

NEW

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இலங்கைப் பரீட்சைத் திணைக்களம்

Department of Examinations, Sri Lanka

88**E****I, II**

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2016 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2016 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2016

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

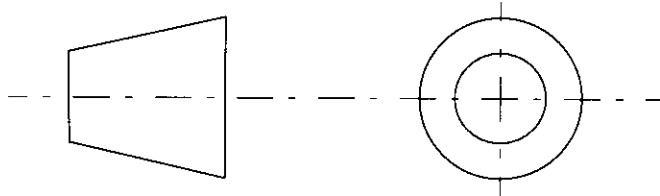
පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

Design and Construction Technology I**Note :**

- Answer **all** questions.
- 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**.
- Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.**
- Further instructions are given on the back of the answer sheet. Follow them carefully.

- The correct angle and the tool used to sharpen the snips shall be
(1) 118° and wheel carborundum stone. (2) 87° and wheel carborundum stone.
(3) 60° and carborundum stone. (4) 20° and oil stone.
- The shape of the cutting plane obtained when a cone cuts inclined to its vertical axis is
(1) parabola. (2) hyperbola. (3) circle. (4) ellipse.
- What is the option that gives, in correct order, the ratios between length & width and length & height of a standard engineering brick with mortar joints?
(1) 3:1 and 2:1 (2) 2:1 and 3:1 (3) 2:1 and 3:2 (4) 3:2 and 2:1
- In Engineering drawing activities grade 2H Pencils are used for
(1) thin lines and to print letters. (2) boundary / limits and edge lines.
(3) dotted and Hidden lines. (4) guide lines and layout diagrams.

5.



The above projection symbol is used to identify the

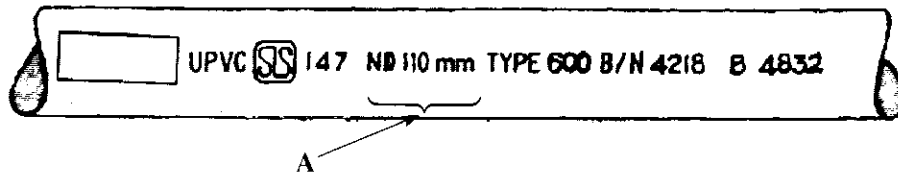
- (1) First angle projection. (2) Third angle projection.
(3) Isometric projection. (4) Three dimensional projection.
- An accessory used to control the flow of water automatically in water distribution systems is
(1) Stop Valve. (2) Gate Valve.
(3) Bib tap. (4) Ball Valve.
- Out of the following, what is the metal which is **not** used in manufacturing drill bits used in power tools?
(1) High speed steel. (2) Tungsten Carbide.
(3) Brass. (4) Mild Steel.
- The tool used to check the horizontality and verticality of a brick wall is
(1) Gauge rod. (2) Try square. (3) Spirit level. (4) Straightedge.

