ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

88 E I, II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2019 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தரப் பரீட்சை, 2019 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2019

නිර්මාණකරණය හා ඉදිකිරීම් තාක්ෂණවේදය **I, II**
வடிவமைப்பும் நிருமாணத் தொழினுட்பவியலும் **I, II**
Design and Construction Technology I, II

06.12.2019 / 0830 - 1140

තුන් පැයයි
மூன்று மணித்தியாலம்
Three hours

අමතර කියවීම් කාලය - මිනිත්තු 10 යි
மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்
Additional Reading Time - 10 minutes

Use **additional reading time** to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Design and Construction 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. Four angles constructed by using only the compass and a simple edge are shown below.


According to these sketches, the value of angles a°, b°, c°, d° respectively are
(1) 30°, 15°, 75°, 130°.
(2) 30°, 15°, 80°, 120°.
(3) 60°, 30°, 75°, 120°.
(4) 60°, 45°, 65°, 150°.

2. The geometrical figure consisting of two focuses is the
(1) circle.
(2) oval shaped circle.
(3) parabola.
(4) ellipse.

3. The four arcuate shapes are named as A, B, C and D. Some statements related to them are shown below.

P – One centre for all arcs.
Q – Arcs have four different centres.
R – Radiuses are equal.
S – Radiuses are not equal.
T – These circular lines are parallel to each other.

Correct statements out of the above are
(1) P, Q and R only.
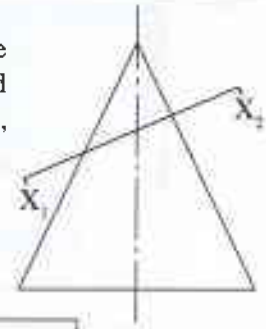(2) P, S and T only.
(3) Q, R and T only.
(4) Q, S and T only.
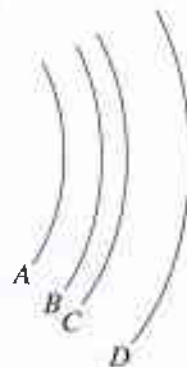
[see page two

4. Two dimensional figure of a cone is shown here. It is intersected by the plane of $X_1 - X_2$ inclined to mid axis. When the upper portion beyond the cutting line is removed, and looked at the three dimensional shape, along the mid axis, the visible top plane view is
   (1) a circle.   (2) an oval shaped circle.
   (3) an ellipse.   (4) a parabola.

5. When this plane figure is inspected, the group of figures shown are
   (1) parallelogram, rhombus, trapezium and square.
   (2) square, parallelogram, triangle and rhombus.
   (3) parallelogram, triangle, trapezium and rhombus.
   (4) square, parallelogram, triangle and trapezium.

6. The length of three sides A, B, C is given in mm separately on the table below. What is the option that includes data, which can construct a triangle according to these data?

	Side A	Side B	Side C
(1)	100	80	40
(2)	120	80	20
(3)	150	70	80
(4)	160	90	50

7. Figure 1 shows a three dimensional shape of a box and its development is shown in figure 2.
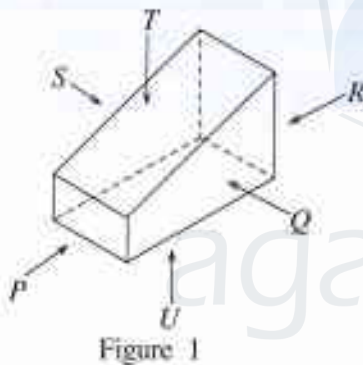

Figure 1   Figure 2
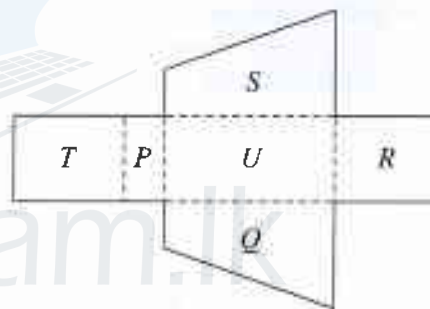
Out of the planes in the development, select the letter that denotes the **unsuitable** plane, out of the planes in the development.

