Nepal Engineering Council Licence Exam

Engineering Drawing

Tutor

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Syllabus

10.1 Engineering drawings and its concepts: Fundamentals of standard drawing sheets, dimensions, scale, line diagram, orthographic projection, isometric projection/view, pictorial views, and sectional drawing. (AALL1001)

Fundamental of Standard Drawing Sheets



Tittle Block

Drawing sheet-Title block



- Name of the firm
- Tittle of Drawing
- Scale
- Projection Method
- Drawing Number
- Initials with dates of person who have designed, drawn, checked, standards and approved

Tittle Block



What are included?

- Name of the firm
- Tittle of Drawing
- Scale
- Projection Method
- Drawing Number
- Initials with dates of person who have designed, drawn, checked, standards and approved

Standard Sheets (Imp)



Paper	Size (mm*mm)
A0	8 <u>41*11</u> 89 1:V2
A1	594*841
A2	420*594
A3	297*420
A4	210*297
A5	148*210

pre 4 $1 m^2$ $0.5 m^2$ $0.25 m^2$ 0.1250.0625

Some Questions

Ratio of Area of A0 to area of A1 is : 2:1

Ratio of Area of A0 to area of A2 is : 4:1

Ratio of Area of A4 to area of A0 is : 1:16

$$\frac{A4}{A0} = \frac{A4}{2A_1} + \frac{A4}{2X2A_2} + \frac{A4}{2X2A_2} + \frac{A4}{2X2X2A_3} + \frac{A4}{2X2X2X2A_3} = \frac{A4}{2X2X2X2A_3}$$

$$= \frac{A446}{16} + \frac{A4}{16} + \frac{A4$$



Lettering

Proportion for Letters for Vertical Capital Letters (h:w = 7:5)





Types of Pencils

` 20000- < 20000- < 20000- < 8B Hud and 7B 6B 20000- -5B 20000 -**4**B 200000- -3B 200000- -2B 20000- -HB Hadans 200000- -F 20000- -2H 20000- -ЗH 20000- -4H 2000000 5H 6H

Different Types of Lines and Their Uses



Different Types of Lines and Their Uses

Hatching line or Section line

Conhnow _____ MIZ Contine thin _____ 2H/4M

Construction Line

Short Break Line

Long Break Line

100m

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100g Buti

Different Types of Lines and Their Uses

Line	Description	General Applications
A	Continuous thick	A1 Visible outlines
В	Continuous thin (straight or curved)	 B1 Imaginary lines of intersection B2 Dimension lines B3 Projection lines B4 Leader lines B5 Hatching lines B6 Outlines of revolved sections in place B7 Short centre lines
c	Continuous thin, free-hand	C1 Limits of partial or interrupted views and sections, if the limit is not a chain thin
D	Continuous thin (straight) with zigzags	D1 Line (see Fig. 2.5)
E— — — — — — —	Dashed thick	E1 Hidden outlines
G	Chain thin	G1 Centre lines G2 Lines of symmetry G3 Trajectories
H F	Chain thin, thick at ends and changes of direction	H1 Cutting planes
1	1	1

Dimensions





Dimensions



Scale
$$\longrightarrow \frac{D \times wing}{A \cdot wul}$$

Full Scale: Journ rod is Shown Journ in drawing.
Scale: $\frac{D}{A} = \frac{100mm}{100mm} = 1.5$

Enlarging Scale: Imm line is Shown Iom in drawing. Ratio > 1
Scale:
$$\frac{D}{A} = \frac{1 \text{ cm}}{1 \text{ mm}} = \frac{10 \text{ mm}}{1 \text{ mm}} = 10: \text{ L}$$
 Scalesging Scale.
Reducing Scale: Imm line is shown Imm in drawing.
Scale: $\frac{D}{A} = \frac{5 \text{ mm}}{5 \text{ km}} = \frac{5 \text{ mm}}{1000 \text{ x loo x loomm}} = 5:30000 \text{ L} \text{ L}$
 $2:3, 1:3, 1:100, 1:50, 5:7$
Reducing Scale:

