



STUDY MATERIAL FOR BOILER OPERATION ENGINEER EXAMS

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MORE INFO

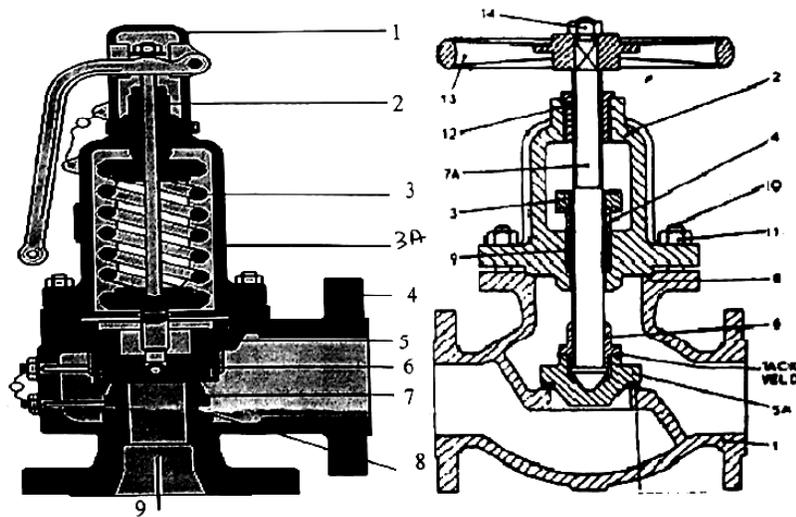
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Solution

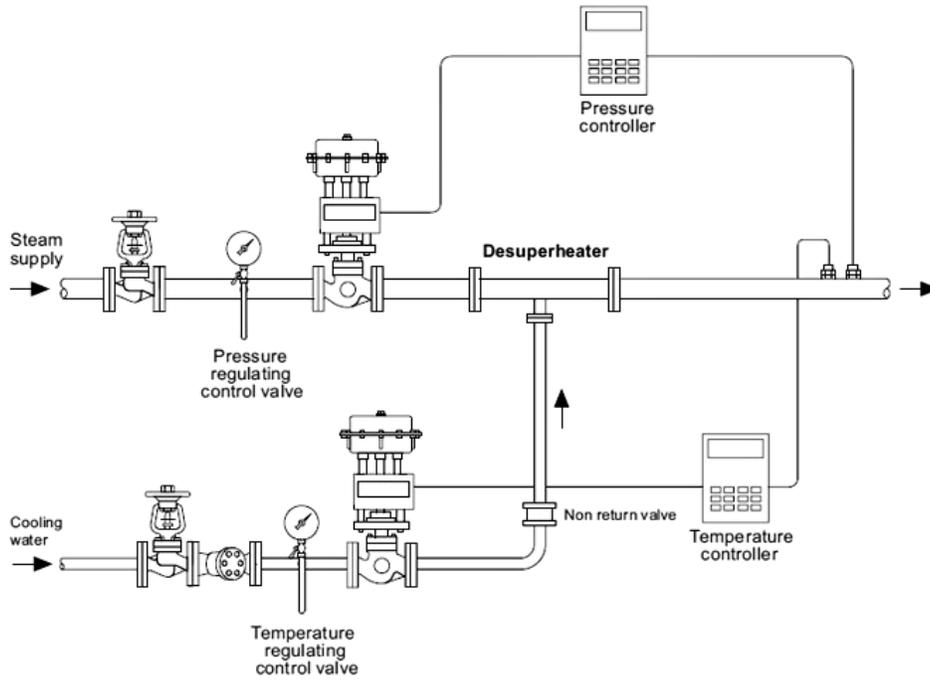
Already solved in this module.

