium alloy. Justify the selection and explain the process in detail with a suitable diagram. (2+3+5) marks	10	1	3
