OL/2015/83-E-I, II

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கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2015 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2015

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ஆக்கத்திறன் தொழினுட்பவியல்	I, II
Design and Technology	**I, II**

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மூன்று மணித்தியாலம்
Three hours

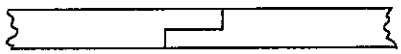
Design and Technology I

Note :
(i) *Answer **all** questions.*
(ii) *In each of the questions **1** to **40**, pick one of the alternatives (1), (2), (3), (4) which you consider as **correct or most appropriate**.*
(iii) ***Mark a cross** (×) **on the number corresponding to your choice in the answer sheet provided.***
(iv) *Further instructions are given on the back of the answer sheet. Follow them carefully.*

1. In the Design Process the qualities of a proposed solution such as measurement, price, colour etc. are stated in
(1) problem analysis. (2) design brief.
(3) specifications. (4) evaluation process.

2. Analyzing the problems of a design process is
(1) writing of a statement to explain the solution.
(2) study of the facts to understand the problem.
(3) deeply study of the solution given for the problem.
(4) deciding the basic characteristics of the solution.

3. What is the name of the timber joint given in the diagram?
(1) half lap joint (2) Butt joint
(3) Scarf joint (4) Bridle joint



4. The lap of a stretcher bond is
(1) $\frac{1}{4}$ of brick. (2) $\frac{1}{2}$ of brick. (3) $\frac{3}{4}$ of brick. (4) 1 brick.

5. What is the correct statement regarding the coarse aggregate?
(1) The construction materials pass through 4.8 mm sieve.
(2) The construction materials do not pass through 4.8 mm sieve.
(3) The construction materials pass through 5.8 mm sieve.
(4) The construction materials do not pass through 5.8 mm sieve.

6. Which pair of statement given below is correct, regarding to the popularization of PVC pipes?
A - PVC pipes are stronger than the galvanized pipes.
B - Use of PVC pipes are easy because of light weight.
C - No need of expertise knowledge to fix PVC pipes.
D - Easy to cut threads in PVC pipes.
(1) A and B (2) A and C (3) A and D (4) B and C

7. The thickness of a brick wall built under the stretcher bond method is
(1) $\frac{1}{4}$ of brick. (2) $\frac{1}{2}$ of brick. (3) $\frac{3}{4}$ of brick. (4) 1 brick.

8. The task to be completed before finish the timber products is
(1) apply wood preservatives. (2) timber conservation.
(3) timber seasoning. (4) apply enamel paints.

[see page two

9. Anti coagulant in the rubber industry is defined as a chemical use
(1) for coagulation of rubber. (2) to avoid coagulation of rubber.
(3) to increase the dry weight of rubber. (4) to remove the odour of rubber.

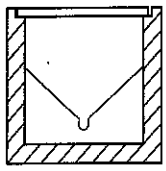
10. The process of heating lead oxide with rubber and sulphur is identified as
(1) producing block rubber. (2) preparing crape rubber.
(3) preparing sheet rubber (R.F.S.). (4) Vulcanizing.

11. A student who makes in new design, had to remove 8 cm diameter circular shape part from 10 cm × 10 cm Plank. What is the most appropriate tool to be used on this task?
(1) Dowtail saw (2) Tenon saw (3) Coping saw (4) Band saw

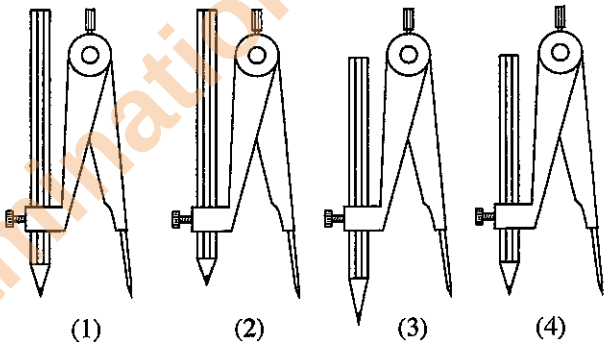
12. Some cracks parallel to the pith were seen as a cut down tree trunk. In timber industry this is identified as
(1) ring shake. (2) heart shake. (3) cup shake. (4) star shake.