Problem (Karnataka BOE 2018, 20 marks)

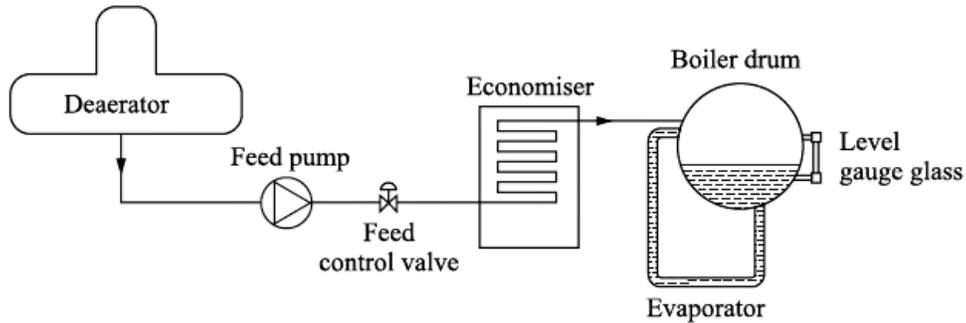
Draw a free hand sketch of the following

- Pressure Reducing with De-superheating Station.
- Feed water Discharge Line with control station from Pump to Economizer Inlet.

Solution



Pressure Reducing with De-superheating Station

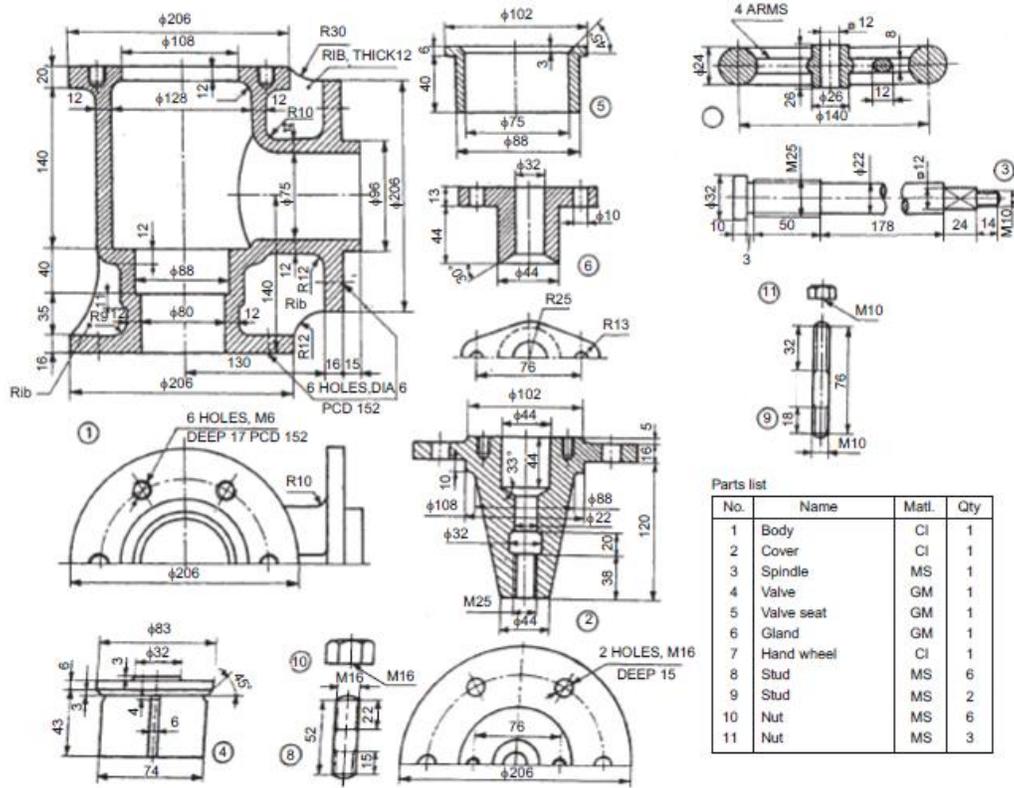


Feed water Discharge Line with control station from Pump to Economizer Inlet

ASSEMBLY DRAWING

Problem (Gujarat BOE 2018, Assam BOE 2022, 20 marks)

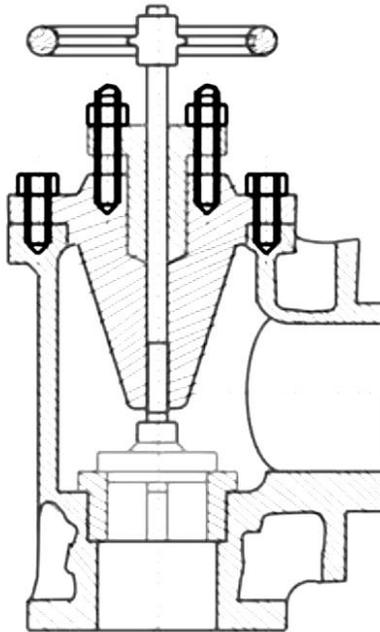
Assemble the parts of the feed check valve, shown in below and draw, (i) sectional view from the front, (ii) view from the right and (iii) view from above.



