THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

097 **MECHANICAL DRAUGHTING**
(For Both School and Private Candidates)

TIME: 3 Hours ***Friday 9th October 2009 a.m.***

Instructions

1. This paper consists of **six (6)** questions.
2. Answer question **number 1** and any other **three (3)** questions.
3. Question number 1 carries 40 marks while the rest carry 20 marks each.
4. Electronic calculators are **not** allowed in the examination room.
5. Cellular phones are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

This paper consists of 5 printed pages.

1. Figure 1 shows two views of a GEAR-CHANGE LEVER bracket from a lathe. When in use, bracket (1) is clamped to the 32 mm diameter axle by a bolt passing through the 19 mm diameter hole and screwed into M 18 threaded hole. Bolt (3) is hexagon – headed, 62 mm long, with the thread running for 44 mm.

With the portion of the axle (2) in position and the bolt screwed tight, draw the following views of the bracket in first angle projection:

(a) The given plan. Show all hidden details in this view.

(b) A sectional front elevation on cutting plane – AA.

Add a title block and parts list.

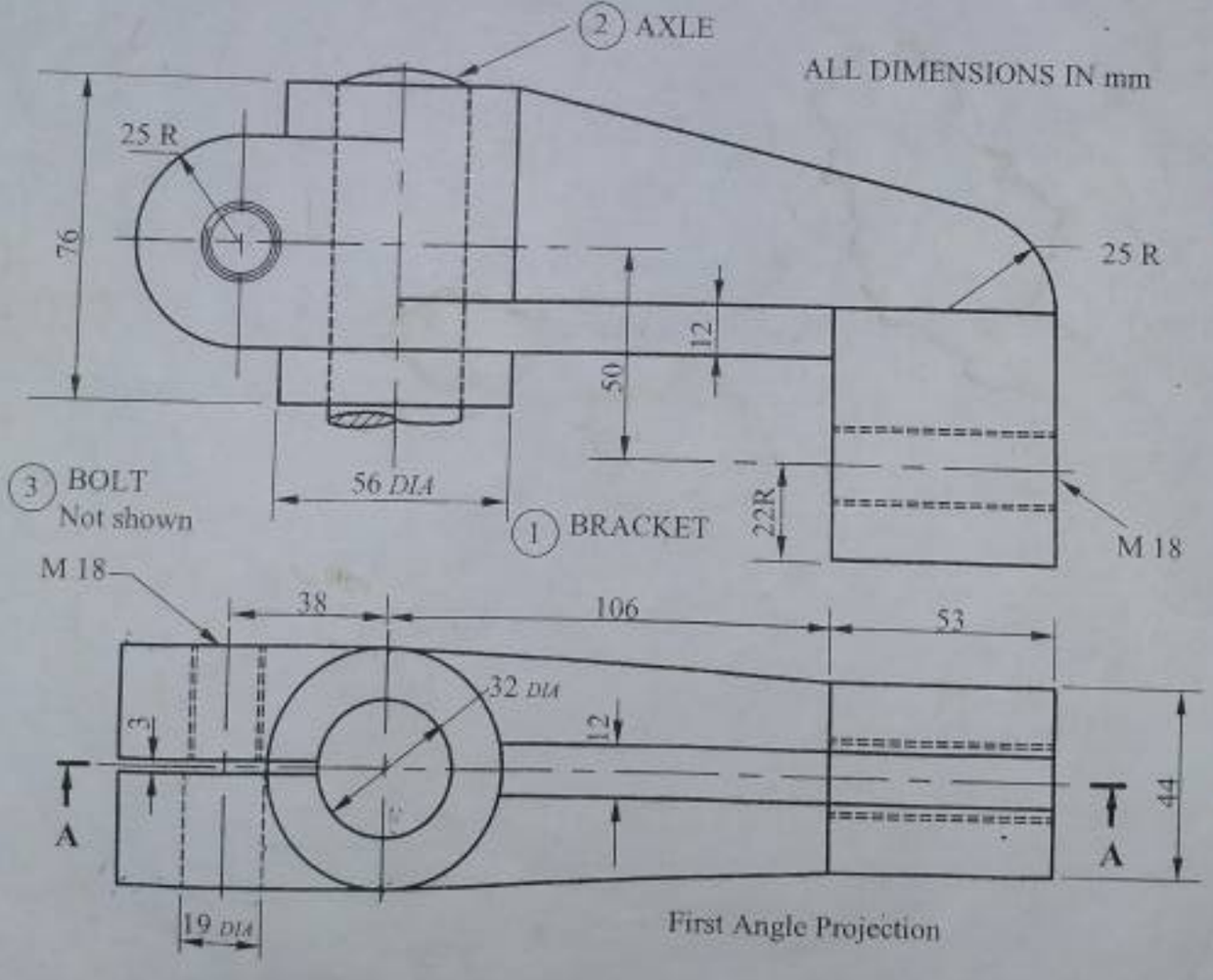

Figure 1

2. Projection of a triangle ABC is shown in Figure 2.

Draw:

(a) The given views

(b) The true shape of the triangle using the auxiliary method.

Show all the constructions clearly.

