JHARKHAND UNIVERSITY OF TECHNOLOGY

Diploma 3rd Semester Sample Paper (DIPLOMA WALLAH)

MACHINE TOOL TECHNOLOGY (MEC 302)

Time: 3 Hours **Full Marks: 70** **SET: 1**

INSTRUCTIONS:

1. Question No. 1 is Compulsory.
2. Answer any **FOUR** questions from the remaining (Q.2 to Q.7).
3. Use diagrams wherever necessary to explain your answer.

Q.1. Multiple Choice Questions [2 × 7 = 14]

(i) The angle between the face of the tool and the plane parallel to the base of the cutting tool is called:

(a) Rake angle (b) Clearance angle
(c) Lip angle (d) Cutting angle

(ii) The lead screw of a lathe machine has which type of threads?

(a) V-threads (b) Acme threads
(c) Square threads (d) Buttress threads

(iii) In a Shaper machine, the metal is removed during:

(a) Forward stroke (b) Return stroke
(c) Both strokes (d) None

(iv) The operation of enlarging a previously drilled hole is known as:

(a) Reaming (b) Boring
(c) Counter-sinking (d) Spot facing

(v) Which milling operation is performed to produce flat surfaces?

(a) Slab milling (b) Gear cutting
(c) Cam milling (d) Thread milling

(vi) A grinding wheel marked as "A 46 K 5 V" uses which abrasive?

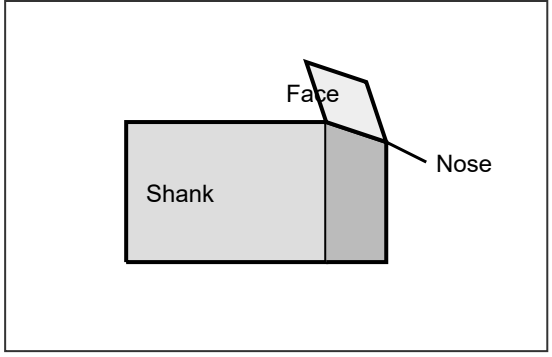
(a) Silicon Carbide (b) Aluminum Oxide
(c) Diamond (d) Cubic Boron Nitride

(vii) The tailstock of a lathe is used for:

(a) Driving the job (b) Supporting the job
(c) Holding the tool (d) Giving feed

SECTION B (Long Answer Type)

Q.2. (a) [Figure Based] Draw the **Single Point Cutting Tool** geometry and label its angles (Back Rake, Side Rake, End Relief, Side Relief). Explain the significance of the **Rake Angle**. [7]

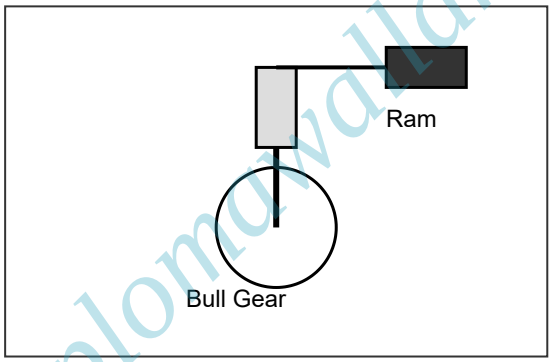


Q.2. (b) [Theory] Differentiate between **Orthogonal Cutting** and **Oblique Cutting** (at least 4 points). **[7]**

Q.3. (a) [Theory] Explain the construction and working of a **Centre Lathe** with a neat block diagram. List its main parts and their functions. **[7]**

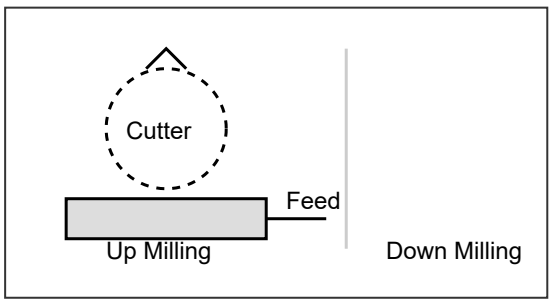
Q.3. (b) [Theory] Describe the **Taper Turning** operation on a lathe. Explain the **Tailstock Offset Method** with a formula. **[7]**

Q.4. (a) [Theory/Diagram] Explain the **Crank and Slotted Lever Quick Return Mechanism** of a Shaper machine with a neat sketch. **[7]**



Q.4. (b) [Theory] Differentiate between **Shaper** and **Planer** machines based on movement of tool/workpiece and size of work. **[7]**

Q.5. (a) [Figure Based] Explain **Up Milling (Conventional)** and **Down Milling (Climb)** with diagrams. Which one gives a better surface finish? **[7]**



Q.5. (b) [Theory] What is **Indexing** in milling? Explain **Simple Indexing** with an example of cutting a hexagonal bolt head (6 divisions). **[7]**

Q.6. (a) [Theory] Explain the **Standard Marking System** of a Grinding Wheel (e.g., 51 A 36 L 5 V 23). Define Abrasive, Grain Size, Grade, Structure, and Bond. **[7]**

Q.6. (b) [Theory] Explain the terms:
(i) Glazing
(ii) Loading
(iii) Dressing
(iv) Truing in grinding. **[7]**

Q.7. Write Short Notes on (Any FOUR): [3.5 × 4 = 14]

a. Cutting Fluids (Functions)

b. Twist Drill Nomenclature

c. Lathe Accessories (Chuck, Faceplate)

d. Broaching (Principle)

e. Tool Life

Diploma Wallah: Solution Key

MCQ: (i) a, (ii) b, (iii) a, (iv) b, (v) a, (vi) b, (vii) b.

Q3(b) Formula: Offset S = [L * (D - d)] / 2l. Where L = Total Length, l = Taper Length.

Q5(b) Hint: Crank turns = 40/N. For 6 divisions, 40/6 = 6 + 2/3 turns (6 full turns + 12 holes on 18 hole circle).