Parts list

No.	Name	Matl.	Qty
1	Body	CI	1
2	Cover	CI	1
3	Spindle	MS	1
4	Valve	GM	1
5	Valve seat	GM	1
6	Gland	GM	1
7	Hand wheel	CI	1
8	Stud	MS	6
9	Stud	MS	2
10	Nut	MS	6
11	Nut	MS	3

Solution



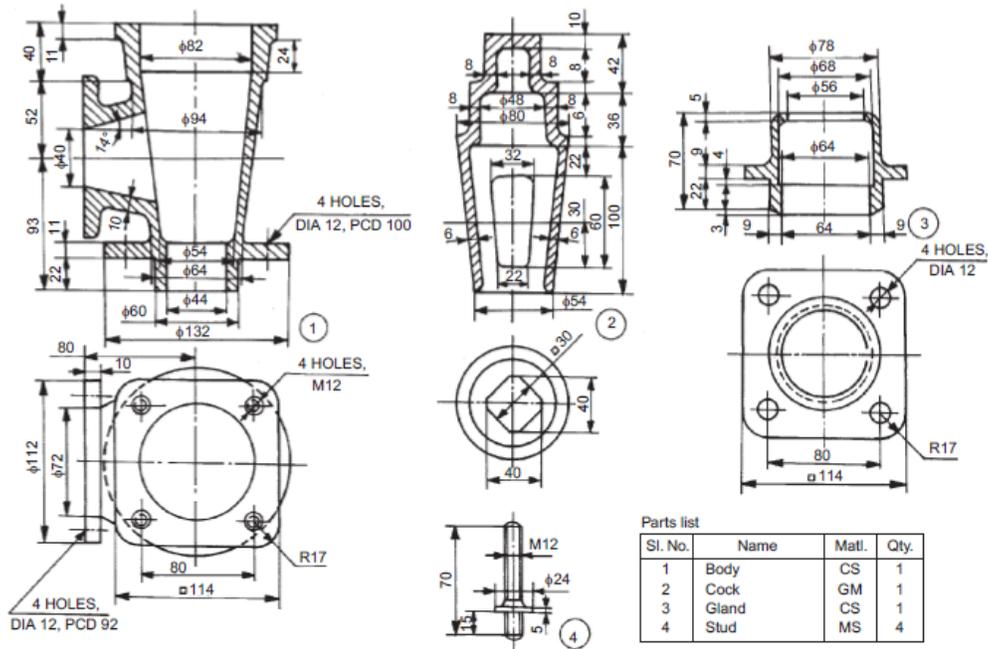


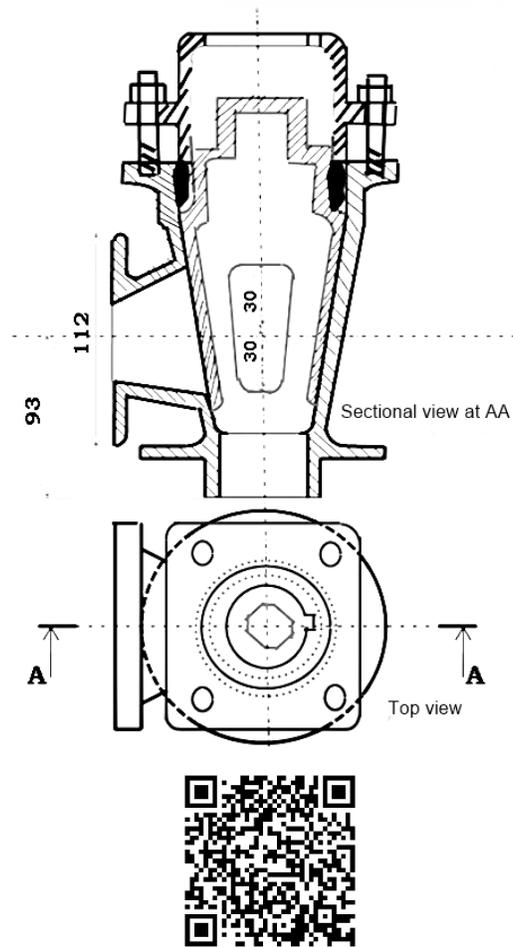
https://youtu.be/KCIy0n4tAUo?si=Cp5P_rwMpTeDgMmF

