Indian School Al Wadi Al Kabir
Assessment – I (2025-2026)

Class: XII | ENGINEERING GRAPHICS (046) | Max. marks: 70
Date: 25/09/2025 | Set- I | Time: 3 HOURS

General Instructions:

(i) Attempt all the questions.
(ii) Use both sides of the drawing sheet, if necessary.
(iii) All dimensions are in millimetres.
(iv) Missing and mismatching dimensions, if any, may be suitably assumed.
(v) Follow the SP: 46 – 2003 revised codes. (with the first angle method of projection)
(vi) In question 23, hidden edges or lines are to be shown in views without section.
(vii) In question 24, no hidden edges or lines are required.

14 × 1 = 14

SECTION – A

Q.1 to Q.14: Answer the following multiple-choice questions. Print the correct choice on your drawing sheet.

1. In an isometric projection, if a line is parallel to one of the axes, how will it appear in the drawing?

(a) The line will appear as a straight line, foreshortened.
(b) The line will appear as a curved line.
(c) The line will appear at 90° to its true angle.
(d) The line will disappear.

2. In orthographic projection, if an object lies in the first quadrant, its position with respect to reference planes will be

(a) Below HP and behind VP

(b) Above HP and in front of VP

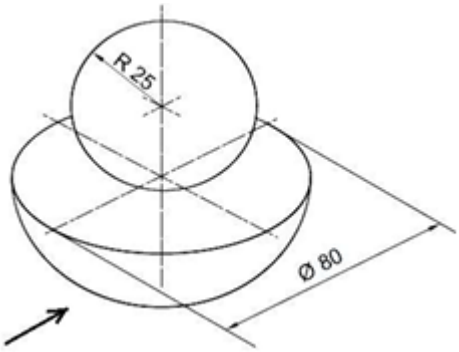
(c) Below HP and in front of VP

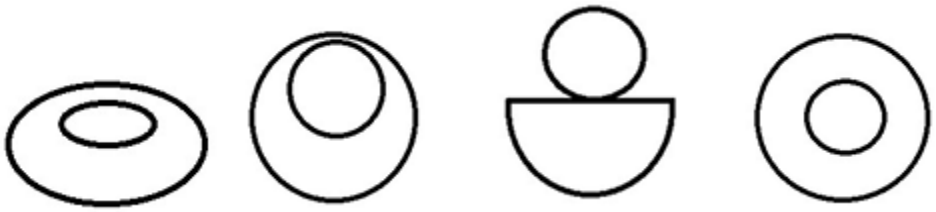
(d) Above HP and behind VP

3. In which projection method do the projections appear to be perpendicular to the plane of projection?

(a) Isometric (b) Orthographic
(c) Perspective (d) Oblique

4. The isometric projection of a combination of solids is shown. Choose the correct top view in orthographic projection for this combination.

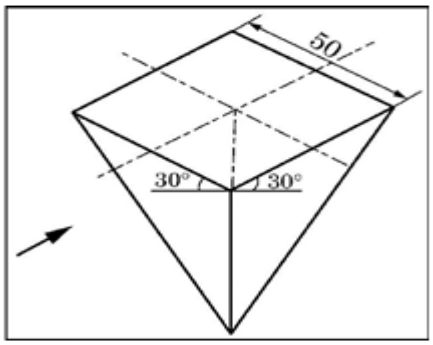




(a) (b) (c) (d)

5. A thread with vertical and parallel flanks is called ----------.
   (a) Triangular thread
   (b) V- thread
   (c) Square thread
   (d) Knuckle thread

6. Choose the correct statements for the given square pyramid as seen from the given arrow:



(a) The solid is resting with its base when its axis is parallel to VP.
(b) The solid is resting on its apex when its axis is perpendicular to VP.
(c) The solid is resting on its apex when its axis is parallel to VP.
(d) The solid is resting on its base when its axis is perpendicular to VP.

7. Match LIST I with LIST II

LIST I (TYPE OF PROJECTION)	**LIST II (FEATURES)**
A. Trimetric	(i) Only two angles between the three principal axes are equal and over 90°.
B. Orthographic	(ii) All the angles between principal axes are equal.
C. Isometric	(iii) All three angles are unequal and not less than 90°.
D. Dimetric	(iv) Draw at right angles.