13. Wire nails, locks and cabin hooks used in construction industry is known as
(1) binding materials. (2) fastners. (3) finishing materials. (4) structural materials.

14. What is shown in this figure?
(1) A cross section of a manhole
(2) A plan view of a manhole
(3) A cross section of a septic tank
(4) A plan view of a septic tank



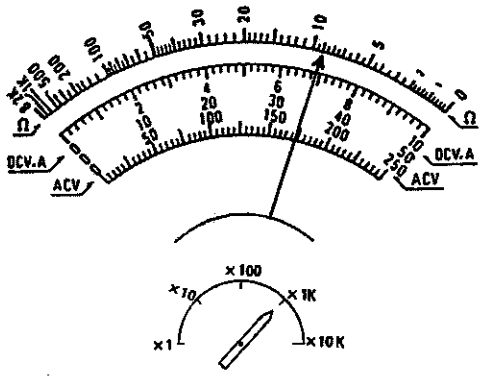
15. It is necessary to fix the pencil correctly when using the compass for technical drawings. Select the figure which shows the correct method of fixing a pencil to a compass within the given figures.



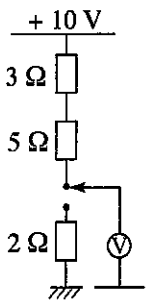
(1) (2) (3) (4)

16. What is the value of a capacitor marked as 2n7?
(1) 2.7 μF (2) 27 μF (3) 2.7 nF (4) 27 nF

17. The figure shows the placing of indicator when measure a resistance value using a multimeter. What is the reading shown by the multimeter.
(1) 90 kΩ
(2) 9 kΩ
(3) 90 Ω
(4) 9 Ω



18. What is the value of voltmeter connected to the circuit in given figure?
(1) 2 V
(2) 3 V
(3) 5 V
(4) 10 V



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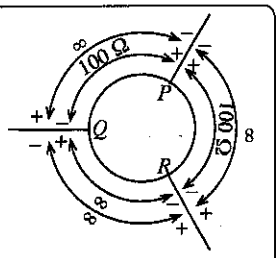
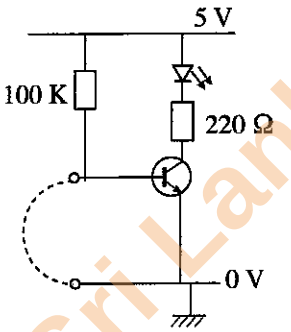
19. The figure shows the value of resistance when connect to the multimeter to each terminal in order to find out terminals of a transistor and polarity. According to it, what is the base and polarity respectively?

(1) Q and NPN (2) P and PNP
(3) Q and PNP (4) P and NPN



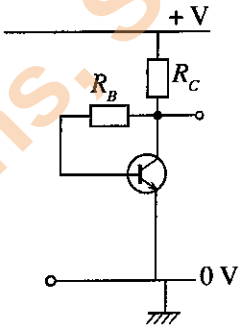
20. The figure shows a circuit where a transistor can be used as a switch. What would **not** be the result when disconnect the conductor indicated by dotted lines?

(1) Light the LED
(2) Base Emitter Voltage of transistor becomes 0.6 V
(3) Collector Emitter Voltage becomes 5 V
(4) Increasing the current flowing from the supply



21. What is the biasing method of the transistor of given amplifier circuit?

(1) Self biasing
(2) Fixed biasing
(3) Emitter biasing
(4) Potential divider biasing



22. What is the correct truth table for the output of logic circuit given in figure?

(1)

B	A	Z
0	0	0
0	1	0
1	0	0
1	1	1

(2)

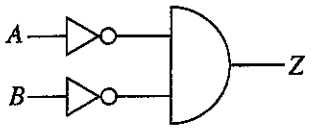
B	A	Z
0	0	0
0	1	1
1	0	1
1	1	1

(3)