Problem (Assam BOE 2022, Kerala BOE 2023, 20 marks)

The part drawings of a blow-off cock are shown in below Fig. Assemble the parts and draw, (i) sectional view from the front and (ii) view from above

Solution

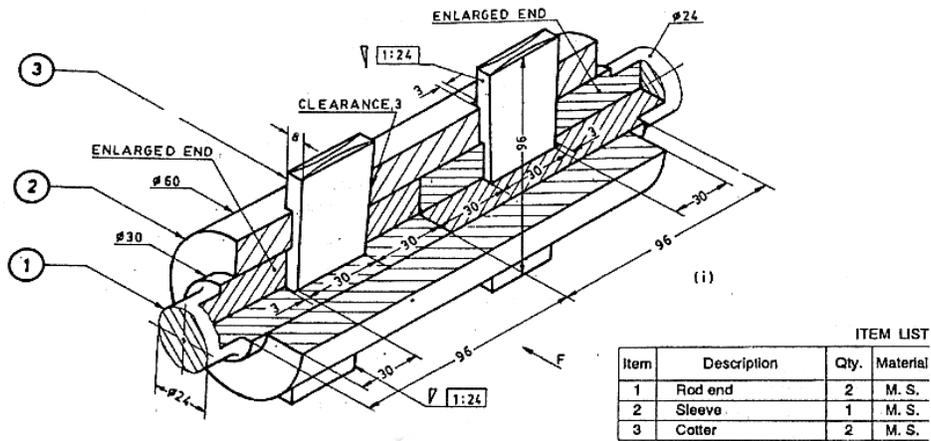


Solution

<https://youtu.be/x0llrFDcYGM?si=c30tAqNegYN2F3NV>

Problem (Kerala BOE 2025, 60 marks)

Part details of a sleeve and cotter joint is shown in figure.



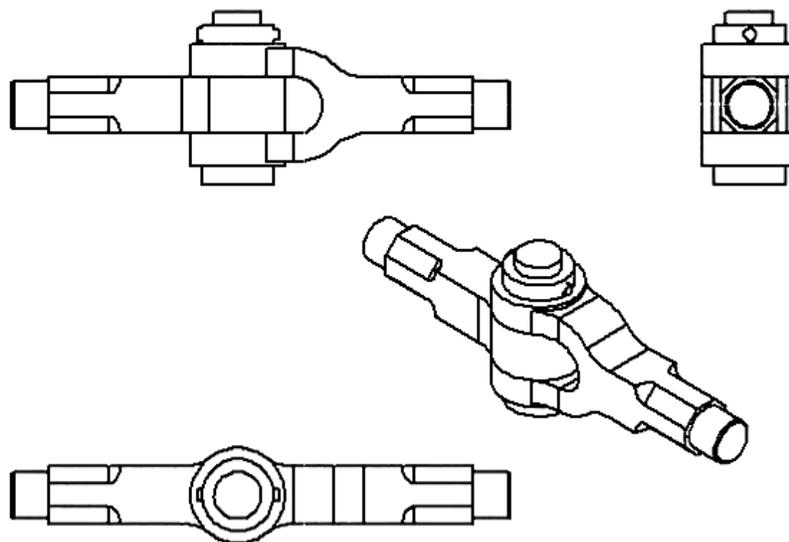
Draw:

(i) Front view top half in section as shown in the direction F.

(ii) Sectional top view of the assembly.

