S6081 June
W.A.S.S.C.E. 1999
TECHNICAL
DRAWING 1
Objective Test
2½ hours

1

Name: .....

Identification Number: .....

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

June 1999 TECHNICAL DRAWING 1 2½ hours

Do **not** *open this booklet until you are told to do so. While you are waiting, read the following instructions carefully. Write your* **Name** *and* **Identification Number** *in the spaces provided above.*

This paper consists of **two** *sections, A and B. Answer Section A on your Objective Test answer sheet, and Section B on the drawing paper provided. Section A will last for 1 hour after which the answer sheet will be collected. Do* **not** *start Section B until you are told to do so. Section B will last for 1½ hours.*

SECTION A
OBJECTIVE TEST 1 hour
[40 marks]

1. Use **HB** pencil throughout.
2. If you have got a blank answer sheet, complete the top section of it as follows:
   (*a*) In the space marked *Name*, write in capital letters your **surname** followed by your **other names.**
   (*b*) In the spaces marked *Examination*, *Year*, *Subject*, and *Paper*, write **'W.A.S.S.C.E.', '1999 June', 'BUILDING DRAWING OR MECHANICAL DRAWING'** and **'1'** respectively.
   (*c*) In the box marked *Identification Number*, write down your **Identification Number** vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. Shade carefully the space with the same number as each digit.
   (*d*) In the box marked *Subject Code*, write down the digits 608112 in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your identification number
   (*e*) In the box marked *Sex*, shade the space marked **M** if you are male, or **F**, if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in **2** above. In the boxes marked *Identification Number, Subject Code* and *Sex*, **reshade** each of the shaded spaces.
4. An example is given below. This is for a **male** candidate, whose **name** is Hamza Isa AUDU whose identification number is **4251102068**, and who is offering **Technical Drawing 1.**

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS
Name: AUDU (Surname) HAMZA ISA (Other Names) Examination: W.A.S.S.C.E Year: 1999 JUNE
Subject: TECHNICAL DRAWING. Paper: 1

IDENTIFICATION NUMBER — SUBJECT CODE — SEX

Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box: M F

For Supervisors only.
If candidate is absent shade this space:

INSTRUCTIONS TO CANDIDATES
1. Use grade HB pencil throughout.
2. Answer each question by choosing one letter and shading it like this: [A] [B] [C]
3. Erase completely any answers you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.
5. Do not make any markings across the heavy black marks at the right hand edge of your answer sheet.

Answer **all** *the questions.*

Each question is followed by four options lettered A to D. Find out the correct option for each question and shade **in pencil** *on your answer sheet, the answer space which bears the same letter as the option you have chosen. Give only* **one** *answer to each question. An example is given below.*

A hexagon has

A, nine sides.
B. eight sides.
C. seven sides.
D. six sides.

The correct answer is **six sides** *which is lettered* **D** *and therefore answer space* **D** *would be shaded.*

[A] [B] [C] [D]

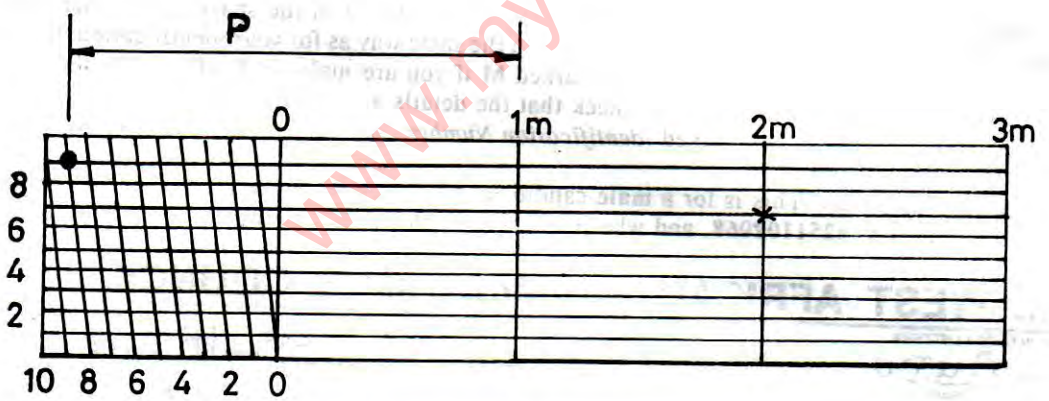
Think carefully before you shade the answer spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Answer **forty** *questions in all: all the questions in Part 1 and* **ten** *questions* **only** *from either Part IIA or Part IIB.*

PART I

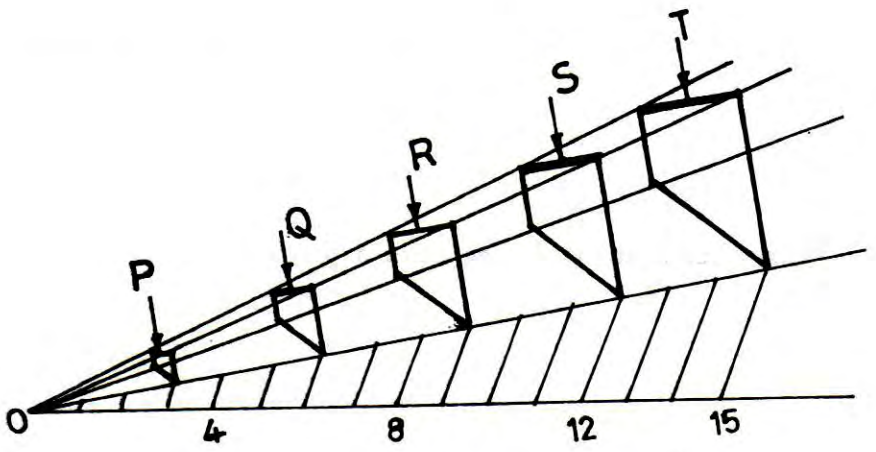
Answer **all** *the questions in this part*



1. What is the distance labelled 'P' in the diagonal scale shown above?

A. 0.89m
B. 1.88m
C. 1.89m
D. 1.98m

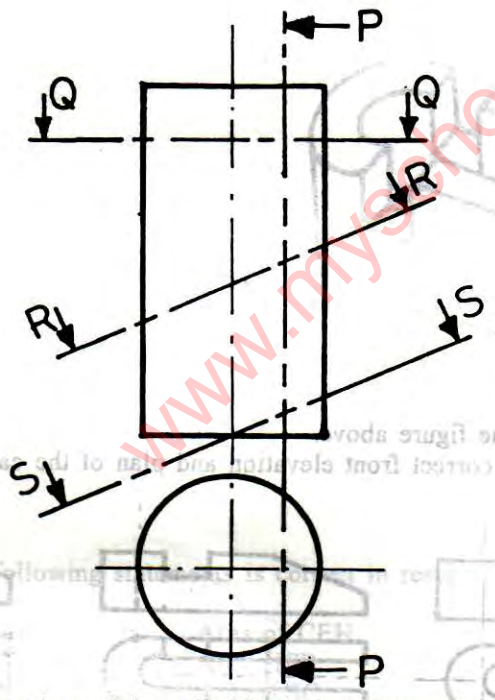
2.



What is the ratio of figure P to S in the diagram above?

A. 3:10
B. 1:3
C. 1:4
D. 2:5

3.



Which of the cut section of the cylindrical pipe shown above will show a rectangle as its true shape?