B	A	Z
0	0	1
0	1	1
1	0	1
1	1	0

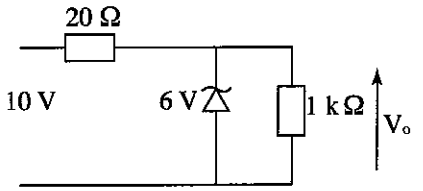
(4)

B	A	Z
0	0	1
0	1	0
1	0	0
1	1	0



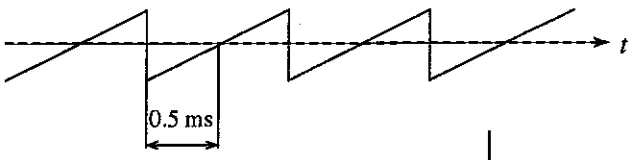
23. The figure shows a voltage regulator circuit which connect a Zenar diode. How much is the output voltage?

(1) 4 V (2) 6 V
(3) 10 V (4) 15 V



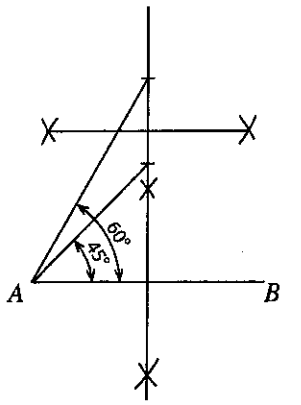
24. What is the frequency of wave form given in figure?

(1) 2000 Hz (2) 1000 Hz
(3) 500 Hz (4) 100 Hz



25. The given diagram shows number of steps for a geometrical construction started from AB line. This construction method is for

(1) construct various types of regular polygons.
(2) design triangles according to given degrees.
(3) construct a trapezium according to the measurements.
(4) design 45° and 60° angles on a line.



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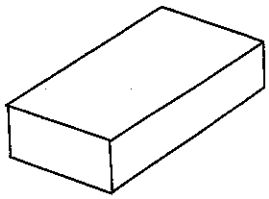
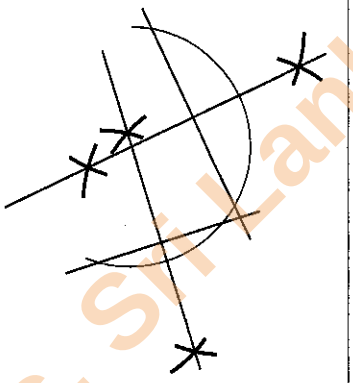
26. The figure shows a diagram drawn according to the isometric projection. According to the diagram, select the pair of statements which shows two fundamental characteristics of isometric projection from the statements given below.



A - Views of the three sides are equal
B - Angles can **not** be measured by measuring the diagram
C - Slant lines meet at two points
D - Slant lines are parallel

(1) A and B. (2) A and C. (3) A and D. (4) B and D.

27. What is the use of the geometric construction given by the diagram?

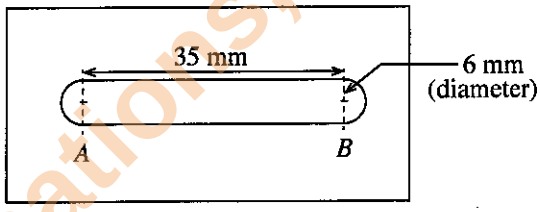


(1) To find the centre of a circle when a part of the circle is given
(2) To bisect two arcs which are closely situated
(3) To bisect a given angle
(4) To draw a common tangent to two circles

28. The path of a moving point from equal distance from a fixed point is,

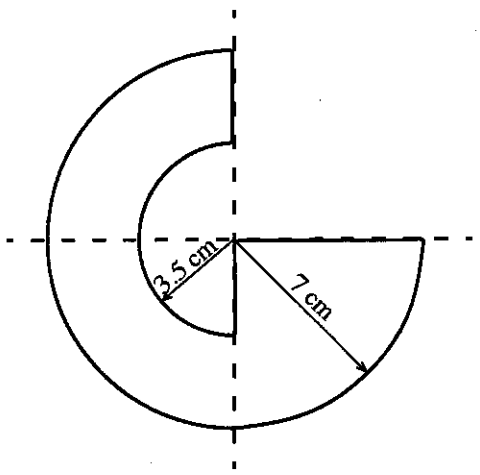
(1) the parabola. (2) the hyperbola.
(3) the line. (4) the circle.

