

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S, FE) / S3 (PT) (S) Examination June 2024 (2019 Scheme)

**Course Code: MET 307****Course Name: MACHINE TOOLS AND METROLOGY**

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

Marks

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|----|---|-----|
| 1 | How is relative motion between tool and workpiece provided in different machine tools? Give some examples. | (3) |
| 2 | Sketch and explain the purpose of performing following operations in a lathe (i). Grooving (ii). Knurling (iii). Chamfering | (3) |
| 3 | Differentiate between conventional milling and climb milling. | (3) |
| 4 | What is the purpose of performing a lapping process? How is it performed? | (3) |
| 5 | With neat sketch explain any one method of straight bevel gear generation | (3) |
| 6 | Explain any two gear finishing operations. | (3) |
| 7 | Distinguish between precision and accuracy of measurement. | (3) |
| 8 | What is an end standard? | (3) |
| 9 | How straightness is checked using a straight edge? | (3) |
| 10 | Explain the principle of microscopy | (3) |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

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| 11 | a) Sketch and explain the applications of any four work holding devices used in a lathe. | (9) |
| | b) What are the constructional features of carriage of a lathe? | (5) |
| 12 | a) What is the need for a quick return mechanism in a shaper? Explain the working of a hydraulic type quick return mechanism used in shaper. | (9) |
| | b) Compare the features of a planer and a shaper. | (5) |

Module -2

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| 13 | a) What is indexing? Compare compound indexing and differential indexing. | (9) |
| | b) Explain the working of a dividing head. | (5) |

- 14 a) What are the parameters used in specifying a grinding wheel? Give an example. (9)
b) Differentiate between cylindrical grinding and centreless grinding. (5)

Module -3

- 15 a) What is the difference between a gear forming method and a gear generating method? (5)
b) With the help of neat sketches, explain the different generating methods used for cutting teeth in spur and helical gears (9)
- 16 a) What are the unique features of a broaching tool? Give a classification of broaching operations. (9)
b) What are the major components of a broaching machine? (5)

Module -4

- 17 a) With the help of a neat sketch, explain the terms (i) basic size (ii) limits of size (iii) tolerance (iv) allowance (v) tolerance zone (9)
b) What is fit? What are the different types of fit? (5)
- 18 a) What is the use of a gauge? Explain the uses of a plug gauge and a ring gauge. (9)
b) Distinguish between a shaft basis system and a hole basis system. (5)

Module -5

- 19 a) Explain the principle of optical measurement. How is measurement done using an optical flat? (9)
b) What is the working principle of a comparator? Give a classification of comparators. (5)
- 20 a) Why surface roughness needs to be controlled? How does surface roughness differ from surface finish? (5)
b) Explain the features of (i) an instrument used for direct measurement of surface texture. (ii) Coordinate Measuring Machine (9)