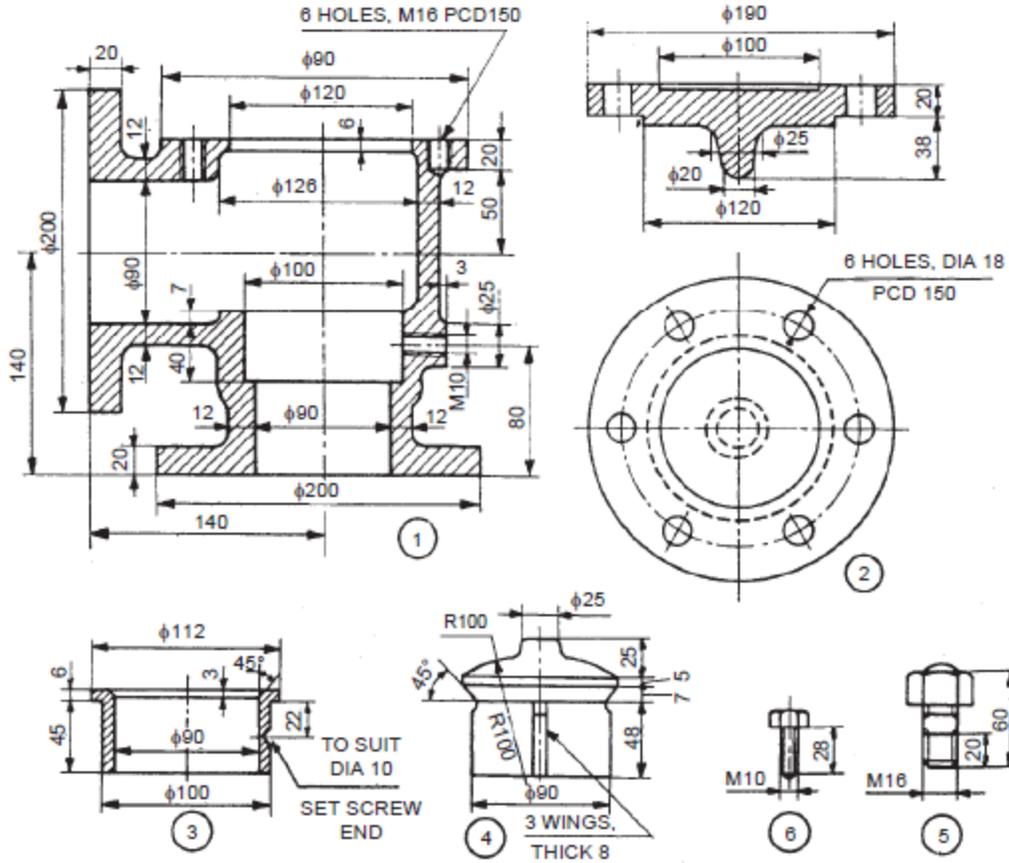
(iii) Side view from left.

Solution



Problem (Jharkhand BOE 2022, 10 marks)

Read the assembly drawing of Non Return Valve in figure and answer the following questions:



Parts list

No.	Name	Matl	Qty
1	Body	Brass	1
2	Cover	Brass	1
3	Valve seat	Bronze	1
4	Valve	Brass	1
5	Stud with nut	MS	6
6	Set screw	MS	1

- (i) What is interference between valve seat and body cover?
- (ii) What is PCD of cover and its thickness?
- (iii) What is designated by "M" in set screw size?
- (iv) What is combined length of grip length and head of bolt.
- (v) What is ID of valve seat.
- (vi) What is height of valve?
- (vii) What is thickness of valve seat?
- (viii) What is thickness of collar at valve body?
- (ix) How many valve chests are there in the assembly?
- (x) Draw symbol of NRV valve.

Solution

(ii) PCD (Pitch Circle Diameter): This refers to the diameter of the circle that passes through the centers of all the bolt holes on the cover. From figure, it is 150 mm.

(iii) The "M" stands for metric, and the "10" represents the diameter of the screw in mm. For example, an M10 screw has a nominal outer diameter of 10 millimetres

(iv) Combined length of grip length and head of bolt: The "grip length" of a bolt refers to the length of the unthreaded portion of the bolt that is intended to pass through the materials being fastened. The "head length" is the height of the bolt head. Therefore, the combined length would be the length of the unthreaded portion of the bolt plus the height of the bolt head. This combined length determines the total length of the bolt required to securely fasten the components. From figure, it is $60 - 20 = 40$ mm.