29. A slot has to be cut and prepared according to the diagram on a 2 mm thickness mild steel sheet. What is the most applicable order of work steps to do this work?



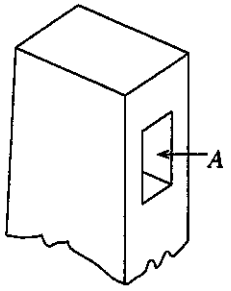
(1) Drill holes on points *A* and *B*, join them by cutting with a cold chisel.
(2) Cut the slot by using suitable types of cold chisels.
(3) Drill a hole and cut the shape using a hacksaw.
(4) Drill more holes around the slot and cut in between the holes using a cold chisel.

30. The diagram shows a work piece made out of a mild steel wire, bended according to number of geometrical shapes. What is the length of wire needed for this work piece?



(1) 51 cm
(2) 54.5 cm
(3) 58 cm
(4) 59.5 cm

31. The list of tools and instruments need for making the mortice hole which is shown by the arrow *A* of the given diagram is



(1) Ball Pane hammer, Marking gauge, Side chisel, Mortice chisel.
(2) Mallet, Mortice gauge, Side chisel, Mortice chisel.
(3) Mallet, Marking gauge, Side chisel, Bevel chisel.
(4) Claw hammer, Mortice gauge, Mortice chisel, Bevel chisel.

32. Water has been leaking through a concrete slab which has been built as a roof of a bus-stop. What is the probable reason for this situation?

(1) Insufficient reinforcement (2) Concrete is not cured
(3) Concreting on a crooked form work (4) Concrete is not compacted

[see page five

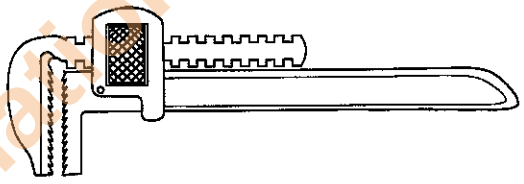
33. An item made out of a certain metal has grinded on a grinding wheel for finishing work. When grinding, yellowish, paddy seed shaped fine sparks sprayed out. This item has made out of
(1) Mild steel. (2) Cast iron. (3) Stainless steel. (4) Medium carbon steel.

34. When the air bubbles entered into the liquid of the hydraulic brake system of a vehicle, the hydraulic brake system will become inactive. Hence the air entered into the liquid should be removed as soon as possible. Which of the following choice included the list of materials, components, tools and persons for a methodical technician to do this task?
(1) Extra brake oil, ring spanner, rubber hose, small glass container, a helper.
(2) Extra brake oil, double ended spanner, PVC tube, plastic container, a driver.
(3) Extra brake oil, adjustable spanner, polythene tube, empty tin can, a trainee.
(4) Extra brake oil, general purpose plier, plastic tube, empty cup, a traffic warden.

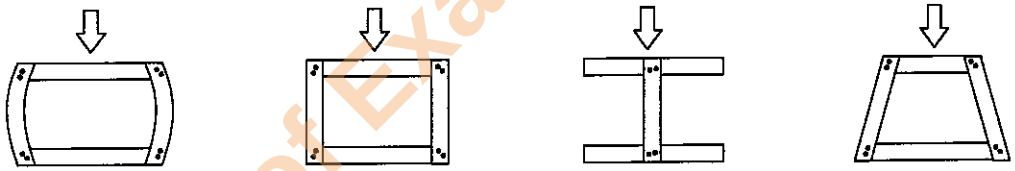
35. The rotating power of the engine goes to the driving wheels through the transmission system. The component or part which can disconnect the rotating power of the engine from the transmission system when needed by the driver is,
(1) the gear lever. (2) the break paddle. (3) the clutch. (4) the differential.