9. The minimum thickness of a brick wall constructed in English bond is
 (1) $\frac{1}{2}$ Brick. (2) 1 Brick. (3) $1\frac{1}{2}$ Brick. (4) 2 Brick.
10. The name of the joint, which is used to increase the width of planks, where edges of one plank are formed with a groove and the edge of the other with a tongue to suit it, is known as
 (1) Tongued and grooved joint. (2) Cross tongued joint.
 (3) Rebated joint. (4) Simple butt joint.
11. In Aluminum related fabrications, a method which is **not** used to assemble Aluminum members together is using
 (1) Riveting nails. (2) Screw nails.
 (3) Brackets. (4) Adhesives.
12. 'Terra Cotta' members which are used for floor paving in buildings are manufactured from
 (1) burnt ceramic. (2) terrazzo chips.
 (3) clay. (4) ground granite.
13. The second floor of a building consists of a reinforced cement concrete slab (RCC Slab) that is used as an assembly hall with a large stage and 200 seats. Only in a function all seats are occupied by visitors. What is the correct option which includes only the dead loads?
 (1) Seats, stage, Constructed walls. (2) Visitors, stage, concrete slab.
 (3) Concrete slab, stage, constructed walls. (4) Seats, constructed walls, visitors.
14. Out of the following, what is the fitting, which is used to lock the windows?
 (1) Window rings. (2) Hinges.
 (3) Hasp and staple. (4) Bolts.
15. In what kind of a situation is the standard type of line shown below, is used in plan drawing?
 — — — — —
 (1) To show visible edges of an object. (2) To draw constructional lines.
 (3) To show hidden lines. (4) To show broken surfaces.
16. Some cracks were found on a concrete slab of a building, after 28 days of casting. The reason for this could be
 (1) concrete not compacted properly.
 (2) reinforcements were not used to standard specification.
 (3) concrete not properly cured.
 (4) aggregates were not properly graded.
17. Out of the following, what is the **false** statement on 'Placing the Concrete' ?
 (1) The concrete should be placed at the relevant place before exceeding the initial setting time of cement from the time of adding water to concrete mix.
 (2) The height of placing the concrete should not exceed 1.5 m at one time.
 (3) The concrete should be laid in small layers of 250 mm thick.
 (4) The medium temperature of concrete should not exceed 70°C.
18. What is the tool used to draw two lines at a required distance, parallel to an edge of planed surface of a timber piece ?
 (1) Bevel gauge. (2) Marking gauge.
 (3) Mortice gauge. (4) Try Square.
19. For finishing work on walls of buildings, plastering is used very extensively. What is the option that mentions, in correct order, the steps followed in plastering walls?
 (1) Forming spots and connecting ledges, filling the spaces in between the ledges, chopping the mortar with straightedge, levelling with the wood float.
 (2) Filling the spaces in between ledges, Forming spots and connecting ledges, chopping the mortar with straightedge, Levelling with the wood float.
 (3) Forming spots and connecting ledges, filling the spaces in between the ledges, Levelling with the wood float, chopping the mortar with straightedge.
 (4) Forming the spots and connecting ledges, chopping the mortar with straightedge, Filling the spaces in between the ledges, Levelling with the wood float.

20. A type of paint that is **not** used to polish timber surfaces is
 (1) Enamel paint. (2) French Polish. (3) Wax. (4) Varnish.
21. Out of the plumbing accessories given, which one is used to connect two pipes with unequal diameters in a water supply system?



22. Which type of hinges are most suitable to hang very wide doors and gates ?
 (1) Butt hinges. (2) Back flap hinges.
 (3) Parliament hinges. (4) Tee hinges.
23. The following figure shows the information printed on a PVC pipe.

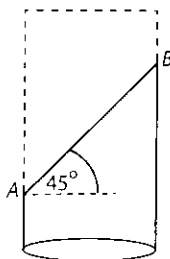


What information of pipe is indicated by A ?

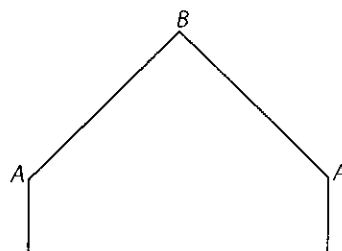
- (1) Bearing pressure. (2) Manufactured Batch Number.
 (3) Nominal External Diameter. (4) SLS Number.
24. Out of the following, what is the option that includes only the 'over heads' in preparation of estimates in construction?
 (1) Electricity bill, Water bill, Transport Cost
 (2) Labour cost, Rent, Insurance fee
 (3) transport cost, Security services, Insurance fee
 (4) Wastages of tools and equipment, Rent , Insurance fee
25. The term used to identify the external curvature of an arch, constructed in bricks is
 (1) Abutment. (2) Extrados. (3) Intrados. (4) Outer header course.
26. The nature of a defect resulting from removing the outer bark of cut logs of timber before the proper time is shown in the figure. Identify the defect
 (1) Heart shake.
 (2) Ring shake.
 (3) Cup shake.
 (4) Star shake.



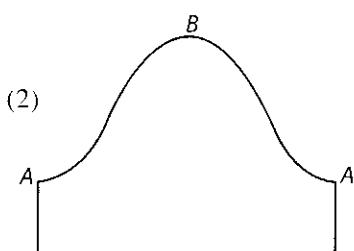
27. Which option indicates correctly, the shape of the development of a bottomless cylinder that has been cut along A-B plane?