A. P-P
B. R-R
C. Q-Q
D. S-S

4. If the exterior angle of a regular polygon is 72°, the polygon is

A. a decagon.
B. an octagon.
C. a hexagon.
D. a pentagon.

5. In which of the following is the principle of the archimedean spiral employed in its construction?

A. Woodruff key.
B. Screw thread.
C. Car head lamp.
D. Hair spring of a wrist watch.

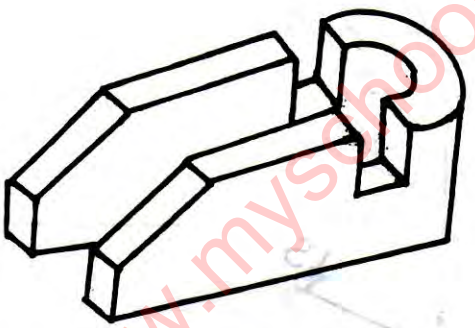
6. Which of the following angles can be trisected using a pair of compasses?

A. 60°
B. 90°
C. 120°
D. 150°

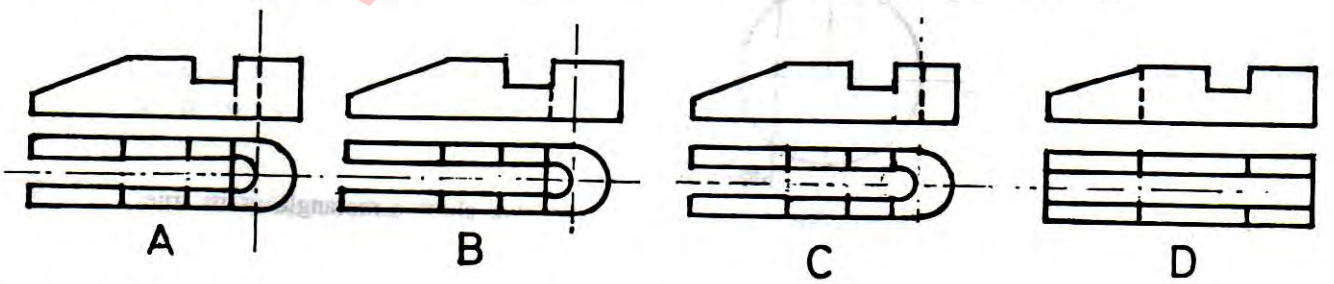
7. In a helix, the length of one complete turn is called the

A. pitch.
B. crest.
C. axis.
D. circumference.

8.

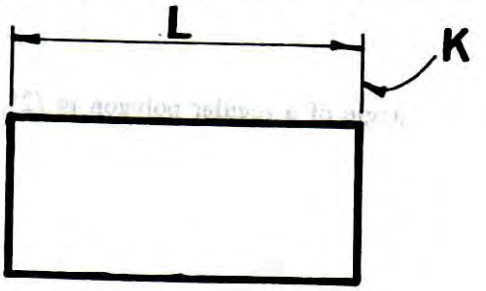


The isometric view of a casting is shown in the figure above.
Which of the following options represents the correct front elevation and plan of the casting?

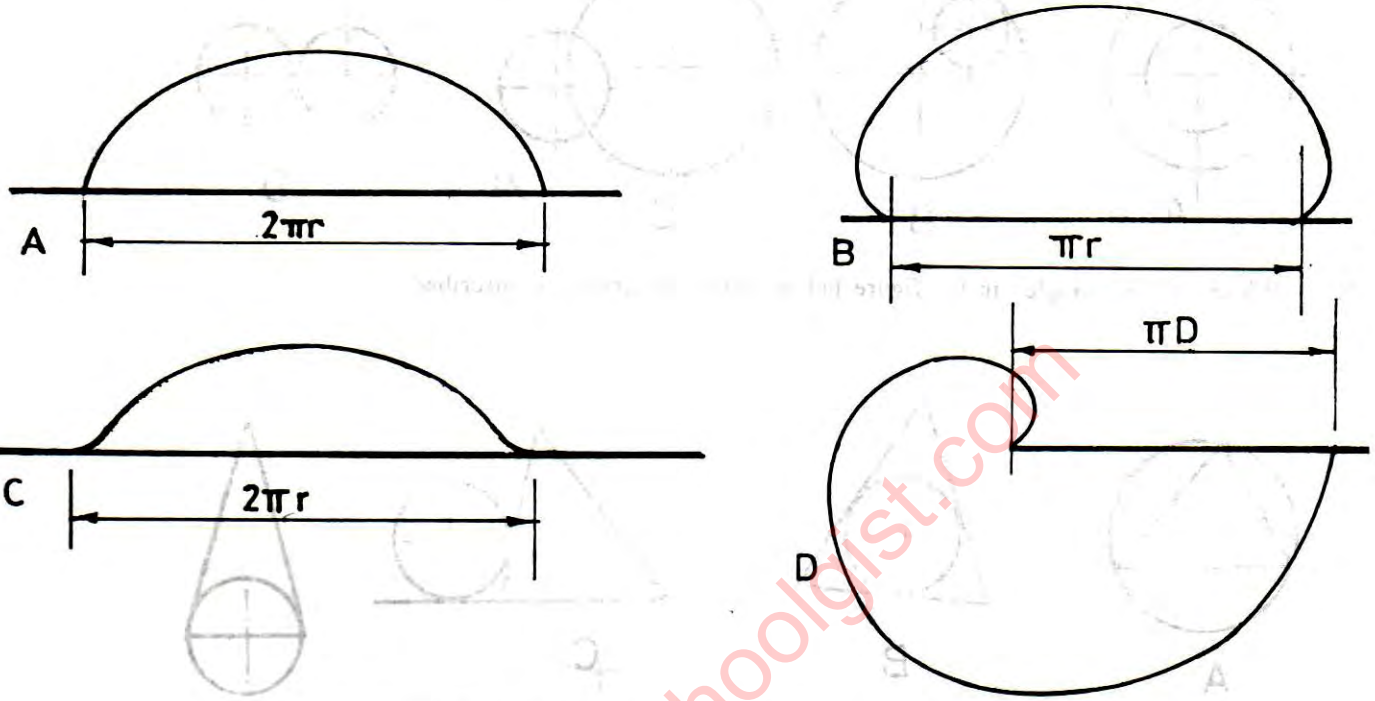


9. In dimensioning, the line labelled K in the figure below is usually referred to as the

A. reference line.
B. datum line.
C. directrix.
D. vertical line.

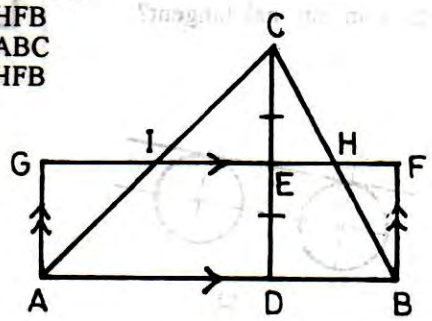


10. **Which of the options below shows the path traced by a point on the circumference of a circle that rolls along a straight line without slipping?**



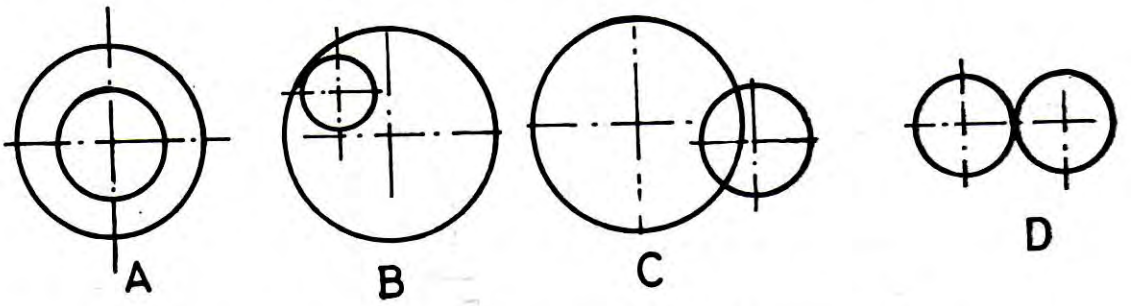
11. **Which of the following statements is correct in respect of the figure shown below?**

