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| Regulation…R20 Subject code: C36PC3 TKR COLLEGE OF ENGINEERING AND TECHNOLOGY  (Autonomous, Accredited by NAAC with ‘A’ Grade)  ***C:\Users\india\Desktop\tkrcet-logo.jpg*B.Tech -III-Year …II…Semester Regular/Supply Examinations, 2023**  **SUBJECT NAME: MACHINE TOOLS AND METROLOGY**  **(Mechanical Engineering)**  ***Maximum Marks: 70*** **Duration: 3 Hours**  **Note:** **1.This question paper contains two parts A and B.**  **2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.**  **3. Part B consists of 10 questions. Answer any 5 questions which carries 10M.**  **4. Each question carries 10 marks and may have a, b, c, d as sub questions.** | | |
| SET-I  Part-A | | | |
| **All the following questions carry equal marks (10x2M=20 Marks)** | | | |
| 1 | | How do you define tool life? | |
| 2 | | What is the principle of working of a lathe | |
| 3 | | How the planer differs from a shaper? | |
| 4 | | What is up milling? | |
| 5 | | What do you mean by the term ‘loading’ in grinding wheel? | |
| 6 | | What do you mean by ‘glazing’ in grinding? | |
| 7 | | What is tolerance limits | |
| 8 | | Explain the working principle of a dial indicator | |
| 9 | | What are the Tool makers microscope uses | |
| 10 | | What is the angle of thread and thread pitch | |
| Part-B | | | |
| Answer **ANY FIVE QUESTIONS** (**10MX 5=50Marks)** | | | |
| 11 | Explain briefly about formation of chip | | |
|  | OR | | |
|  | What are the differences between orthogonal cutting and oblique cutting | | |
| 12 | Explain the construction of Merchant Circle diagram. | | |
|  | OR | | |
|  | Differentiate among shaping, planning and slotting machines. | | |
| 13 | What is a jig-boring machine? Describe its construction and working in detail with a neat sketch. | | |
|  | OR | | |
|  | Explain about types of lathe operations | | |
| 14 | Explain the classifications of shaper machines | | |
|  | OR | | |
|  | Explain in detail with neat sketches horizontal type of boring machines | | |
| 15 | The heights of peak and valleys of 20 Successive points on a surface are 35, 25, 40, 22, 37, 19, 41, 21, 42, 18, 42, 24, 44, 25, 40, 18, 40, 18, 39, 21 microns respectively, measured over a length of 20mm. Determine CLA and RMS values of roughness surface | | |
|  | OR | | |
|  | Compare and contrast unilateral and bilateral tolerance system | | |

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| SET-II  Part-A | | | |
| **All the following questions carry equal marks (10x2M=20 Marks)** | | | |
| 1 | What are the advantages of boiled water reactor | | |
| 2 | Explain the conditions favoring the use of negative back rake angle on a single point cutting tool | | |
| 3 | Differentiate between capstan and turret lathe. | | |
| 4 | Define lapping? Compare lapping with honing and grinding. | | |
| 5 | Explain the need for the use of tolerance | | |
| 6 | Differentiate between hole basis and shaft basis system | | |
| 7 | What is a profile meter | | |
| 8 | What is drunken thread? | | |
| 9 | List out the applications of CMMs | | |
| 10 | Differentiate between roughness and waviness. | | |
| Part-B | | | |
| Answer **ANY FIVE QUESTIONS(10MX 5=50Marks)** | | | |
| 11 | | What is an automatic machine? State the factors, which effect the classification of automatic machines. | |
|  | | OR | |
|  | | Briefly discuss about Geometry of single point cutting tool? Also, explain the following i) rake angle ii) Clearance angle iii) cutting angle iv) lip angle, with neat sketch | |
| 12 | | Briefly discuss about the different type of taper turning methods with sketches. | |
|  | | OR | |
|  | | Explain the construction and working principle of shaper | |
| 13 | | A C.I. plate measuring 300mm × 100mm × 40mm is to be rough shaped along its wider face. Calculate the machining time taking approach = 25mm, over travel = 25mm, cutting speed = 12m/min, return speed = 20m/min, allowance on either side of the plate width = 5mm and feed per cycle = 1mm | |
|  | | OR | |
|  | | Explain in detail with neat sketches horizontal type of boring machines. | |
| 14 | | Explain the procedure for simple indexing with an example | |
|  | | OR | |
|  | | Briefly discuss the three basic types of commands in programming of CMMs. | |
| 15 | | Differentiate between two- and three-wire methods. | |
|  | | OR | |
|  | | A hole and shaft system had the following dimensions: 60 H 8 /c 8 The multiplier of grade 8 is 25. The fundamental deviation for ‘C’ shaft is – (9.5 + 0.8 D). The diameter slip is 50 – 80. Design the suitable ‘GO’ and ‘NO-GO’ gauges for shaft and hole. | |