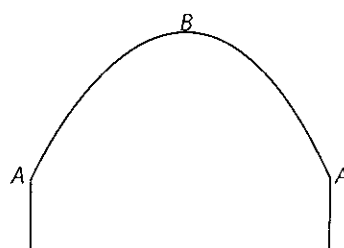
(1)



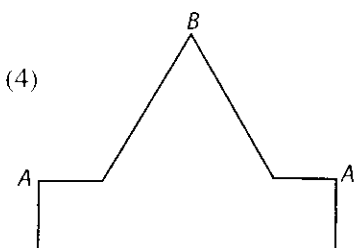
(2)



(3)



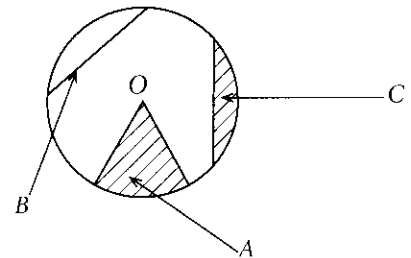
(4)



28. What level of a related profession is suitable for an individual who has completed NVQ Level 4?
 (1) Supervisors. (2) Managers.
 (3) Planners. (4) Craftsmen who can work independently.
29. After identifying a weakness of a construction activity done by a student, the first step that he should follow is to
 (1) redraw the plans and work diagrams.
 (2) readjust the specifications to suit the design.
 (3) analyze the causes for the failure.
 (4) analyze the required information to eliminate the defect.
30. In constructing a rubble wall, one fact that should be followed to maintain the strength is to
 (1) lay the wider side of the rubble on to the ground and construct.
 (2) construct every course to equal heights.
 (3) use dressed rough stones.
 (4) lay wider and longer mortar joints.

31. In the circle where 'O' is the centre, A, B and C indicated on the diagram are

- (1) chord, sector and segment respectively.
 (2) segment, chord and sector respectively.
 (3) sector, chord and segment respectively.
 (4) sector, diameter and segment respectively.



32. What is the true length of a wall indicate as 42 mm length on a building plan drawn to the scale of 1:100 ?
 (1) 0.42 m. (2) 4.2 m. (3) 10 m. (4) 42 m.
33. 'Compression', a mechanical property of a building material means
 (1) the tension the building material is subjected to when a force is applied.
 (2) a crack building material is subjected to where an external force is applied.
 (3) a pressure building material is subjected to when a force is applied on the surface.
 (4) ability to convert building material to liquid when they are subjected to heat.
34. Out of the following hand tools and equipment used in construction, what is the tool / equipment that is **not** used to check the accuracy?
 (1) Trysquare (2) Spirit level (3) Auger (4) Level tube
35. What is the standard mixture ratio used to cast concrete structures like columns, beams, slabs and lintels?
 (1) 1 : 3 : 6 (40) (2) 1 : $1\frac{1}{2}$: 3 (25) (3) 1 : 2 : 4 (20) (4) 1 : 3 : 6 (20)
36. What type of pipes are embedded in ground to carry water in water supply systems?
 (1) UPVC (2) CPVC (3) GPVC (4) Alkathene.
37. In a practical exercise a group of students had to fix a Bip tap to the centre of PVC pipe system. What is the correct PVC accessory that they selected?
 (1) Reducing Tee Socket. (2) Equal Tee Socket.
 (3) Faucet Tee Socket. (4) Faucet Socket.
38. What is the standard equipment that the workmen should use to measure cement and aggregate to prepare mortar and concrete in a work site?
 (1) Gauge box. (2) Mortar Pan. (3) Bucket. (4) Shovel.
39. The Pitch of a timber log is located
 (1) outside the Heartwood. (2) inside the Heartwood.
 (3) outside the Sapwood. (4) between the sap and Heartwood.
40. Slaked lime is manufactured by
 (1) adding water to quick lime powder.
 (2) burning limestone in an open area.
 (3) adding cement powder to quick lime powder.
 (4) mixing quick lime powder, Sand with water and filtered by a gunny bag.

