



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of U.O. Act, 1986)

SLOT: A2+TA2

REG. NO.:

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

Programme Name & Branch : B.Tech. Mechanical Engineering
Course Code : BAMEE101
Course Name : Manufacturing Processes
Faculty Name(s) : Prof. Venkateshwarlu B, Prof. Kishore Kumar Mahato,
Prof. C. Pandivelan, Prof. Shivani Gupta,
Prof. Vivek Kumar Barnwal
Class Numbers : VL2026270104883, VL2026270104891, VL2026270104896,
VL2026270104902, VL2026270104955
Date of Examination : 27 September 2026
Exam Duration : 90 minutes (8.30-10.00 AM) **Maximum Marks: 50**

General Instructions:

- Answer all Questions and **graph sheet** can be used.
- 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. 2: Describe forming and welding processes, identify common defects, and discuss basic inspection methods.
CO. 3: Apply machining principles, including tool geometry and cutting mechanics, to conventional and abrasive finishing operations.

Q. No.	Question	M	CO	BL
1.	A low carbon steel 40 mm thick plate is rolled and reduced to 32 mm thick in one pass using a two-high non-reversing rolling mill. During this process, the plate widens by 3% in order to maintain a constant volumetric flow rate. The yield and tensile strength of the plate are found to be 165MPa and 278MPa, respectively. The upper and lower rolls having same diameter of 70 cm are rotating slowly in opposite direction with a speed of 51 rpm. The plate is admitted in to the rolling mill at an initial speed of 12 m/min. For this rolling scenario, determine: (a) The feasibility of rolling operation if coefficient of friction between the plate and rolls is considered as 0.157. (b) Velocity of the plate while leaving the rolling mill (c) Percentage of forward and backward slips during rolling	10	2	4
2.	Identify the following metal forming defects shown in below Figure (a-d) and explain the reasons for their occurrence and also suggest suitable remedial solutions in brief.	10	2	3



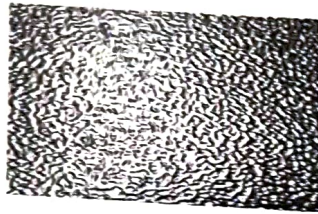
VIT

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

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

SLOT: A2+TA2

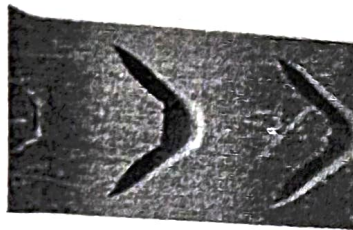
REG. NO.:



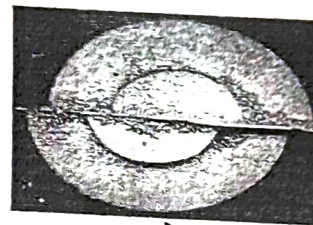
(a)



(b)



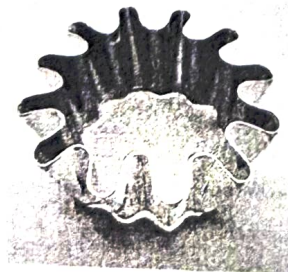
(c)



(d)

Figure (a-d)

3. An aerospace component shown in the below Figure is to be manufactured from a steel plate of thickness 6.374 mm. Identify the suitable metal forming process and explain its working procedure in detail with a neat sketch. Also, mention its advantages and limitations.



Figure

10

2

4



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) -II
FALL SEMESTER 2026-2027

4.	During an orthogonal metal cutting on a lathe with the cutting tool having rake angle of 10°, depth of cut of 1.6 mm, feed rate of 0.25 mm/rev, and cutting speed of 160 m/min were used. The cutting ratio of 0.865 was obtained during machining. The vertical tangential force (F_t) of 1095 N and the horizontal cutting force (F_c) of 836 N were recorded by the lathe-tool dynamometer used during machining. Determine the magnitude of (a) Friction force, (b) Normal friction force, (c) Shear force, (d) Normal shear force, (e) Friction angle, (f) Shear angle, and (g) Coefficient of friction. Note: Use only graphical method to determine the magnitude of forces.	10	3	4
5.	A high speed steel (HSS) tool follows the relation $VT^{0.15} = C_1$ and tungsten carbide (WC) tool follows $VT^{0.25} = C_2$. At a cutting speed of 30 m/min, both the tools have a tool life of 2 hours. (a) Compute their tool lives if the cutting speed is increased to 40 m/min, and (b) Estimate the percentage reduction in their tool lives because of increase in cutting speed from 30 m/min to 40 m/min.	10	3	4