(v) ID of valve seat = 90 mm

(vi) Height of valve = $48 + 7 + 5 + 25 = 85$ mm

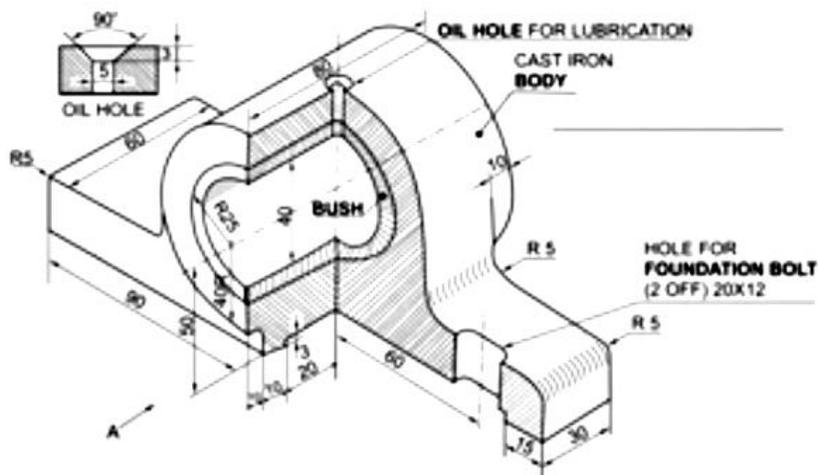
(vii) Thickness of valve seat = $100 - 90 = 10$ mm

(x) See figure below.

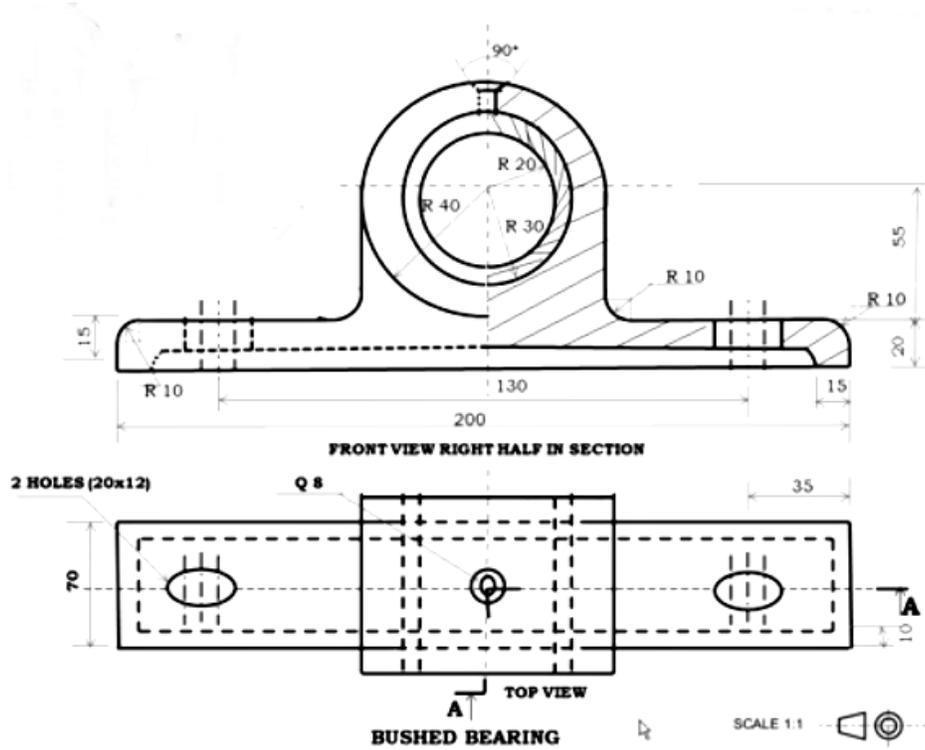


Problem (Haryana BOE 2019, 30 marks)

Following figure shows an isometric view of a Bushed Bearing. Draw (a) front view, right half in section (b) end view, left half in section (c) top view.

