THEORY EXAMINATION – JAN 2021		TIME – 3 Hrs 15 Min
B.TECH - ME	**SEMESTER – V**	**M.M. - 56**

PAPER - MEC-303	SUBJECT- Production Technology

INSTRUCTIONS TO BE FOLLOWED

- **Allotted time for examination is 3 hours 15 minutes that includes time for downloading the question paper, writing answers, scanning of answer sheets and E-mailing the PDF files to the designated Email ID.**
- **For all B Tech. Mechanical Engineering Students, the Email ID is:- btechmechuiet@kuk.ac.in**
- **The candidates will be required to attempt 75% of the question paper (maximum) by choosing to their any best questions accumulating 56 marks.**
- **The PDF files should be saved as Roll No. and Subject Code. Proper attention should be given while sending the email and in the subject line, the Roll Number and Subject Code should be mentioned.**
- **Maximum Page Limit should be 20 (Twenty) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the Kurukshetra University Examination guidelines.**
- **Over-attemptation should be avoided.**
- **Handwriting should be neat and clean and diagrams should be clear and contrasted.**
- **The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.**
- **While attempting the paper, the candidate will use blue/black pen only.**
- **Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.**
- **Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.**

PART-A

Q. No. – 1 Answer the following questions.   **15x1=15**

(i)	The primary tool force used to calculate the total power consumption in machining in the a) Radical force b) tangential force c) axial force d) frictional force
(ii)	Which cutting tool material is normally used for turning steel of very high hardness? a) HSS b) Tungsten carbide c) CBN d) Diamond
(iii)	Calculate the time taken to face a work piece of 72 mm length if the spindle speed is 80 rpm and cross feed is 0.3 mm/rev.
(iv)	Discuss the significance of side relief angle in metal cutting.
(v)	Compare grinding with other machining operations.
(vi)	Find the tool life equation if a tool life of 80 min is obtained at a cutting speed of 20 m/min and 8 min at 80 m/min
(vii)	Name the instruments used for measuring the external taper.
(viii)	A shaft has a dimension $\varnothing 35^{-0.009}_{-0.025}$. The respective value of fundamental deviation and tolerance are _____.
(ix)	Which threads are used in lead screw having half nut in the lathe which is free to rotate in both directions?
(x)	In 3-2-1 principle of fixture design, 3 refers to the number of _____.
(xi)	According to principle of location in jigs and fixtures, how many degrees of freedom are to be eliminated to have a body fixed in space?
(xii)	Which manufacturing process is used for production of Helical gears?
(xiii)	Internal gears and splines used in automobile industry are manufactured by _____ process.
(xiv)	With the help of sketch, discuss concept of incremental coordinate system.
(xv)	During the execution of a CNC part program block NO20 GO2 X45.0 Y25.0 R5.0 the type of tool motion will be _____.

PART-B

2	From the following data observed during an experiment on orthogonal cutting, determine the shear plane angle and friction angle if the rake angel = 20°, uncut chip thickness = 0.125mm, cutting force component = 1100N, force component normal to the cutting force component = 400N, chip thickness = 0.525mm.	5
3	A 25mm diameter steel bar was turned at 300 rpm using HSS tool. Tool failure occurred after 10 minutes. When the spindle speed was decreased to 250rpm, the tool failed in 52.5 minutes. Assuming that Taylors equation of tool life applies, find the expected tool life at a spindle speed of 275 rpm	5
4	Discuss the meaning of clamping? Explain the principle involved in the design of clamp?	5
5	Distinguish gear burnishing with gear grinding	5

PART-C

6	a) Explain chip removal mechanism. What is the difference between oblique machining and orthogonal machining?	05
	b) Prove that: $\tan \phi = r \cos \alpha / (1 - r \sin \alpha)$	05
7	Explain the various machining parameters involved during turning operations on the lathe machine.	10
8	a) What is tool signature? Explain each term of a tool designated as: 8-12-10-7-5-15-1.5	04
	b) What are cutting fluids? List the functions and types of cutting fluids.	06
9	a) Explain the constructional details, underlying principle, working procedure and application of screw thread micrometre.	08
	b) Justify the terms Sensitivity, Repeatability, Readability and Reproducibility in reference to measuring instrument.	02
10	a) What are the methods of manufacturing internal threads?	05
	b) How does thread rolling differ from thread cutting?	03
	c) What do you mean by thread chasing process?	02
11	a) Explain 3-2-1 location principle applied to (i) a rectangular block ii) a short cylinder with neat Sketches.	05
	b) Explain construction and working of a channel jig or a turning fixture with a neat	05
12	Explain with neat sketch manufacturing of gear-by-Gear shaping using pinion type cutters. What are the advantages of this method?	10
13	What are the preparatory and miscellaneous functions used in part programming? Discuss about any five G-codes and five M-codes with their functions.	10