A. Area of CIE = Area of CEH
B. Area of CEH = Area HFB
C. Area AGFB = Area ABC
D. Area DEHB = Area HFB

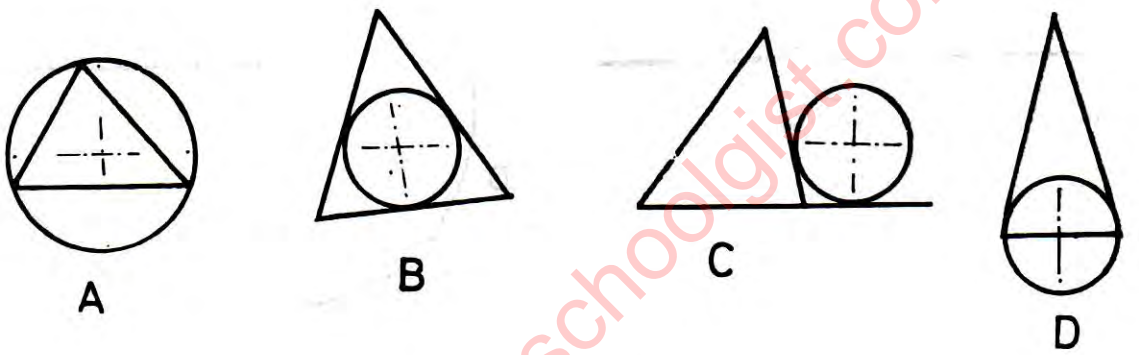


Turn over

12. Which of the following circles is concentric?



13. Which of the triangles in the figure below can be described as inscribed?



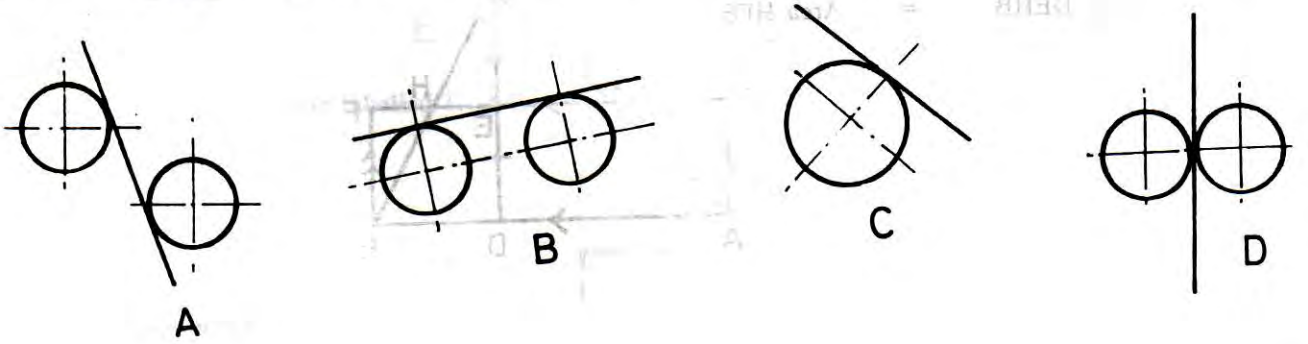
14. The similarity between a deltoid and a rhombus is that

A. both are parrallelograms.
B. their angles are all right angles.
C. all their sides are equal.
D. their diagonals bisect at right angle.

15. Which of the following is not required in the construction of a parabola?

A. Directrix.
B. Vertex.
C. Minor axis.
D. Focus.

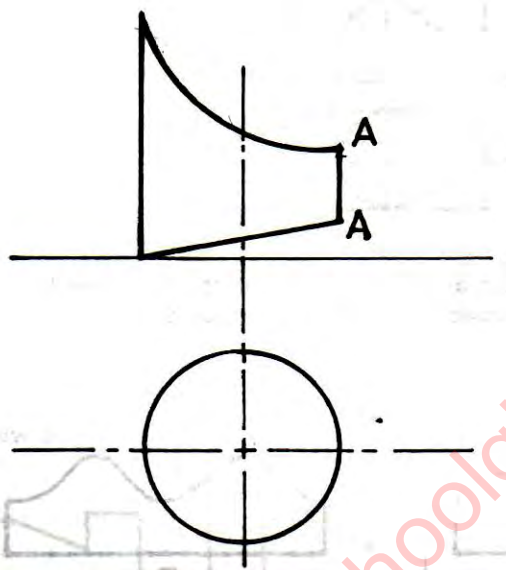
16. Which of the following is an internal tangent?



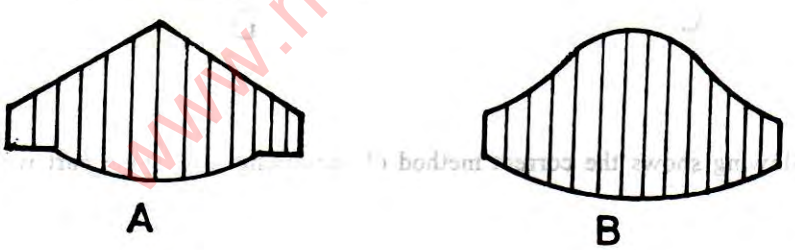
17. **To draw an escribed circle of a given triangle, the first step is to**

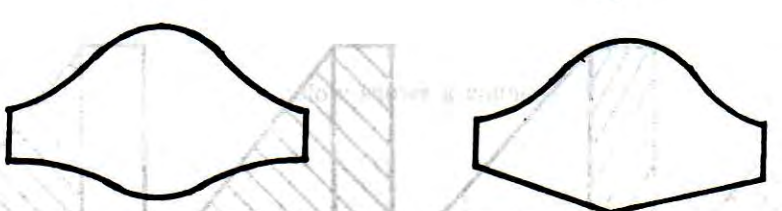
A. **bisect one side.**
B. **bisect one interior angle.**
C. **draw a perpendicular bisector.**
D. **extend one side.**

18.



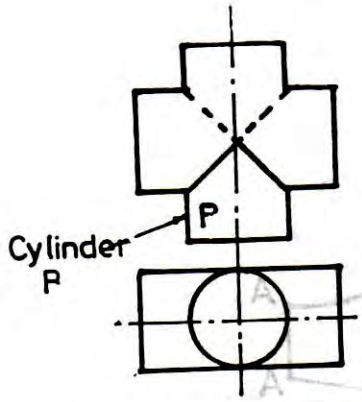
Two views of a truncated cylinder are given in the figure above with A–A as the seam. Which of the options below shows the correct surface development of the cylinder?



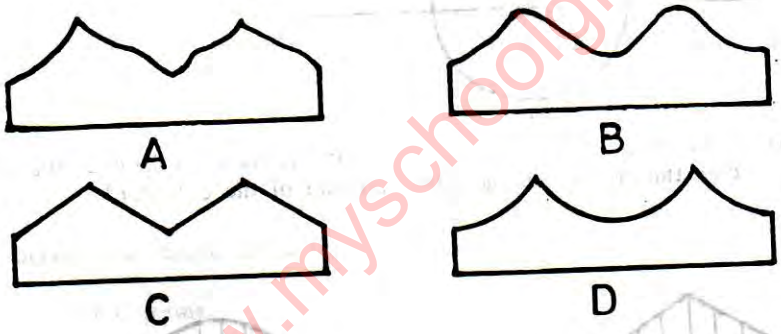


Turn over

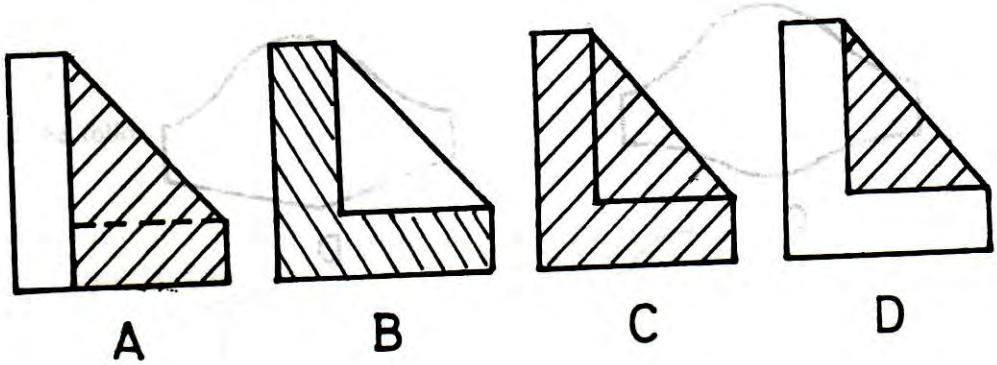
19.