නව නිර්දේශය/புதிய பாடத்திட்டம் / New Syllabus

NEW

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இலங்கைப் பரீட்சைத் திணைக்களம்

Department of Examinations, Sri Lanka

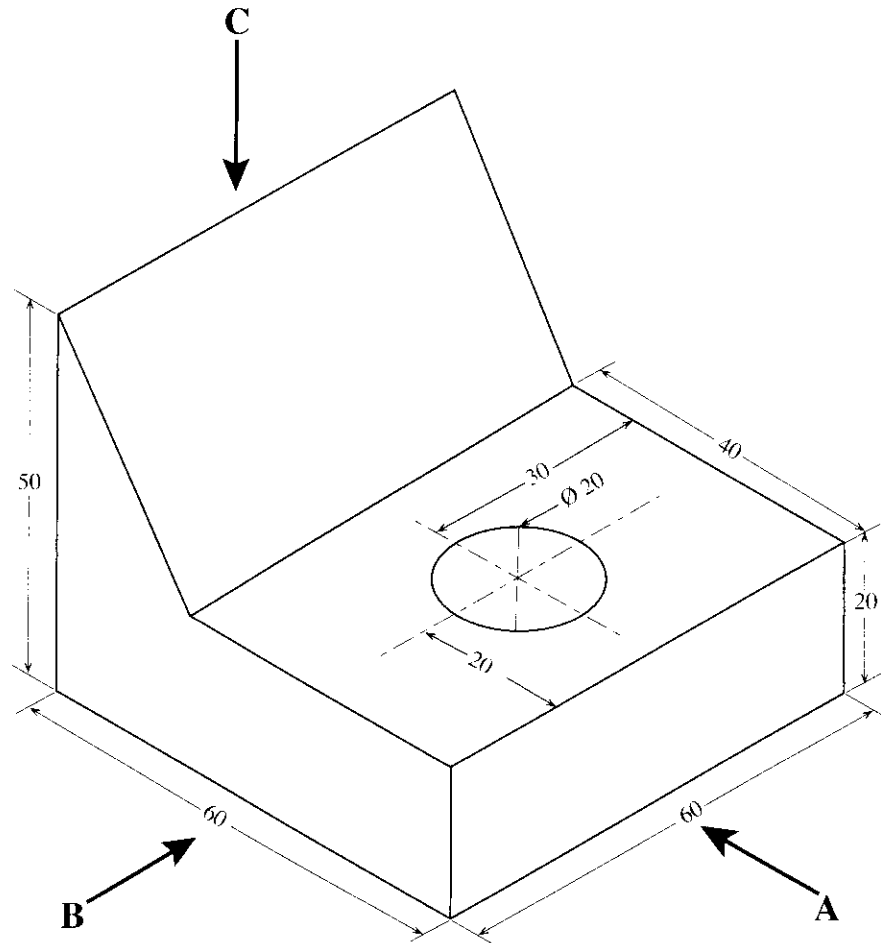
88**E****I, II**

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2016 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2016 டிசம்பர்
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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 only selecting question No. 1 and **four** others.
- * question No. 1 carries **20** marks and **each** of the other questions carries **10** marks.

1. (i) An isometric view of an object is given below.



(All dimensions are in millimetres.)

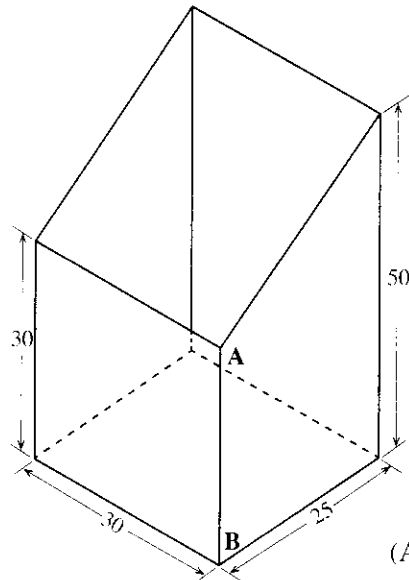
Observing the principles of Orthographic projection, draw the following views to the scale 1:1 in third angle projection, according to the isometric figure above.