(1) P (2) Q (3) R (4) T

8. What is the **incorrect** statement, out of the following?
   (1) Out of all lines which can connect two points on the same plane, the shortest line is a straight line.
   (2) The sum of the three internal angles of the equilateral, isosceles and scalene triangles are different from each other.
   (3) The angles made between two perpendicularly intersecting lines are right angles.
   (4) Sextant is $\frac{1}{6}$ of the circumference of a circle.
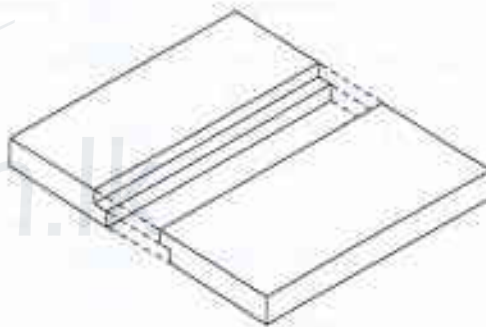
9. The most suitable type of saws to cut a wheel from a wooden plank are
   (1) tenon saw and hand saw.   (2) compass saw and bow saw.
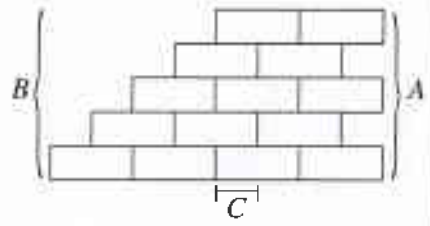   (3) dovetail saw and tenon saw.   (4) handsaw and dovetail saw.

10. The raw materials used in manufacturing plywood are
    (1) saw dust and adhesives.
    (2) small pieces of timber and adhesives.
    (3) veneers sawn methodically and adhesives.
    (4) wood pulp and adhesives.

11. The most accurate tool used to measure the diameter of a hole is
    (1) try square.   (2) inside caliper.
    (3) measuring tape.   (4) outside caliper.

12. The most efficient equipment/tool used to drill a hole on a piece of timber is
    (1) electric hand drilling machine. (2) ratchet brace.
    (3) auger.   (4) hand drilling machine.

13. When screws are named as 1″×8, the length of the nail is considered as 1 inch. No. 8 there represents
    (1) diameter of the head of screw nail.
    (2) height of the screw thread of screw nail.
    (3) diameter of the shank of screw nail.
    (4) size of the countersink of screw nail.

14. What is the type of coating that can be used for both wood and metal surfaces?
    (1) Enamel   (2) Sealer   (3) Varnish   (4) French Polish

15. The most suitable and durable finishing method for a wooden item, which is exposed to sunlight is
    (1) finishing with sealer and wood finish. (2) finishing with water base material.
    (3) finishing with varnish.   (4) finishing with lacquer.

16. Level 7 of the National Vocational Qualification (NVQ Level-7) frame is
    (1) National Level certificate.
    (2) Diploma Level certificate.
    (3) Higher Diploma Level certificate.
    (4) Degree Level certificate.

17. Figure shows a timber joint used to increase the width.
    What is that joint?
    (1) Grooved and tongued joint
    (2) Cross tongued joint
    (3) Rebated joint
    (4) Square edge joint

18. The load imposed on a building by its own roof is
    (1) a live load.   (2) a dead load.
    (3) an environmental load.   (4) a mechanical load.

19. The 'surface tension', of a construction material is a
    (1) chemical property.   (2) physical property.
    (3) thermal property.   (4) mechanical property.

20. Consider the following statements.
    A – Lubrication
    B – Removing the grinding powder
    C – Preventing the corrosion of tools
    D – Preventing the heating of a tool

    Out of the above, the pair of statements which mentions the causes of applying oil to the oilstone and water to the sandstone when sharpening cutting iron of planes and blades of chisel is
    (1) A and B.   (2) A and C.   (3) B and C.   (4) B and D.

21. Out of the following, what is the most suitable apparatus, to draw a line parallel to an edge of a planed and prepared piece of timber?
    (1) Try square   (2) Steel ruler   (3) Marking gauge   (4) Scriber

[see page four

22. The chemical 'Creosote' is used
    (1) for timber preservation.
    (2) for curing of concrete.
    (3) to resist the corrosion of steel members.
    (4) to control the setting time of cement.

23. In a machine, turning the parts easily, smooth performance and efficiency happen as a result of
    (1) seasoning.   (2) lubricating.   (3) preservating.   (4) finishing.

24. Tools are divided into two main categories based on the method of using. These two categories are
    (1) cutting tools and drilling tools.   (2) tamping tools and construction tools.
    (3) finishing tools and sharpening tools.   (4) hand tools and power tools.

25. The storey pole is used to
    (1) measure the length and the thickness of a brick wall.
    (2) arrange the bricks of a course in a straight row.
    (3) check the horizontality and verticality of a brick wall.
    (4) check the height of brick courses.

26. Out of the following, the chemical property of various materials used in construction is
    (1) melting point.   (2) specific heat.
    (3) electric resistance.   (4) viscosity.

27. The ability to elongate and bend a material without breaking it is
    (1) fusibility.   (2) plasticity.   (3) ductility.   (4) elasticity.