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| SET-III  Part-A | | | |
| **All the following questions carry equal marks (10x2M=20 Marks)** | | | |
| 1 | | what is the various operations can be performed on a lathe | |
| 2 | | what are the types of headstock | |
| 3 | | list any four holding devices | |
| 4 | | what is a semi-automatic lathe? | |
| 5 | | Explain the need for the use of tolerance | |
| 6 | | What are fits | |
| 7 | | Differentiate between precision and accuracy | |
| 8 | | Give classification of measuring instruments | |
| 9 | | Define system error and correction | |
| 10 | | What are measurement standards? | |
| Part-B | | | |
| Answer **ANY FIVE QUESTIONS(10MX 5=50Marks)** | | | |
| 11 | What are the various types of lathe? How are they classified? Explain any one type with  a neat sketch.  What are the various types of lathe? How are they classified? Explain any one type with  a neat sketch.  What are the various types of lathe? How are they classified? Explain any one type with  a neat sketch.  What are the various types of lathe? How are they classified? Explain any one type with  a neat sketch.  Describe the turning process in lathes and Explain the working of a multi spindle lathes and its applications | | |
|  | OR | | |
|  | Differentiate between Capstan and Turret lathe and What are the different attachments used in lathe machine? Explain any two attachments? | | |
| 12 | Explain the working of radial drilling machine with a sketch | | |
|  | OR | | |
|  | Explain the working of planning machine with a sketch. | | |
| 13 | Describe briefly the method of estimation of the required for producing all the teeth of a spur gear in a gear hobbing machine | | |
|  | OR | | |
|  | Explain the geometry of milling cutters with sketches. | | |
| 14 | a) Explain the Taylor’s principle applied in limits.  b) Explain the principle of optical flat and auto collimator | | |
|  | OR | | |
|  | a) Explain Hole basis system and shaft basis system  b) Describe the measuring method by using sine bar. | | |
| 15 | Differentiate between two- and three-wire methods. | | |
|  | OR | | |
|  | a) Describe the screw thread measurement with sketch  b) What are the types and applications of CMM? | | |
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| SET-IV  Part-A | | | |
| **All the following questions carry equal marks (10x2M=20 Marks)** | | | |
| 1 | | what are the types of headstock | |
| 2 | | Differentiate between capstan and turret lathe | |
| 3 | | what is a semi-automatic lathe? | |
| 4 | | How the planer differs from a shaper? | |
| 5 | | What do you mean by the term ‘loading’ in grinding wheel? | |
| 6 | | Differentiate between precision and accuracy | |
| 7 | | What is drunken thread? | |
| 8 | | What are measurement standards? | |
| 9 | | What are the Tool makers microscope uses | |
| 10 | | What are the Tool makers microscope uses | |
| Part-B | | | |
| Answer **ANY FIVE QUESTIONS(10MX 5=50Marks)** | | | |
| 11 | During straight turning of a 24 mm diameter steel bar at 300 rpm with an HSS tool a tool life of 9 min was obtained. When another bar of same material and same dimensions was turned using the same tool at 250 rpm, the tool life increased to 48.5 min. What would be the tool life if the speed was 280 rpm? | | |
|  | OR | | |
|  | Explain different types of chips formed during metal cutting | | |
| 12 | Which are the major parts of carriage of a lathe . Explain functions of each. | | |
|  | OR | | |
|  | What are the different types of drilling machine? explain any one with neat sketch | | |
| 13 | In a shaper operated with crank and slotted link quick return mechanism, one of the strokes is taken place, when crank rotate 72o . Calculate the time to shape with one pass, over the surface of a plate 500 x 900 mm size when the cutting speed is 10 m/min if feed is 3 mm and clearance at each end is 70mm. The cut is taken place along 500mm side. | | |
|  | OR | | |
|  | Which are the different types of planer machines? Explain any TWO with its special uses. | | |
| 14 | Briefly discuss the three basic types of commands in programming of CMMs. | | |
|  | OR | | |
|  | a)Explain the Taylor’s principle applied in limits.  b) Explain the principle of optical flat and auto collimator | | |
| 15 | Explain in detail with neat sketches horizontal type of boring machines | | |
|  | OR | | |
|  | Describe the measuring methods by using sine bar? | | |