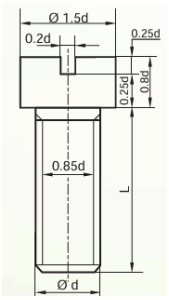
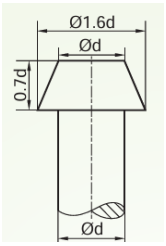
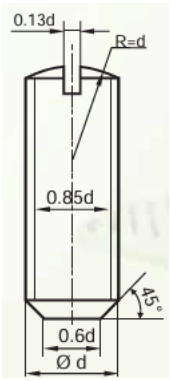
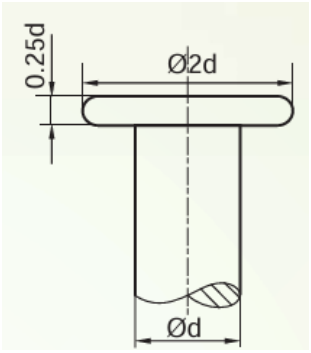
(a) A-(ii) B-(i) C-(iv) D-(iii)
(b) A-(iii) B-(iv) C-(ii) D-(i)
(c) A-(iv) B-(iii) C-(i) D-(ii)
(d) A-(i) B-(ii) C-(iii) D-(iv)

8. Which of the following statements are correct for an Internal thread?
   (i) It is represented as a hidden circle.
   (ii) Can be seen in a Hexagonal Nut.
   (iii) The crests are rounded off for a Metric Thread profile(Internal).
   (iv) Bolt and screw have an internal thread.

(a) (i) & (ii)
(b) (ii) & (iii)
(c) (i) & (iii)
(d) (iv) & (ii)

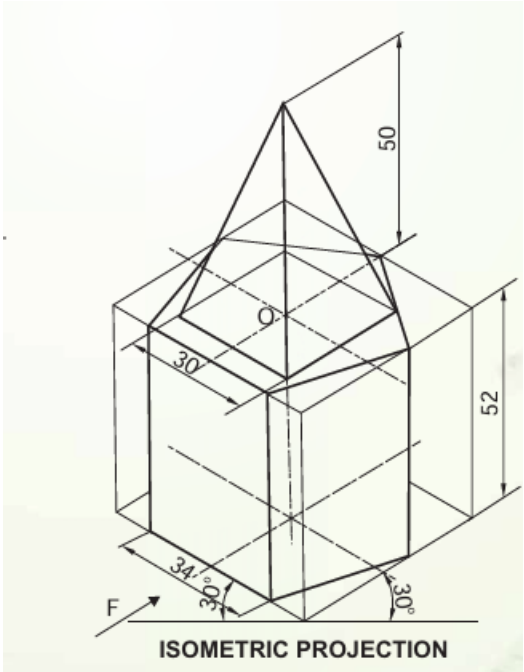
9. What will be the threaded length of the nut end, if the nominal diameter of a collar stud is 10 mm?
   (a) 26 mm
   (b) 10 mm
   (c) 20 mm
   (d) 15 mm

10. Match the LIST I with LIST II

LIST I – FRONT VIEW	**LIST II – NAMES OF MACHINE PARTS**
A. 	(i) Grub screw
B. 	(ii) Cheese head screw
C. 	(iii) Flat head rivet
D. 	(iv) Pan head rivet

(a) A-(iii), B-(iv), C-(i), B-(ii)
(b) A-(i), B-(iii), C-(iv), D-(ii)
(c) A-(iv), B-(ii), C-(iii), D-(i)
(d) A-(ii), B-(iv), C-(i), D-(iii)

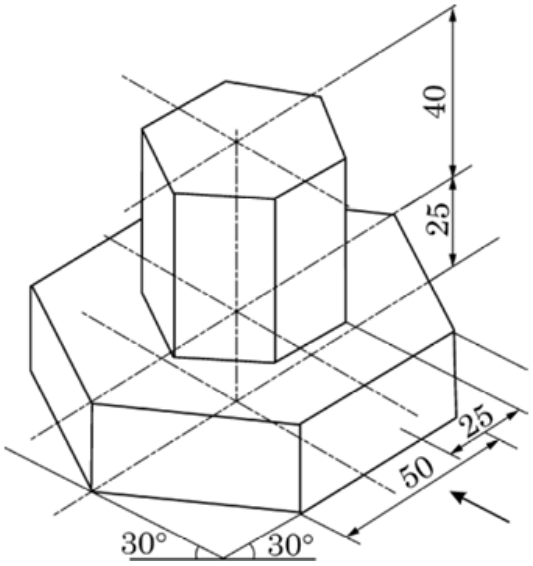
11. Choose the correct statements for the given figure.