36. The high voltage current flows to the spark plug of a petrol engine when the ignition system's
(1) activating time of the ignition switch key.
(2) closing time of the contact breaking points.
(3) time when the current flows to the primary coil.
(4) opening time of the contact breaking points.

37. The given diagram shows an instrument used by a technician. This instrument specially need to
(1) heavy task of engine repairing.
(2) special task of a plumber.
(3) hold a work piece tightly in absence of a vice.
(4) loosen nuts and bolts which are very difficult to loosen.

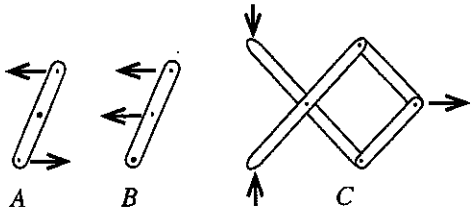


38. The diagrams show several structures proposed by a student to hold a heavy weight. Out of the following which structure is most suitable for holding a heavy weight?



(1) (2) (3) (4)

39. The diagrams show three lever methods. When operating these lever systems they will be worked as follows.
(i) moving direction does **not** change
(ii) moving direction changes by 90°
(iii) moving direction changes
What is the choice that includes, *A*, *B*, *C* lever system in respectively above statements?



A *B* *C*

(1) *A*, *B*, *C* (2) *A*, *C*, *B* (3) *B*, *C*, *A* (4) *C*, *A*, *B*

40. Four tools are given below which are relevant to practical works of the design and technology subject.
A - Tinman's snips B - Centre punch C - Cold chisel D - Twist drill bit
Which choice includes the cutting angles of these tools according to above order?
(1) A - 80°, B - 90°, C - 45°, D - 108° (2) A - 87°, B - 90°, C - 60°, D - 118°
(3) A - 88°, B - 55°, C - 65°, D - 120° (4) A - 89°, B - 48°, C - 80°, D - 128°

* *

[see page six

Department of Examinations, Sri Lanka

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இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

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අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2015 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2015 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2015

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ஆக்கத்திறன் தொழினுட்பவியல் I, II
Design and Technology I, II

Design and Technology II

* *Answer* ***five*** *questions in all, selecting question No.* **1** *and* ***four*** *others.*
* *Question No.* **1** *carries* **20** *marks, and other selected questions carry* **10** *marks each.*

1. Select **one** out of the design briefs A, B and C given below and answer the questions in relation to that.

A - Design and make a gate by using galvanized tubes for an opening of 1 m breadth and 1 m height placed on the school's boundary wall.

B - Design and pave the foot path using bricks or concrete from the school gate to the principal's office for a width of 1 m and 5 m long.

C - Design and make an electric symbolic method to indicate the availability or unavailability of the principal in his office. This circuit should be controlled from the principal's office and indicator should demonstrate at the gate.

(i) Present your solution for the selected Design brief using a diagram/circuit.

(ii) Write **four** Design specification suggested by you for that design.

(iii) Write a list of materials required for your design.

(iv) Write a list of tools and equipment required to make your design.

(v) Prepare a cost estimate for the design.

(vi) If the design brief you have selected is A or B, describe how you construct it, and if it is C, describe how it works.

(vii) Write **two** safety precautions that are to be practised in construction work.

(viii) Explain in brief the importance of using safety wears during the Design process.

(ix) State a damage that could course your design if the school is situated in a coastal area.

(x) State your suggestions to minimize the damage from such effect that indicated as answer to (ix) above.

2. The both load bearing and non load bearing walls are constructed during building construction. Non load bearing walls are specially constructed as partition walls to separate the rooms.