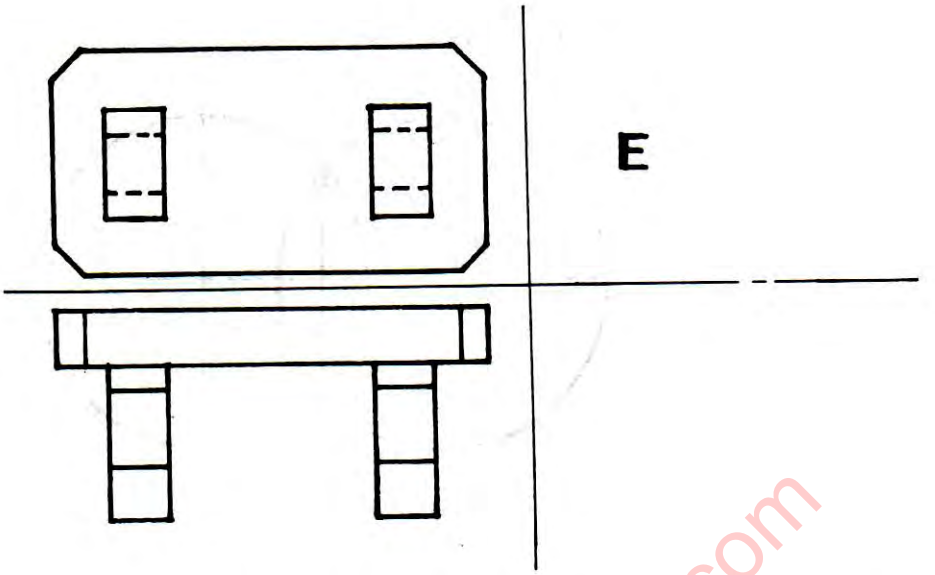
The figure above shows the elevation and plan of two intersecting cylinders.
Which of the following options represents the correct surface development of cylinder P?



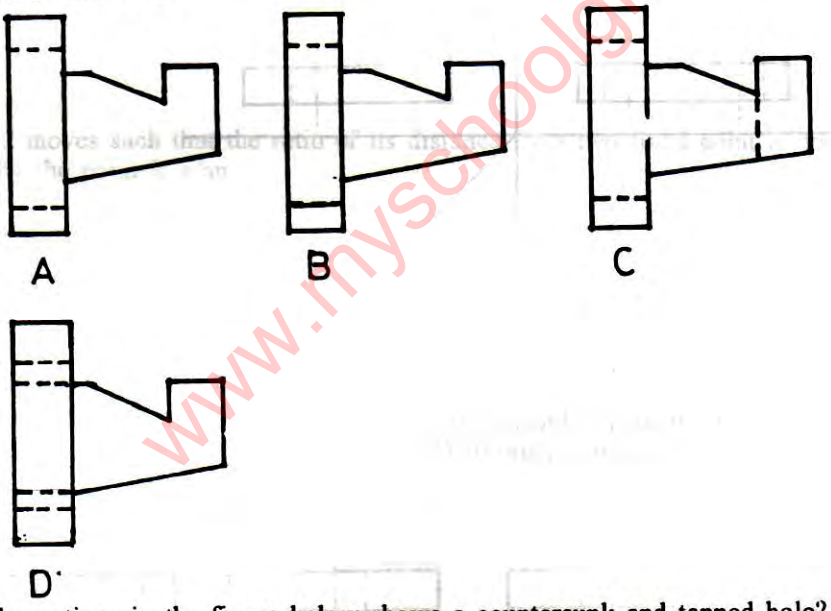
20. Which of the following shows the correct method of sectioning a machine part with a web?



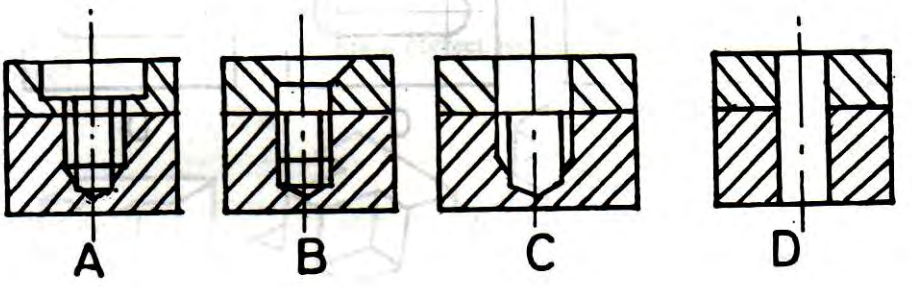
21.



The figure above shows the front elevation and plan of a rack. Which of the following represents the correct end view at E?