(i) Both solids are pentagonal prisms.
(ii) Bottom solid is a pentagonal prism, and top solid is a square pyramid.
(iii)The top solid is an inverted square pyramid.
(iv) The Common axis of both the solids is perpendicular to HP.

(a) (i) and (iv) only
(b) (ii) and (iii) only
(c) (ii) and (iv) only
(d) (i) and (iii) only

12. Which statements are correct for the given figure on the isometric projection of a combination of
solids?



(i) The axes of both solids are perpendicular to HP.
(ii) Bottom solid is a hexagonal pyramid, and top solid is a hexagonal prism.
(iii) The total number of rectangular faces in the given figure is 12.
(iv) The total number of hexagonal faces in the given figure is 6.

(a) (i) and (iv) only
(b) (i) and (iii) only
(c) (ii) and (iv) only
(d) (ii) and (iii) only

13. The portion of the shaft in the sleeve is called the ----------.
(a) pulley
(b) journal
(c) cotter
(d) coupling

14. Match LIST – I with LIST – II, according to your understanding of the topic 'Bearings'.

LIST I (FEATURES)	**LIST II (USE)**
A. Bushed bearing	(i) prevents the rotation or sliding of the bush
B. Open bearing	(ii) holds the lubricant
C. Dowel pin	(iii) higher loads at medium speed
D. Oil hole	(iv) useful for shafts rotating at slow speeds

(a) A-(iv) B-(i) C-(ii) D-(iii)
(b) A-(ii) B-(iii) C-(iv) D-(i)
(c) A-(iii) B-(iv) C-(i) D-(ii)
(d) A-(i) B-(ii) C-(iii) D-(iv)

SECTION B

Q.15 to Q.18: Read the following paragraph and answer the questions given below:

4 × 1 = 4

A group of Class 12 Engineering Graphics students is assigned a project to design a **tool cabinet** in their school workshop. The cabinet has multiple drawers and compartments with various geometrical features. The students are required to create **isometric projections** of the cabinet parts, such as rectangular drawers, cylindrical handles, and square nuts. While preparing the drawings, they must follow the principles of isometric projection, including isometric scale, orientation of axes, and representation of circular features.

15. While drawing the cabinet in isometric projection, which of the following combinations of axes should the students use?

    (a) All axes at 45° to each other
    (b) One vertical and two axes at 30° to the horizontal
    (c) All axes at 60° to each other
    (d) Two vertical and one horizontal axis

16. To ensure accuracy, students want to use the isometric scale for converting true lengths. What does the isometric scale help in achieving?

    (a) Enlarging the object to fit the drawing sheet
    (b) Showing the hidden lines correctly
    (c) Converting true lengths to isometric lengths for accurate representation
    (d) Changing the shape of the object

17. The students are drawing the cylindrical knobs of the cabinet in isometric projection. How should they represent the circular face of a cylinder?

    (a) As a perfect circle
    (b) As a straight line

(c) As an ellipse
(d) As a square

18. Which of the following statements is correct regarding the shape of an object in isometric projection?

(a) All faces are shown in true shape and size
(b) Only vertical faces are shown in true size
(c) No face is shown in its true shape
(d) Only hidden parts are shown in true shape

Q.19 to Q.22: Read the following paragraph and answer the questions given below:
ABC Manufacturing Company is designing a new industrial assembly machine that requires various types of fasteners for different applications. The design team needs to select appropriate fasteners based on specific requirements:

- **Assembly A**: Requires permanent joining of two steel plates (8mm thick each) that will experience high shear forces.
- **Assembly B**: Needs temporary fastening of a cast iron housing to a steel base with frequent maintenance access.