(i) Name a suitable brick bond method to construct non load bearing partition walls.

(ii) Draw a sketch of a front elevation up to **four** courses height of a brick wall you named for (i) above.

(iii) State **two** advantages of using cement blocks instead for the bricks.

(iv) Write the steps of finishing a plastered internal wall of a house.

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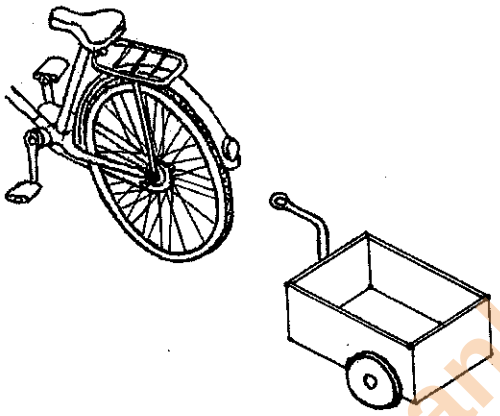
3. A student who designed a little trailer to his bicycle for the transportation of small goods for short distances, has prepared the following specifications before designing a connecting method (hitch) of trailer to the bicycle.



1. It should **not** disconnect when taking to the front or back (reverse).
2. The weight of trailer should **not** come over to the mud guard of the bicycle or to the wheel.
3. The deck of the trailer should be parallel to the ground when towing.

(i) Draw the diagram of a hitch (connecting method) which complies with above specifications.

(ii) State separately a list of materials and a list of tools and equipment required to make your design.

(iii) Write the method of construction process of your design.

(iv) Describe the finishing method to be applied to your hitch system, for it's safety and beauty.

4. The components to be fixed by the customer at the end of electricity supply provided by the electricity supplying authority are indicated as 1, 2 and 3 in the block Figure I.

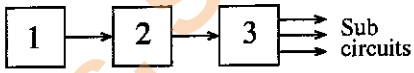


Figure I

(i) Name the components to be fixed in cages 1, 2 and 3 respectively.

(ii) From the above (i) components, which component will be activated during a electric shock / leakage?

(iii) What is the component to be activated initially during over current flowing?

(iv) The given Figure II shows a lamp *L* controlled by the switch *S* and *F* is a socket outlet. Draw a wiring circuit for these appliances. (The specific number of wires should run on the line and wires should connect to the correct terminals of each appliance.)