28. The dimensions of a stretcher face of a brick, manufactured in accordance with Sri Lanka standard specification is
    (1) 215 mm × 65 mm.   (2) 220 mm × 65 mm.
    (3) 225 mm × 75 mm.   (4) 230 mm × 75 mm.

29. The figure shows a front elevation of a brick wall constructed in stretcher bond. Select the correct option that gives the terminology used for A, B and C in that order.
    (1) toothing, raking back and lap
    (2) toothing, raking back and bed joint
    (3) raking back, toothing and bed joint
    (4) raking back, toothing and lap

30. Select the correct statement with reference to English bond.
    (1) Uses for load bearing walls.
    (2) Minimum width of the wall is equal to ½ brick.
    (3) The wall thickness may be increased by ¾ of bricks.
    (4) Lap of the bond is ½ brick.

31. Select the answer which bears the correct material ratio of mass concrete without reinforcement.
    (1) 1:1:2   (2) 1: $1\frac{1}{2}$:3   (3) 1:3:6   (4) 1:2:4

32. What is the main objective of concrete compaction?
    (1) Forming porosity of concrete
    (2) Increasing tensile strength of concrete
    (3) Expediting setting time of concrete
    (4) Removing air trapped inside the concrete

[see page five

33. The ratio of a certain concrete mix is stated as 1:2:4 (12). What is meant by (12) there?
    (1) Diameter of the reinforcement bar
    (2) The size of the coarse aggregate
    (3) The compressive strength
    (4) The volume of water

34. Consider the following statements.
    A – grading of aggregates
    B – correct mixing ratio
    C – water - cement ratio
    D – Curing the concrete mix
    Out of the above statements, what statements include the factors affecting the quality of a concrete?
    (1) A, B and C   (2) A, B and D   (3) A, C and D   (4) B, C and D

35. To prevent the errosion of soil bunds and edges, a rough rubble masonry walls type covered with a wire mesh is used. The name of this type is
    (1) Gabion retaining wall.
    (2) random rubble coursed masonry.
    (3) random rubble uncoursed masonry.
    (4) ashlar rubble masonry.

36. 'Water hammer' phenomenon takes place in a pipe system, because of using
    (1) a bend.
    (2) an elbow bend.
    (3) a reducing elbow bond.
    (4) a joining socket.

37. When Galvanized Iron pipes are joined with accessories to prevent the liquid leaking through the threads, the material used to wrap around it is known as
    (1) thread seal tapes.
    (2) coconut fibre.
    (3) polythene strips.
    (4) twine.

38. A ϕ 20 mm water tap has to be installed to the temporary stop of the PVC pipe as shown in the figure. The necessary material required are
    (1) reducing socket, faucet socket, solvent cement and water tap.
    (2) thread seal tape, reducing socket, solvent cement and water tap.
    (3) faucet socket, thread seal tape, solvent cement and water tap.
    (4) faucet socket, solvent cement, el-bow and water tap.

    Brick wall →
    Temporary stop (ϕ 20 mm)
    ← PVC pipe
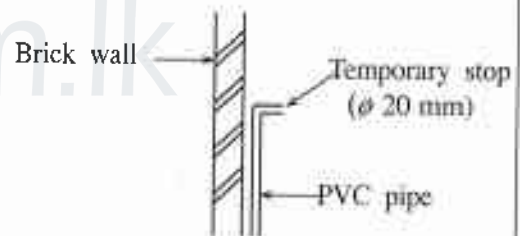
39. What is the solvent used to dissolve emulsion paint in finishing work?
    (1) Thinner
    (2) Turpentine
    (3) Water
    (4) Kerosene oil

40. Consider the following statements.
    A – Closing the small pores on the surface
    B – Controlling the absorption of secondary coat
    C – Creating a colourful appearance in the wall paint
    D – Controlling the abrasions on the wall caused with contacts
    E – Facilitating drying
    Select the statements that mention the basic objectives of applying primary coat before applying paint in finishing work of construction members.
    (1) A and B
    (2) B and C
    (3) C and D
    (4) D and E

✳ ✳

- 6 -

ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග
இலங்கைப் பரீட்சைத் திணைக்களம் **88** **E** **I, II**
Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2019 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2019 டிசெம்பர
General Certificate of Education (Ord. Level) Examination, December 2019

නිර්මාණකරණය හා ඉදිකිරීම් තාක්ෂණවේදය **I, II**
வடிவமைப்பும் நிருமாணத் தொழினுட்பவியலும் **I, II**
Design and Construction Technology **I, II**

Design and Construction Technology II

* Answer *five* questions selecting the *first* question and *four* others.
* Question No.1 carries **20** marks and each of the other questions carry **10** marks each.