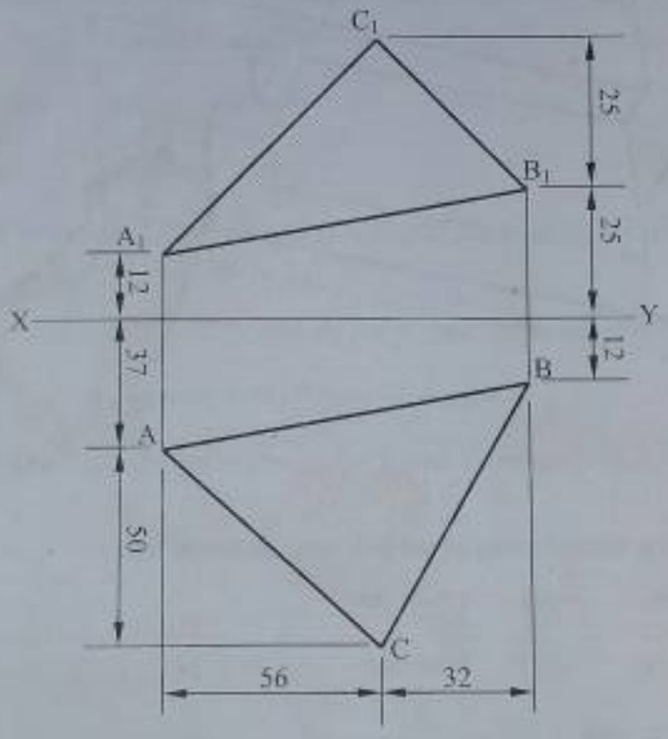

Figure 2

3. A rod CD 80 mm long oscillates about point D. A point 'P' moves from free end C uniformly along the rod towards the pivoted end and comes back to its initial position as the rod swings first to the right from its vertical position through 60° and then to the left by the same angle and comes back to its vertical position. Draw the locus of point 'P'.

4. Figure 3 shows a pictorial projection of a machined block.
Draw the given block in isometric projection. Show all the constructions clearly.

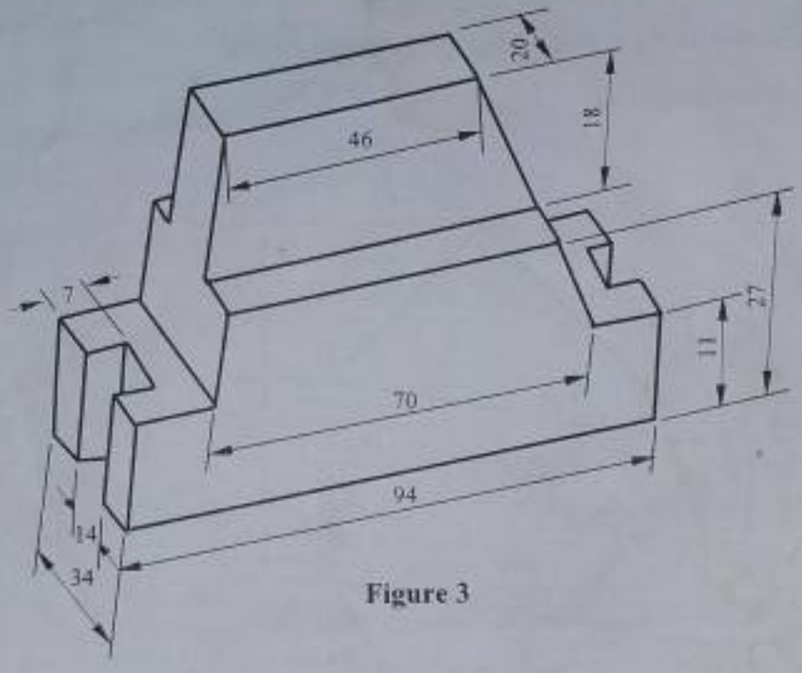

Figure 3

5. (a) Write down the abbreviations of the following technical terms:

(i) Centres (ii) Under cut

(iii) Material (iv) Spot face

(v) Counter sunk.

(b) With the aid of sketches show the following electrical symbols:

(i) Filament lamp (ii) Ohm meter

(iii) Loud speaker (iv) Variable resistor

(v) Electric buzzer.

(c) With neat sketches draw the conventional representation of the following engineering components:

(i) External thread (ii) Gear

(iii) Diamond knurling (iv) Square on shaft

(v) Compression spring.

(d) Draw neat sketches of the following types of screws:

(i) Cheese head screw (ii) Counter sunk screw

(iii) Round head screw (iv) Grub screw

(v) Allan head screw.

6. A front elevation of the body of a small metal jug is given in Figure 4. Draw full size the following:

(a) The given front elevation, do not include the handle and mouth.

(b) The end elevation in the direction of arrow 'S'.

(c) The development of the jug body with the joint along A-B.

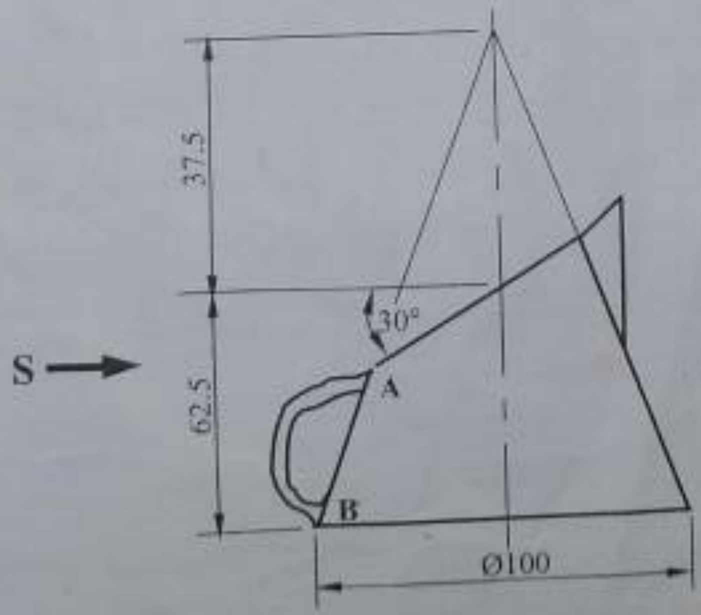

Figure 4