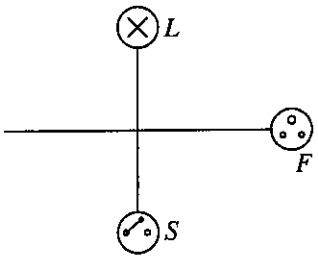


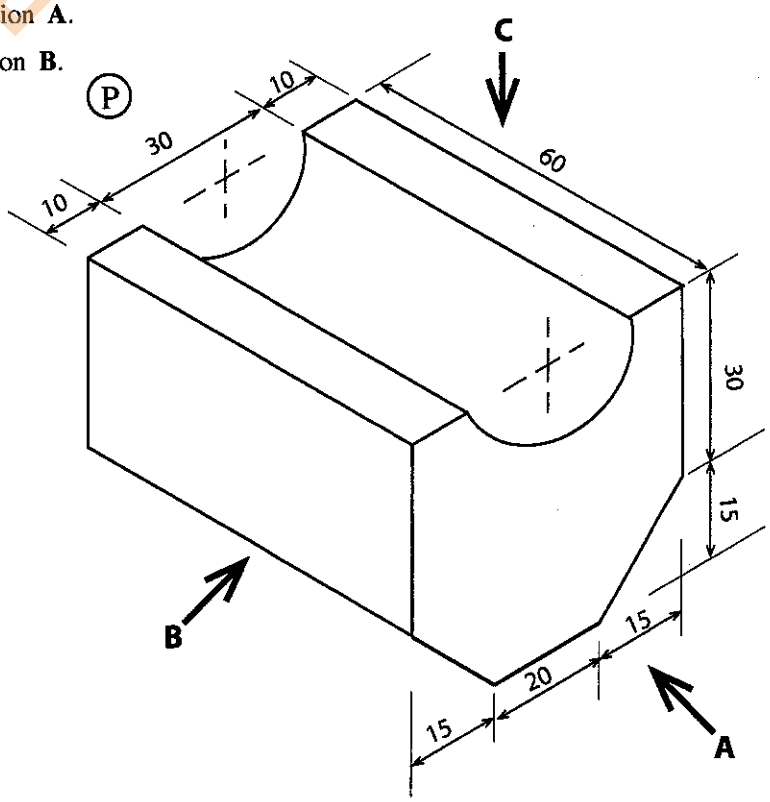
Figure II

5. The diagram (P) is an isometric drawing and measurements are given in millimetres. Draw

(i) the front elevation from the direction **A**.

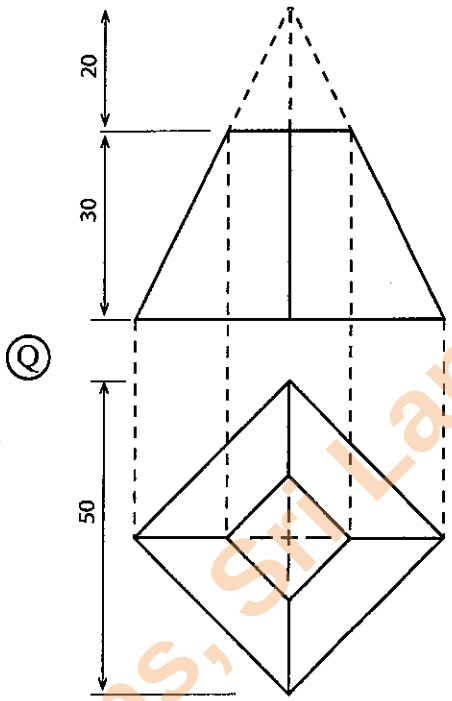
(ii) the side elevation from the direction **B**.

(iii) the plan from the direction **C**.

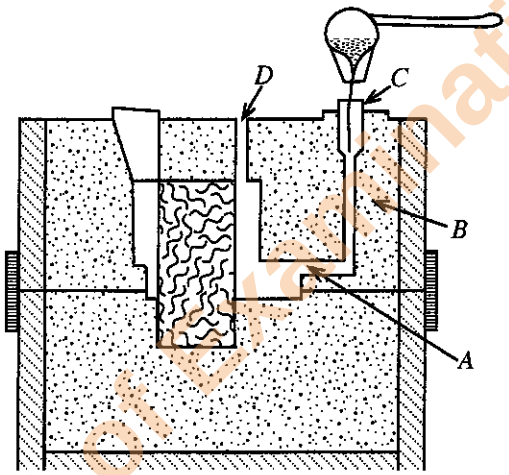


[see page eight

(iv) The figure (Q) shows an aligned front elevation and plan of a pyramid. This has drawn as an initial step to draw a development of a work piece made by thin metal sheet to a shape of a sectioned pyramid. Copy the figure (Q) and draw the development of lower part of sectioned pyramid. (all the measurements given in millimetres)



6.



(i) The above figure shows a mould to be used for producing a product by casting. Name *A*, *B*, *C* and *D*.

(ii) Introduce, what is moulding pattern and write **two** facts/features to be considered during the making of moulding pattern.

(iii) Name **three** clearances which should maintain during the making of moulding pattern.

(iv) Describe how the prepared moulding pattern is completed.

7. Special consideration of safety precautions is an important factor to complete a job successfully. Otherwise accidents and damages may take place.

(i) Name **four** facts which course accidents/damages.

(ii) State **four** rules to be practiced in a work place.

(iii) Describe in brief the safety procedures apply to the tools and equipment.

(iv) Explain in brief, the facts to be followed by a technician in relation to the environmental safety.

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