4 × 1 = 4

19. In the case study, Assembly A requires permanent joining of steel plates under high shear forces. Which fastener would be MOST appropriate?
(a) Hexagonal head bolt with nut
(b) Machine screw with flat head
(c) Stud with a hexagonal nut
(d) Snap head rivet

20. The main advantage of using studs over bolts in high-temperature applications is:
(a) Lower cost
(b) Easier installation
(c) No head to damage during thermal cycling
(d) Better corrosion resistance

21. For Assembly B requiring frequent maintenance access, which fastener combination is BEST suited?
    (a) Countersunk rivet
    (b) Stud with a hexagonal nut
    (c) Snap head rivet
    (d) Bolt welded to base

22. Name the machine part which is having threads throughout its length?

    (a) Rivet heads
    (b) Bolts
    (c) Nuts
    (d) Machine screws

23. (a) Figure 1 shows the details of parts of an Open Bearing. Assemble these parts correctly and then draw to scale 1 : 1 its following views :
    (i) Front view, left half in section. (13)
    (ii) Top view. (8)
    (iii) Print the title and scale used. Draw a projection symbol. Give 6 important dimensions. (6)

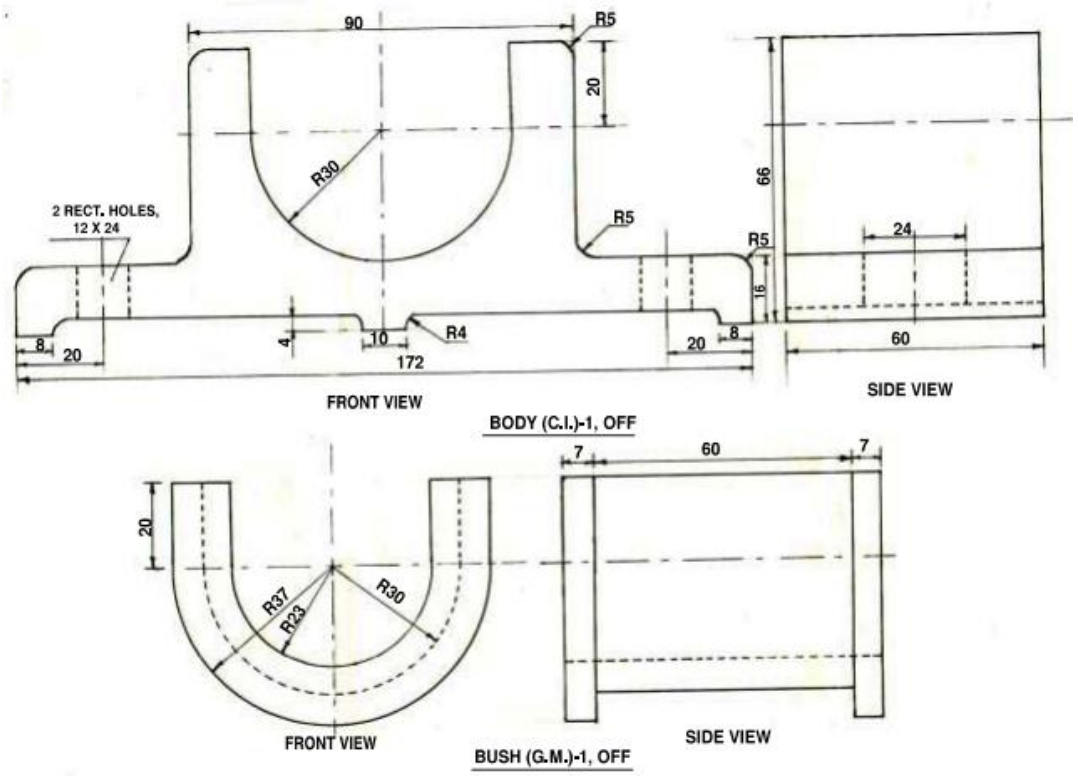


FIG 1. OPEN BEARING NOTE : FIGURE NOT TO SCALE, USE DIMENSIONS GIVEN FOR SOLUTION

OR

23. (b) Figure 2 shows the assembly of a Bushed Bearing. Disassemble the parts correctly and then draw to scale 1:1 the following views of the following components. Keep the same position of both, Body and Bush, with respect to H.P. and V.P.