Scale













First Angle Projection

Third Angle Projection



Multi View Projection-First angle and Third angle projection at a glance

First Angle Projection	Third Angle Projection
The object is imagined to be in first quadrant.	The object is imagined to be in third quadrant.
The object is lies between the observer and plane of projection.	The plane of projection lies between the observer and object.
The plane of projection is assumed to be non transparent.	The plane of projection is assumed to be transparent.
When view are drawn in their relative position Top view comes below Front view, Right side view drawn to the left side of elevation.	When view are drawn in their relative position Top view comes above Front view, Right side view drawn to the right side of elevation.



V2 - 0.815

AXONOMETRIC DRAWING



Axonometric Projection/ Drawing

Remember : 81.65 %

Isometric Drawing and Isometric Projection ?



AXONOMETRIC PROJECTIONS

Axonometric Projection/ Drawing

Remember : 81.65 %

Isometric Drawing and Isometric Projection ?

Oblique Drawing



Cavalier

Cabinet

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Perspective Projection



PERSPECTIVE DRAWING









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PERSPECTIVE DRAWING

1. A cube of side base 30 mm rests with it base on the ground and one of its faces lies in the PP. The station point is 50mm in front of the PP, 60 mm above the ground. The central plane is 40mm away from the axis of cube towards the left. Draw the perspective view.











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Sectional Drawing

The technique called **section views** is a very important aspect of design and documentation. It is used to

- improve the visualization and clarity of new designs,
- clarify multiview drawings,
- reveal interior features of parts, and
- facilitate the dimensioning of drawings.











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Practice Yourself - A



Practice Yourself - B





EXERCISES. Study the two types and complete the table by matching the numbered orthogonal drawings with the same isometric view. G н κ ・FV り NON LSV ∖∛ 1 2 4 5 7 8 9 10 <u>6</u>

Answers – A

B
-

1	В
2	J
3	Α
4	- I
5	К
6	L
7	E
8	Н
9	С
10	G

G	3
н	9
I	5
J	6
К	2
L	None

Practice Questions

- 1. This type of projection is when projectors are parallel to each other, but are at an angle other than 90 degrees to the plane of projection:
- (A) Oblique projection (B) Perpendicular projection (C) Aesthetic projection (D) Angular projection

2. The type of line that projects from an object for the express purpose of locating a dimension is a ------ line.

- Visible A.
- Hidden Β.
- Extension
- Dimension D.

3. In isometric Drawing

(A) All axes are equally Inclined
(B) Two axes are equally inclined
(C) None of the axes re equally inclin
(C) Trainforming

- (D) None of the above



4. When the receding lines are true length, and the projectors are at 45 degrees to the plane of projection, the oblique drawing is called this:

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A. Cabinet projection

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- B. Cavalier projection
- C. Axonometric projection
- D. Isometric projection

5. Architectural drafters generally prefer to use ______ drawings to help illustrate 3-dimensional views of a structure.

A. isometricB. perspectiveC. orthographicD. auxiliary

6. The type of line that projects from an object for the express purpose of locating a dimension is a ______ line.
A. Visible
B. Hidden
C. Extension
D. Dimension



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8. This type of axonometric drawing has equal foreshortening along two axis directions and a different amount on the third axis:







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A. 30 B. 60 C. 90 D. 120





11. Two-point perspective is also known as:

A. Two-view perspective B. Regular perspective C. Parallel perspective D. Angular perspective

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12. Perspective drawings are classified according to their number of these features:

A. Station points B. Picture planes Vanishing points Ground lines

13. In isometric projection, all distances are approximately this percentage of their true size:

A. 120 percent B. 80 percent C. 50 percent

D. 100 percent

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14. The principle reason for using an auxiliary view is ______.