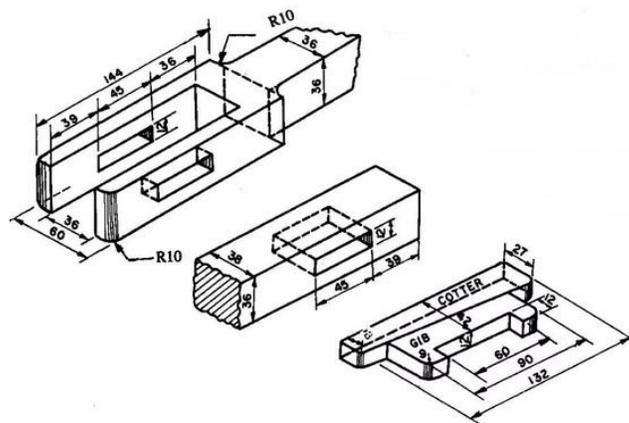


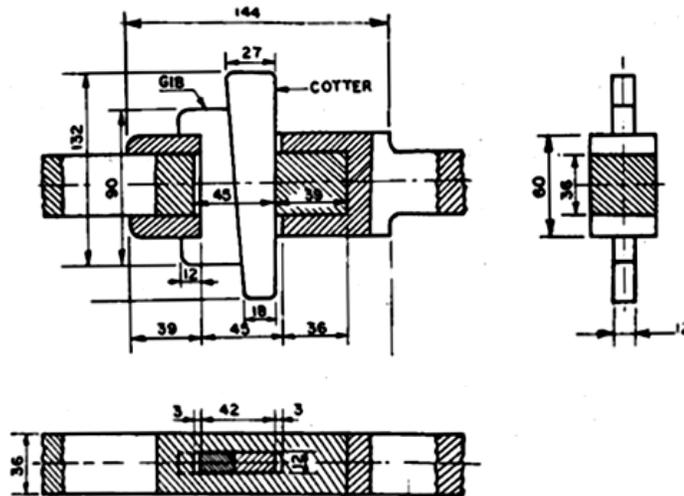
Solution



Problem (Haryana BOE 2019, 30 marks)

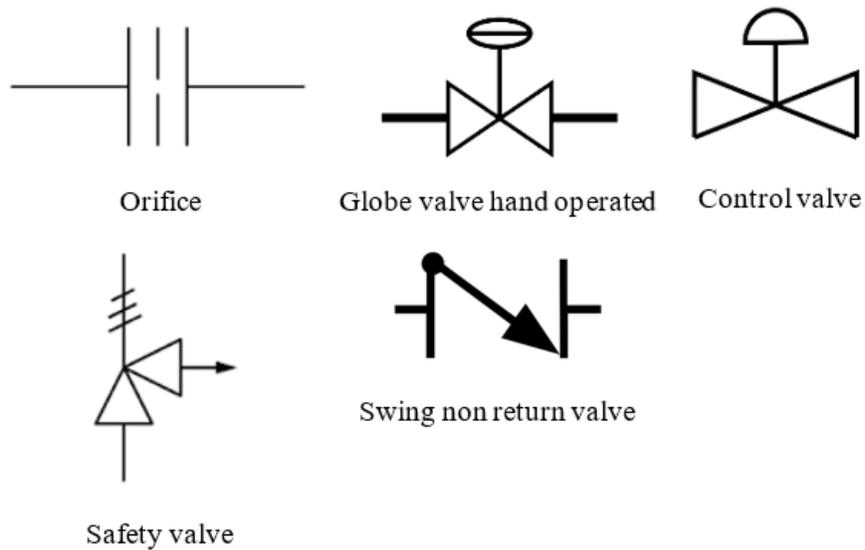
Following figure shows the details of a Gib and Cotter joint. Draw the following views of the joint with the parts assembled in their working (a) front view upper half in section (b) top view or plan (c) side view.



Solution**SYMBOLS****Problem (Maharashtra BOE 2025, 5 marks)**

Draw symbols of the following:

1. Orifice
2. Globe Valve Hand Operated
3. Control Valve
4. Safety Valve
5. Non return Valve

Solution**Problem (Maharashtra BOE 2024, 5 marks)**

Draw process instrumentation symbols of following valves:

1. Gate Valve
2. Globe Valve
3. Check Valve
4. Control Valve
5. Safety Valve

Solution