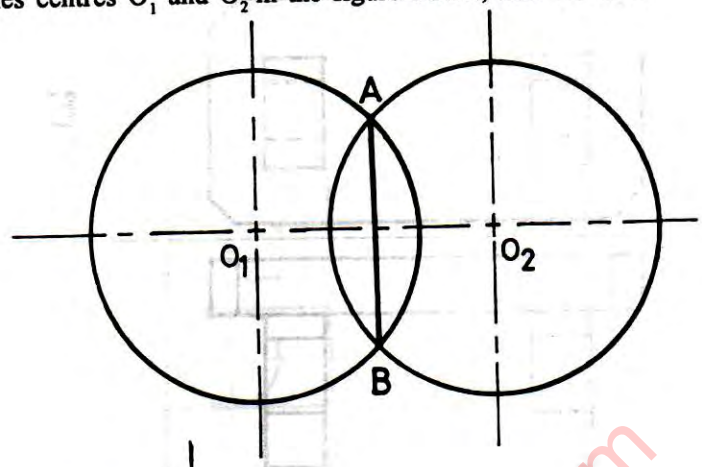


22. Which of the options in the figure below shows a countersunk and tapped hole?

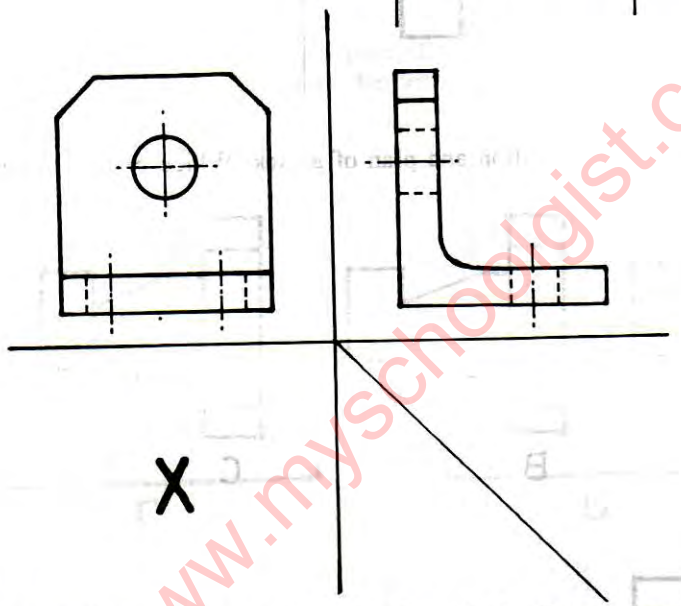


23. In respect to the two circles centres O_1 and O_2 in the figure below, line AB is a

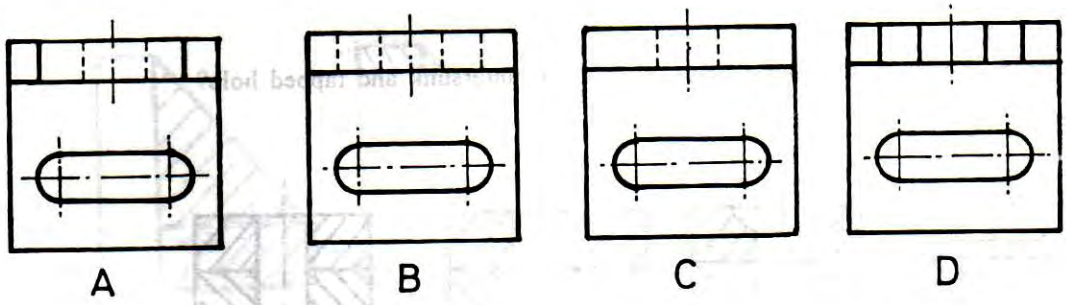
A. normal.
B. chord.
C. diameter.
D tangent.



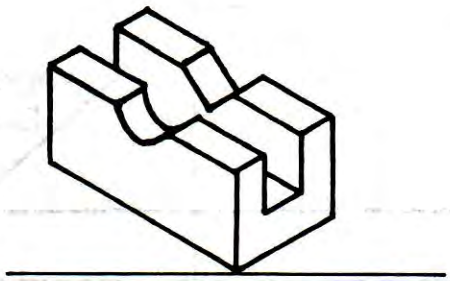
24.



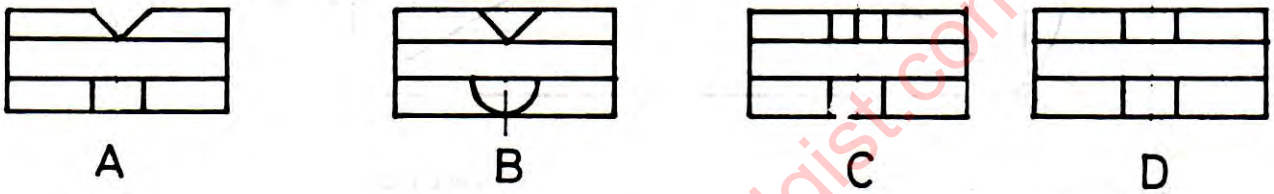
The front and end elevations of an object is given in the figure above. Which of the following is the correct plan at X?



25.



The figure above is an isometric view of a casting. Which of the options given below represents a correct plan of the casting?

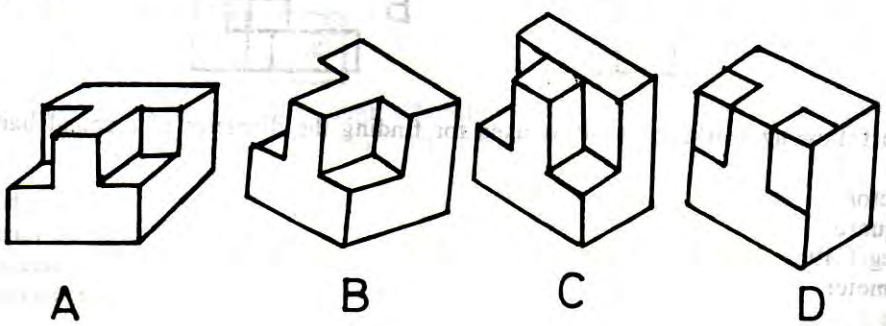


26. When a point moves such that the ratio of its distance from two fixed point is constant, then the path traced by the point is a/an

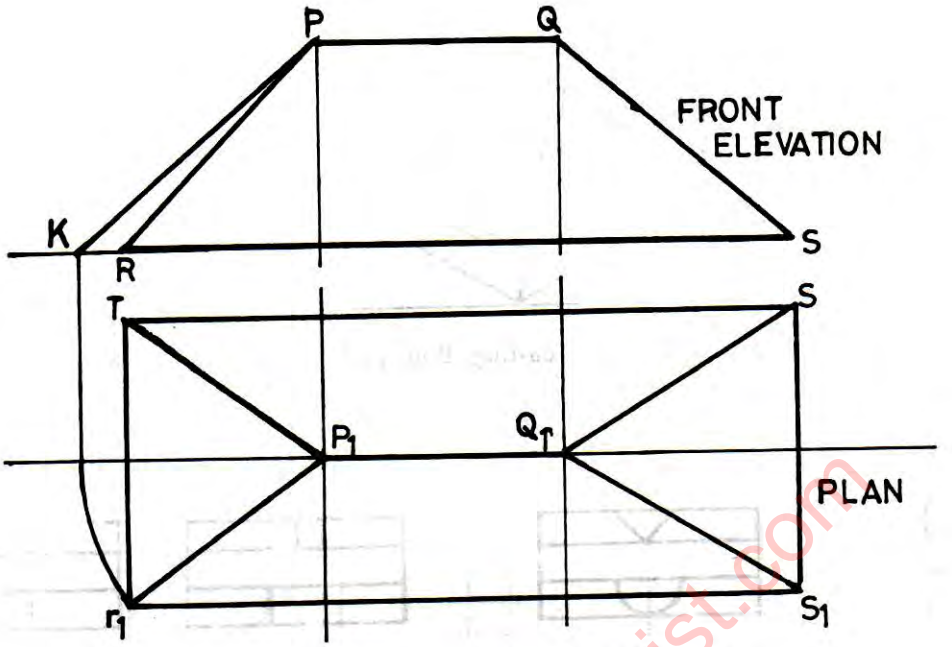
A. parabola.
B. ellipse.
C. cycloid.
D. hyperbola.

27.

Which of the options below represents a correct isometric projection of the block shown in the figure above?



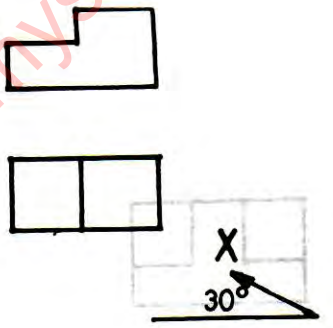
28.



The figure above shows the front elevation and plan of a hipped roof. Which of the following represents the true length of the hip rafter ?

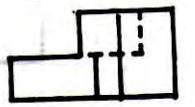
A. PQ
B. P_1Q_1
C. PK
D. PR

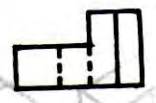
29.

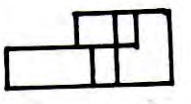


Which of the options below is the correct auxilliary elevation of the block shown above looking in the direction of arrow X?