A. to eliminate hidden lines
B. to create a true projection plane from an inclined plane in one of the primary views
C. to show cylinders as ellipses
D. to locate center marks

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15. The principle views associated with orthographic projection are _____

A. Front viewB. Right side viewC. Top viewD. All of the above



16. A full scale technical drawing will have a scale factor of _____.

A. 1:1 B. 1:2 C. 2:1

D. 1:4

17. A typical set of mechanical working drawings includes ______.

A. exploded assemblyB. part detailsC. parts listD all of the above

18. If a plane is parallel to the plane of projection, it appears:

A. True size
B. As a line or edge
C. Foreshortened
D. As an oblique surface

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20. There are two main types of projection:

- A. Parallel and Orthographic
- B. Station-point and Perspective
- C. Parallel and Perpendicular
- D. Perspective and Parallel

21. The following is not included in the tittle of the drawing sheet?

- A. Sheet No.
- B. Scale
- C. Method of Projection
- D. Size of sheet

22. Which of the following line is used for visible outlines

- A. Continuous Thick
- B. Continuous Thin
- C. Chain Thin Line
- D. Short Zig Zag Line

23. Which of the following line is used for dimension lines

- A. Continuous Thick
- B. Continuous Thin
- C. Chain Thin Line
- D. Short Zig Zag Line

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25. Which the following is represented by dotted line

- A. Hidden EdgesB. Projection Line
- Visible outlines C.
- D. Hatching Line

26. A line of 1 metre is shown by 1 cm on a scale its representative factor (RF) is:

A. 1
B. 100
C. 1/100
D. 1/50

$$RF = \frac{D}{R} = \frac{1 cm}{1m} = \frac{1 cm}{1 o cm} = \frac{1}{100}$$

27. The value of ratio of isometric projection length to true length is

- 0.141 A.
- B. 0.372
- C. 0.815
- D. 0.642

28. For the given orthographic views, Which of the following is the correct isometri view ??















29. The internal angle of regular pentagon is <u>degree</u>.



Sum = (n-2) × 180

30. The following is (are) the method(s) of projecting the pictorial views.

- a) Axonometric projection
- **b)** Oblique projection
- c) Perspective projection
- d) All of the above

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31. The following are the Polyhedron except

- a) Triangular Prism
- b) Square based Pyramid
- c) Cube

A three-dimensional shape with flat polygonal faces, straight edges, and sharp corners or vertices is called a polyhedron

line **32.** Which of the following position is not possible for a plane? a) Perpendicular to both HP and VP Parallel to both HP and VP c) Perpendicular to HP and parallel to VP d) Perpendicular to VP and parallel to HP **33. Rectangular prism is an example of** Objects having isometric lines Object having non-isometric lines Object having curved surfaces c)

d) None of the above

34. The Length: Width in case of an arrow head is

a) 1:1 b) 2:1 c) 3:1 d) 4:1

35. A right regular hexagonal prism in resting on HP on its base, its top view is a

- a) Square
- b) Rectangle
- d) Hexagon



36. For the given isometric views, Which of the following is the correct Front view??



37. The development of cylinder is a

- a) Rectangle
- b) Circle
- c) Ellipse
- d) None of the above

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37. What is the dimension of A1 size drawing sheet?

- / 1189 mm x 841 mm ----- A D
- ы∕∕ 594 mm x 841 mm ✓
- ^{c)} 1230 mm x 880 mm
- ^{d)} 880 mm x 625 mm
- Ao 811×1189 AI 594×891

38. In an isometric sketch of a cube:

a. The frontal face appears in its true shape
b. The receding axes are at 45 degree to the horizontal
c All the faces are equally distorted
d. X Only the depth distance must be removed



39. Identify the front view of the below isometric view.

а. d. b. С.

40 Which of the following angle cannot be drawn by using set square? a. 15⁰

- b. 20⁰
- c. 60⁰

d. 150 ⁰