1. (i) Following figure shows an isometric view of an object.
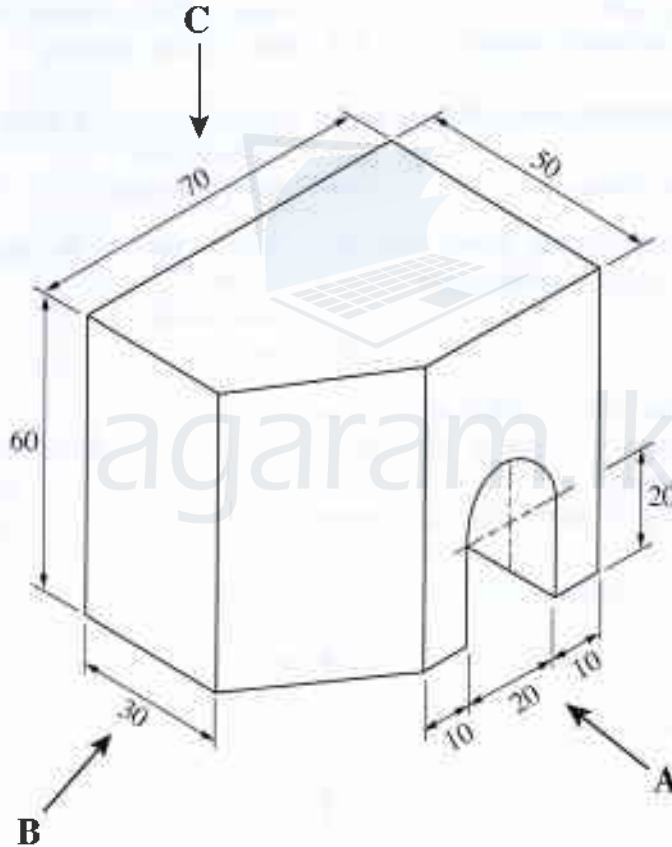
(All dimensions are in millimetres.)

Draw the following views of above isometric drawing according to third angle projection.

Front elevation, seen through direction arrow **A**

Side elevation, seen through direction of arrow **B**

Plan, seen through direction of arrow **C**

Used scale should be 1:1.

(ii) Draw **two** circles with 25 mm radius of each with 100 mm distance between two centers and draw the common external tangent.

2. When finishing a certain product, the finishing method should be decided based on the material used for construction.

   (i) Name **four** finishing methods that can be used for timber designs.

   (ii) Smoothing is necessary in the process of finishing a timber product. Explain **three** factors that should be considered during smoothing.

   (iii) How does the preservation of a product take place due to the finishing? Explain with **three** examples.

3. The efficiency of a tool is diminuated when the tool is not sharpened.

   (i) What is the shape of the file used when a handsaw is sharpened?

   (ii) State the space that should exist between cutting iron of plain and back iron of plain in planing of soft wood and hard wood.

   (iii) State the **four** steps of sharpening a handsaw in order.

4. (i) Three pairs of water pipe accessories are given below. Explain the difference between accessories of each pair.

   (a) Bend and L-bow

   (b) Joining socket and Reducing socket

   (c) Faucet socket and valve socket

   (ii) Name **four** tools / equipment used to finish a water supply system of a house and describe their uses briefly.

5. Brick walls and reinforced concrete are mostly used in building construction.

   (i) Name a suitable type of brick bond for external walls.

   (ii) Draw separately the plan views of first and second course of 90° wall corner with two brick length of each side in the type of brick bond named in (i) above.

   (iii) A cross-section of a Lintel is given below. Copy the figure to the answer script and mark compressive zone, tensile zone and neutral axis.
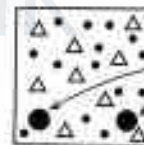
6. 'Personal safety' is essential in the construction process.

   (i) What is the safety advice that can be seen at first by a person who enters a construction site?

   (ii) Name **five** safety wear which should be worn by craftsmen who work at a wall construction site.

   (iii) Describe **two** precautions that should be taken for the safety of students who walk about close to a construction site at school premises.

7. It has been decided to pave 11 m long, 3 m wide road with 225 × 110 × 60 mm paving blocks.

   (i) How many paving blocks are required for this task?

   (ii) Number of labour hours required to pave and finish a 1 m² of road and their payments are shown below.

   - one trained craftsman (block paver)   –   1 hour

     payment per hour for one person   –   Rs. 250/-

   - two helpers   –   1 hour

     payment per hour for one person   –   Rs. 200/-

   Calculate the total payment that should be made to craftsmen and helpers to finish the above task.

✵ ✵ ✵