D 

A 

C 

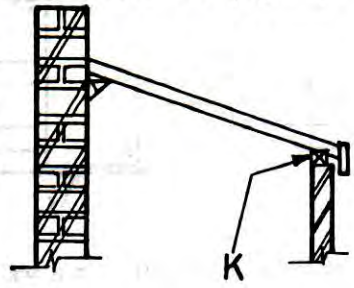
B 

30. Which of the following workshop tools is used for finding the diameter of a round bar?

A. Protractor
B. Try square
C. Odd leg Caliper
D. Micrometer

PART IIA

BUILDING DRAWING (Option)



The figure above shows a roof.
Use it to answer questions **31** *and* **32.**

31. Identify the type of roof.

A. gable roof.
B. butterfly roof.
C. lean to roof.
D. collar roof.

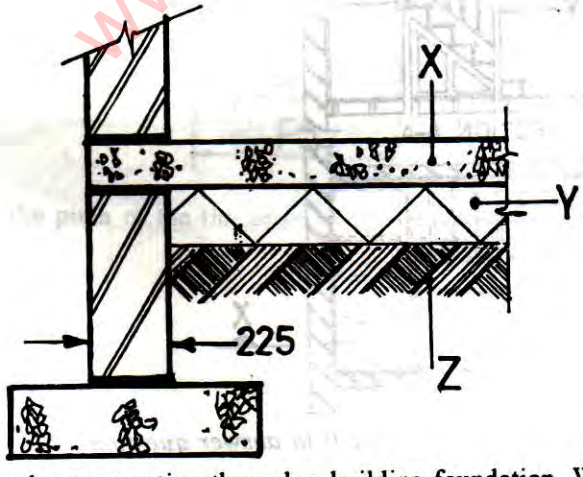
32. The roof member labelled K is the

A. purlin.
B. nogging
C. rafter.
D. wall plate.

33. A site plan shows the

A. location of buildings.
B. building foundation.
C. elevation of a building.
D. cross-section of a building.

34.

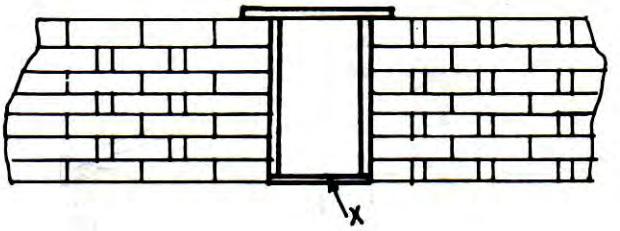


The figure above shows a section through a building foundation. Which of the following correctly identifies the labelled features X, Y and Z (in that order) ?

A. mortar screed, earth filling, hardcore.
B. mortar screed, concrete, hardcore.
C. concrete slab, hardcore, earthfilling.
D. concrete slab, earthfilling, hardcore.

35. The diagram below shows an elevation of a frame in a brick wall. What is the labelled member 'X' called?

A. Jamb.
B. Sill.
C. Brace.
D. Bend.

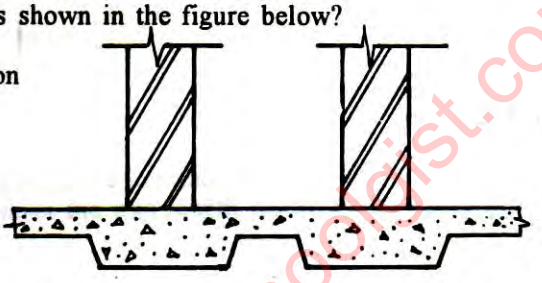


36. In which of the following types of floor construction is a wall plate used?

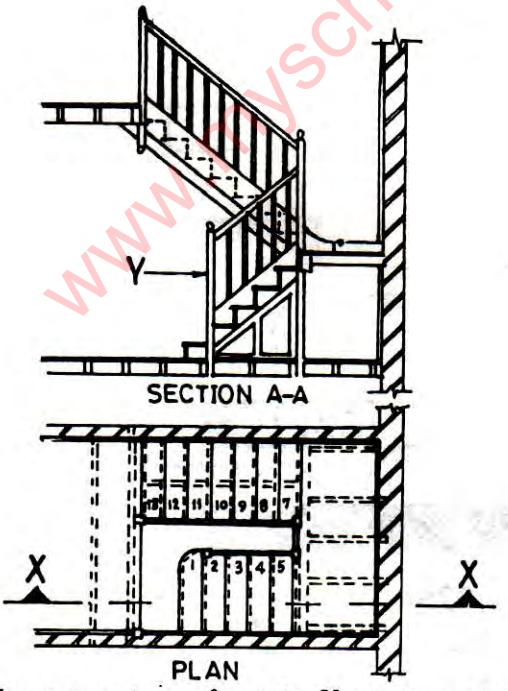
A. Solid concrete floor.
B. Reinforced floor.
C. Hollow timber floor.
D. Pre-cast floor.

37. What type of foundation is shown in the figure below?

A. Wide strip foundation
B. Raft foundation.
C. Pile foundation.
D. Pad foundation.



38.



The figure above shows two views of a stair. Use it to answer questions **38** *and* **39**.

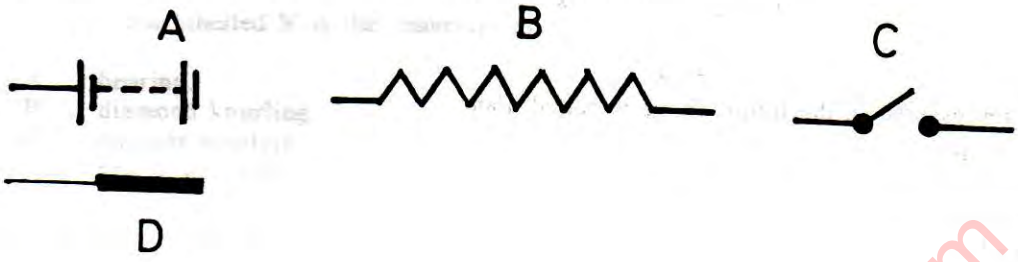
The type of stair shown above is/an

A. half turn stair.
B. open newel stair.
C. geometrical stair.
D. dog-leg stair.

39. The part labelled Y is the

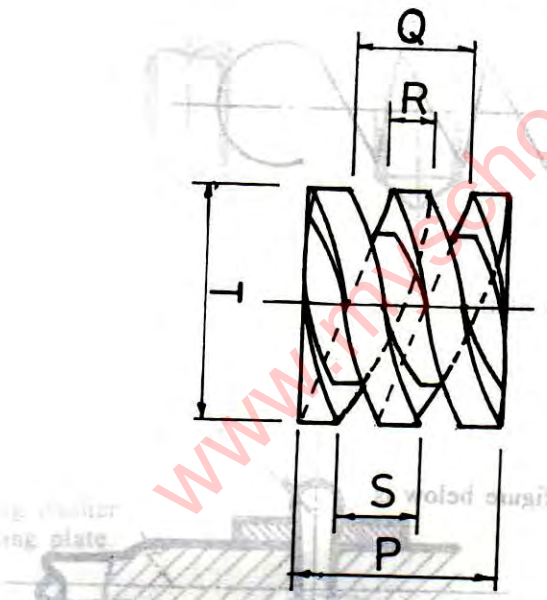
A. railings.
B. newel post.
C. winders.
D. soffit.

40. Which of the symbols below represents a resistor?



PART IIB
MECHANICAL DRAWING (Option)

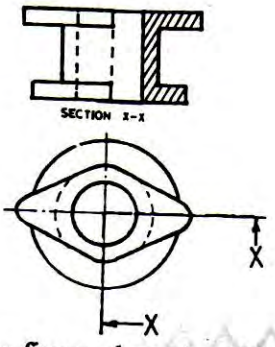
31.



In the figure above, the pitch of the thread is represented by the part labelled

A. Q
B. R
C. S
D. P

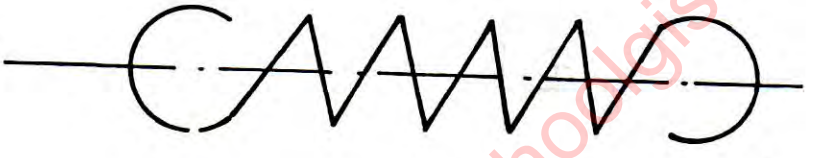
32.



The section represented in the figure above is called a/an

A. offset section.
B. aligned section.
C. revolved section.
D. half-section.

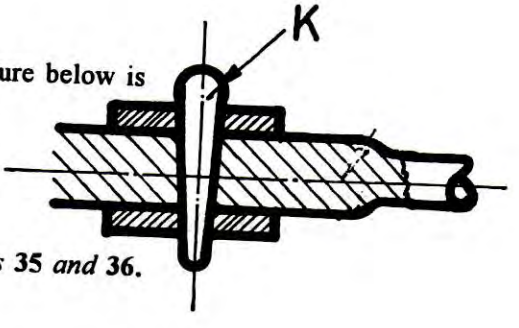
33.