(i) Body:

(a) Front view, left half in section. (8)

(b) Top view. (6)

(ii) Bush:

(a) Full sectional front view. (4)

(b) Top view. (3)

(iii) Print the titles of both and the scale used. Draw the projection symbol. Give 6 important dimensions. (6)

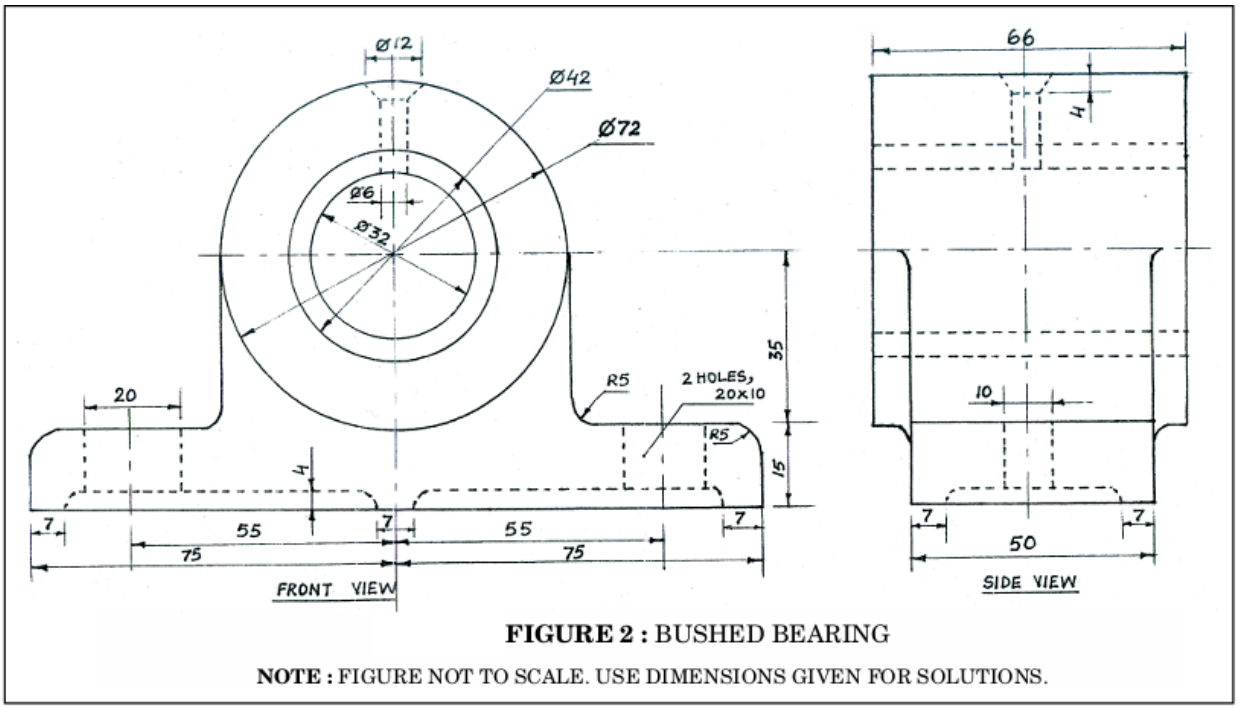


FIGURE 2 : BUSHED BEARING

NOTE : FIGURE NOT TO SCALE. USE DIMENSIONS GIVEN FOR SOLUTIONS.

SECTION C

24. (a) Construct an isometric scale. **1 × 4 = 4**

(b) Draw the isometric projection of a triangular prism (base edge 40 mm, axial length 60mm) resting on its rectangular face on H.P. Its axis is perpendicular to V.P. Indicate the direction of viewing. Give all the dimensions.

1 × 9 = 9

25. (a) Draw to scale 1:1, the standard profile of the Metric thread internal with the enlarged pitch as 40mm. Give standard dimensions. **1 × 8 = 8**

OR

25. (b) Draw to scale 1:1, the front view and top view of a vertical Hexagonal Nut of nominal diameter 25 mm. Give the standard dimensions. **1 × 8 = 8**