GUJARAT TECHNOLOGICAL UNIVERSITY

BE-4 SEMESTER – OLD PAPER – S22 TO W25 – QUESTION BANK SOLUTION

Subject Name & Code:
Manufacturing Processes (3141908)

🛠️ UNIT 4: Boring Machines

Q.1 – List functions, advantages, and disadvantages of a boring machine. (Assume 4 marks – no mark given)
Ans:
Functions:

- Enlarge & finish existing holes
- Correct hole alignment (axis straightness)
- Generate internal grooves or tapers
- Machine large diameter holes (e.g., cylinder bores)

Advantages:

- High accuracy (IT6)
- Can machine off-centre holes & blind holes
- Suitable for large, heavy workpieces

Disadvantages:

- Slower than drilling
- Requires skilled operator
- Higher equipment cost

Q.2 – Differentiate between drilling machines and boring machines. (4 marks)
Ans:

Parameter	Drilling machine	Boring machine
Primary operation	Creating hole	Finishing/enlarging hole
Tool	Twist drill	Single-point boring bar
Accuracy	IT10–IT12	IT6–IT8
Workpiece size	Small to medium	Large (e.g., engine blocks)
Hole alignment	Cannot correct	Can correct axis
Machine structure	Light to medium	Heavy, rigid

Q.3 – Describe horizontal boring machine with neat diagram. (7 marks)
Ans:

Construction:

- Heavy bed with longitudinal table
- Column (headstock) with horizontal spindle
- Spindle can move horizontally (W-axis)
- End support column (outboard bearing)

Working:

- Workpiece clamped on table which moves in X, Z.
- Boring bar extends through workpiece hole.
- Rotary motion of spindle + axial feed.

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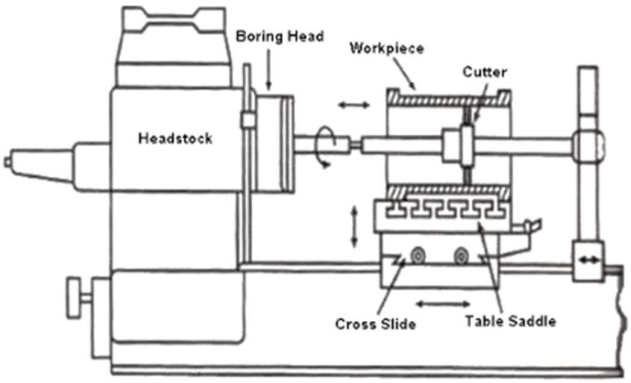


Table Type Horizontal Boring Machine

Fig.4.1 Horizontal Boring Machine

Applications:

- Machining engine cylinder blocks
- Large gearbox housings
- Pump casings

Advantages: Can machine four sides in one setup.
Limitations: High cost, large floor space.

Q.4 – Describe various types of operations performed by a vertical boring machine. (Assume 7 marks due to multiple repeats)
Ans:
Vertical boring machine (VBM) – also Vertical Turret Lathe (VTL):
Work rotates on horizontal table; vertical tool head moves.
Operations:

1. **Boring** – enlarging hole with single-point tool
2. **Turning** – external cylindrical surface
3. **Facing** – flat top surface
4. **Grooving** – circular grooves on face or bore
5. **Taper boring** – by swivelling tool head
6. **Threading** – large diameter threads
7. **Drilling** – using rotating tool (requires special attachment)

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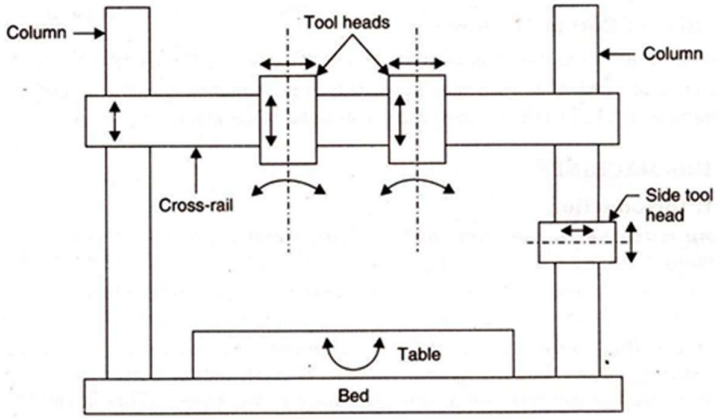


Fig.4.2 Vertical Boring Machine

Advantage: Gravity helps chip removal, good for heavy parts.
Limitation: Limited height.