The figure above is a schematic representation of a

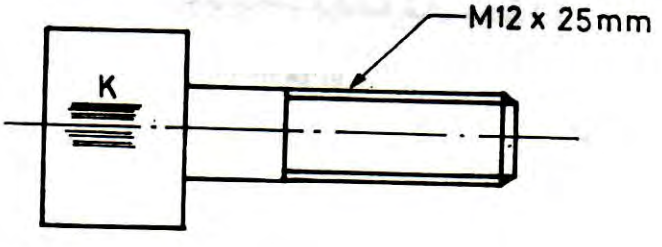
A. compression spring.
B. tension spring.
C. conical spring.
D. torsion spring.

34. The locking device labelled **K** in the figure below is



A. split pin.
B. boss.
C. cotter.
D. taper pin.

Use the figure below to answer questions **35** *and* **36.**



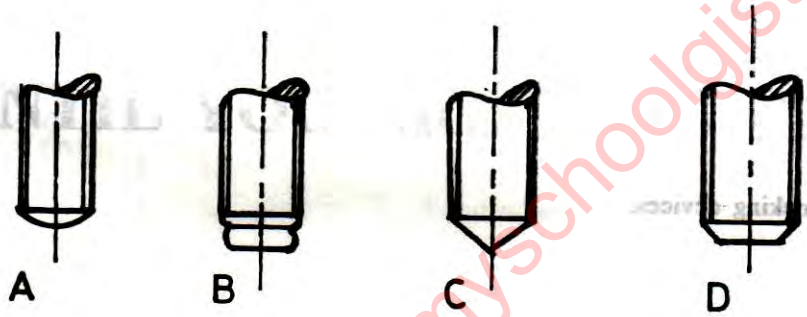
35. The expression M12 x 2.5mm on the thread refers to

A. diameter and flank.
B. root diameter and pitch.
C. diameter and pitch.
D. diameter and thread depth.

36. The portion labelled K is the conventional representation of

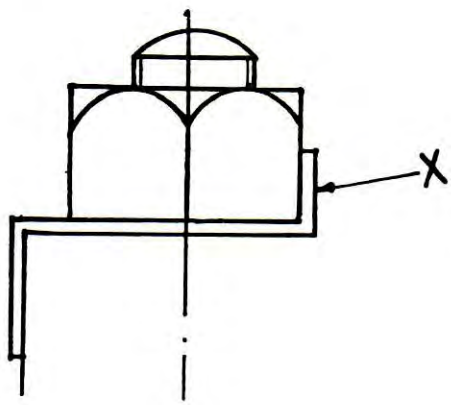
A. bearing.
B. diamond knurling.
C. straight knurling.
D. square on shaft.

37. Which of the following screw points is chamfered?



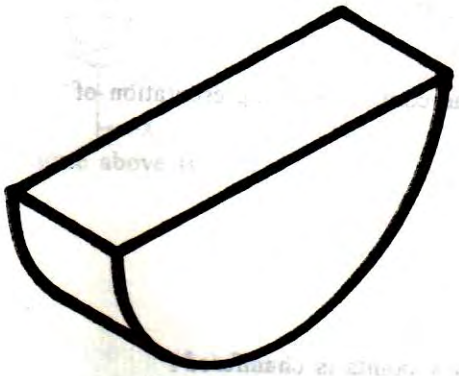
38. The locking device labelled X in the figure below is called a

A. split pin.
B. tab washer.
C. spring washer.
D. locking plate.



39. **The type of key shown in the figure below is called**

A. **feather key.**
B. **woodruff key.**
C. **sunken key.**
D. **gib-head key.**



40. **The following are all locking devices.**

I. **Split pin.**
II. **Spring washer.**
III. **Grub screw.**
IV. **Tab washer.**

Which of them are frictional?

A. **III and IV only.**
B. **II and III only.**
C. **I and II only.**
D. **II and IV only.**

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

YOU WILL BE PENALIZED SEVERELY IF YOU ARE FOUND LOOKING AT THE NEXT PAGE BEFORE YOU ARE TOLD TO DO SO.

SECTION B **1½ hours**

[60 marks]

Answer **three** *questions only from this section.*

Strictly geometrical methods are to be used. Lines that are parallel, perpendicular or inclined at angles of 30°, 45° or 60° to other lines may be drawn without construction lines being shown. All other construction lines must be shown clearly. Accuracy and good draughtsmanship are essential.

One A2 (594 mm X 420mm) sheet of drawing paper is provided. Both sides may be used. In the bottom right-hand corner of each side that is used, write your **name**, *your* **identification number** *and the* **number** *of the question you answer.*

All dimensions on the diagrams are in millimetres.

All questions carry equal marks.

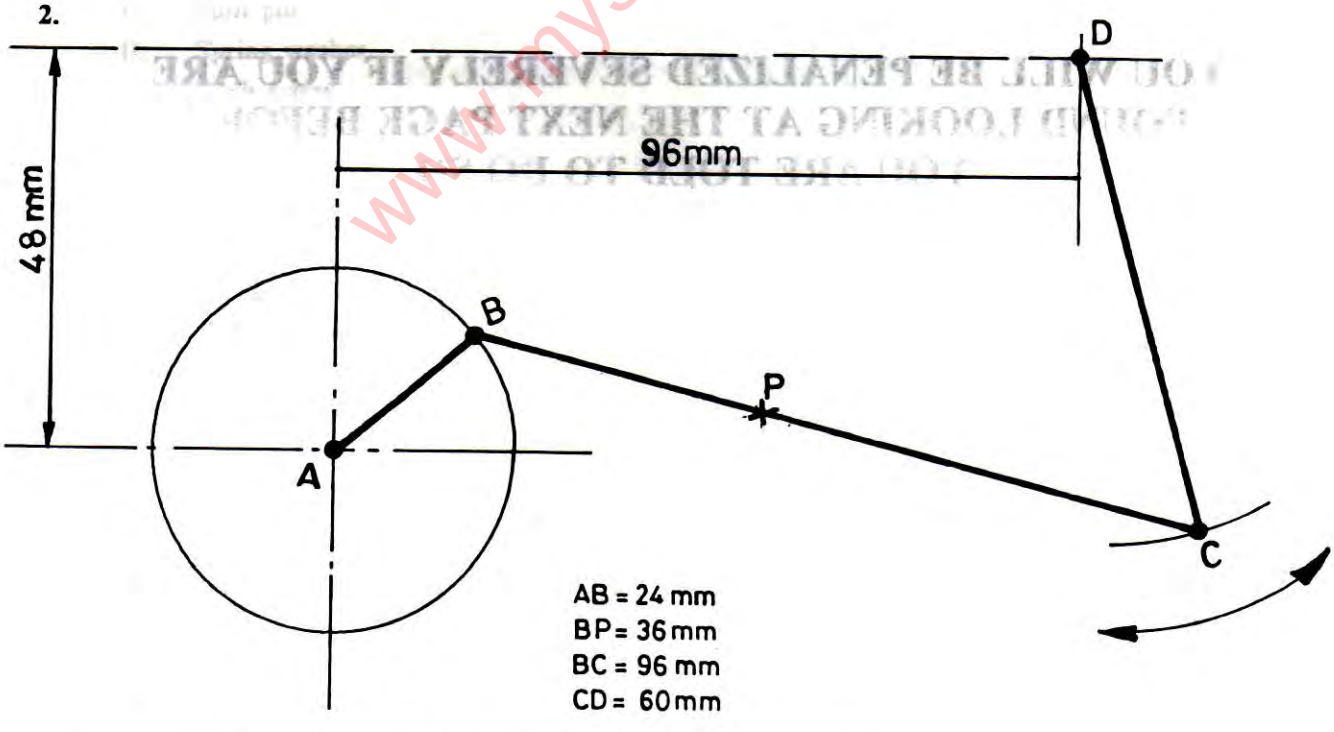
1. (*a*) Construct a polygon ABCDE using the following information.

AB = BC = AE = 55mm
ED = DC = 65mm

Angle ABC = 135° and angle EAB = 120°.

(*b*) Reduce the polygon constructed to a similar one $\frac{3}{5}$ of its area

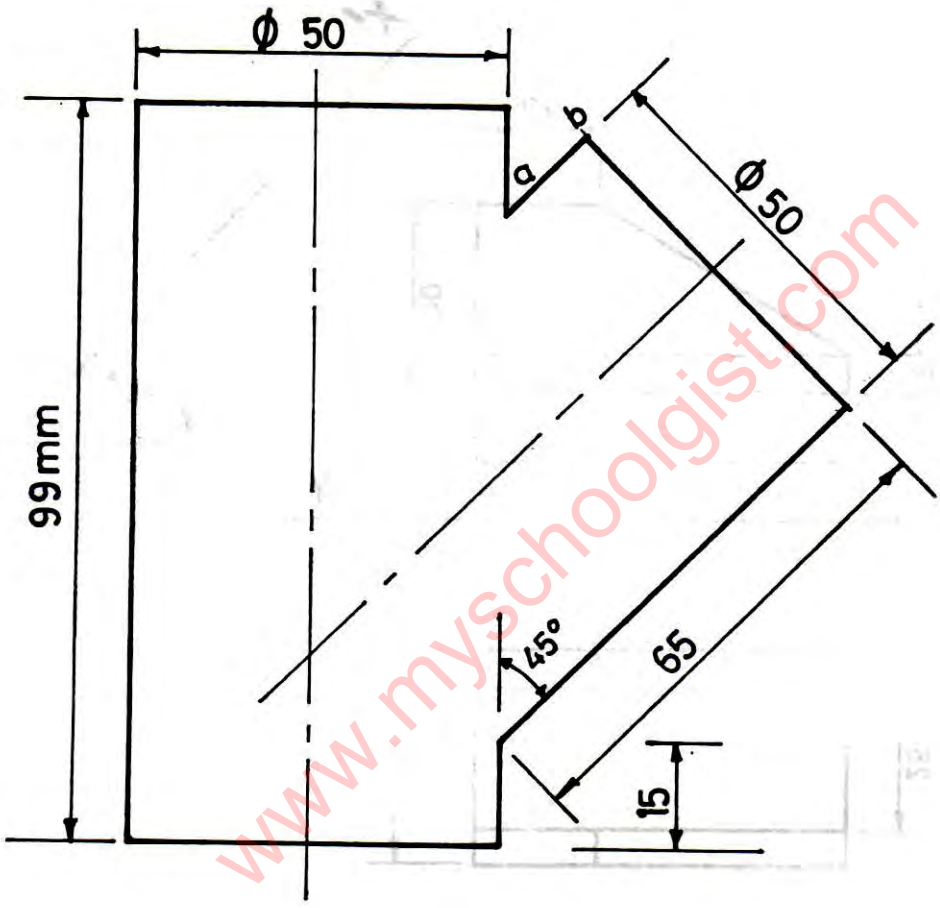
2.



The details of a crank mechanism are given in the figure above.
Points B and C are pin-joints.

Construct the locus of point P for one complete revolution of the crank *AB*.

3.

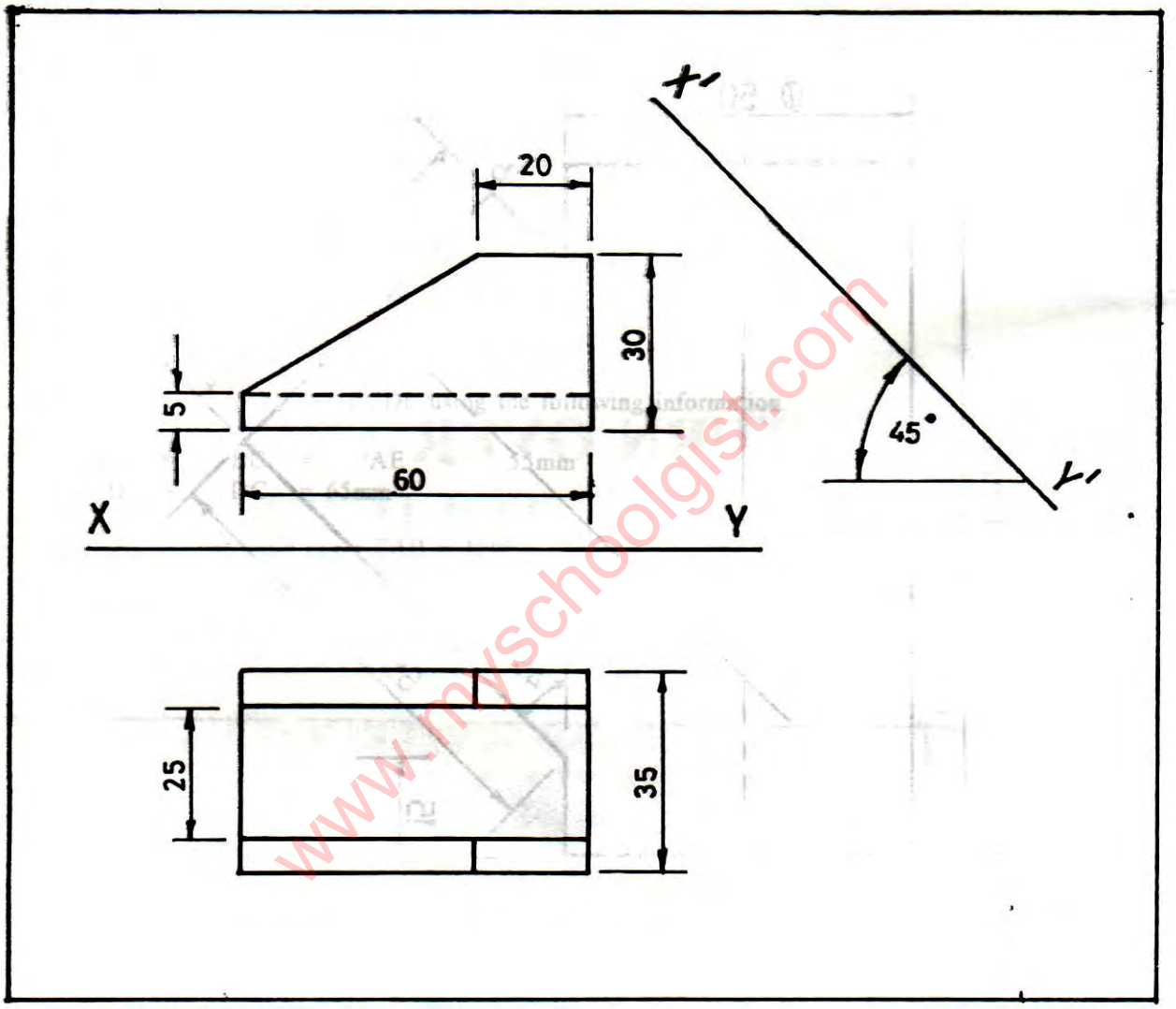


Two cylinderical pipes of equal diameter intersect as shown in the figure above.

Using the data given, draw:

(*a*) the given view;
(*b*) the curve of interpenetration of the two pipes;
(*c*) the surface development of the shorter pipe using a b as seam.

4.



Two views of a casting in first angle orthographic projection are given in the figure above. Draw the auxiliary elevation of the casting projected on X 'Y'.