Front Elevation looking from the direction of arrow A.

Side Elevation, looking from the direction of arrow B.

Plan, looking from the direction of arrow C.

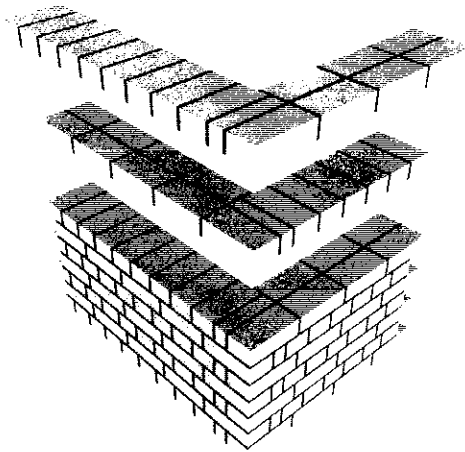
- (ii) Figure shows a part of a square shaped pipe made out of thin sheets with right angled corners, whose apex is cut at an angle.



(All dimensions are in millimetres.)

Split it along A-B to the scale of 1 : 1 and draw the surface development of the above.

2. Figure given below shows a brick bonding, used frequently in construction of walls in a residence.



- (i) (a) Name the above brick bonding.
- (b) What is the reason for preventing falling the vertical joints in line on two adjacent courses?
- (c) What is the strategy used to prevent falling the vertical joints in line on two adjacent courses?
- (ii) (a) State the mortar mix and the ratio, that should be used in construction of durable and strong brick walls.
- (b) State the steps in order, that should be followed in hand mixing of mortar to construct a wall.
- (iii) When a certain wall is to be plastered and the spots are formed, it was found that the thickness of the plaster at the bottom is 12mm and that of top is 15 mm. State the reason for this.

3. Various types of timber is frequently used in construction industry for different requirements.
- List **four** natural properties in timber logs.
 - State the **four** steps of planing the timber planks obtained after conversion of timber and write a short description on any **two** of them.
 - Timber is seasoned to prevent losses caused due to the lapse of dampness irregularly. State **two** main methods of seasoning timber.
 - State **two** benefits in seasoning of timber.
4. (i) In installing a water supply system, different types of accessories have to be used. Name a suitable fixing accessory necessary for each of the following situations in a PVC water supply system.
- Change the direction in 90° of smooth flow of water.
 - In obtaining water from a well or any other source keeping the water column in the suction line.
- (ii) In installing a water supply system, different tools and equipment have to be used. Name the most suitable tools or equipment for the following activities.
- Cutting the PVC pipes.
 - Removing the residues and smoothing the ends of the cut pieces.
- (iii) State a strategy used to prevent the leaks, for each of the following situations.
- Joining a PVC socket to a PVC pipe.
 - Fixing a tap to a faucet socket.
5. (i) Plain concrete is used for concrete beds, paving slabs and to level column bases. Mention **three** properties of Plain concrete.
- (ii) Mention the steps of the process used in preparation of a reinforced concrete drain cover.
- (iii) To determine the workability of concrete, on site,
- Name the test that can be performed
 - What are the equipment necessary?
 - Describe the related steps used in the testing process.
6. (i) Name **four** tools and equipment used for sharpening the equipment used for cutting and paring.
- (ii) Write **four** advantages of lubricating machine parts.
- (iii) State **four** factors that affect accidents in construction industry.
- (iv) Four Sign Boards displayed 'On Personal Safety' in construction sites are shown in the figure below. State the locations where they are to be displayed and write suitable sentences for each them.



A



B

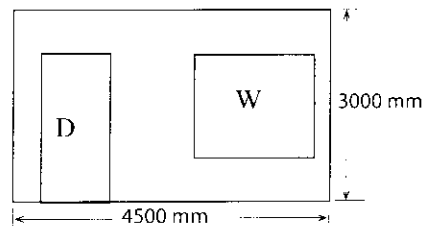


C



D

7. The rough sketch given below shows a front wall of a building. Answer the questions, using the sketch and given data below.



* 900×2100 mm Door opening and 1200×1200 mm Window opening is located on it.

* Mortar ratio of Plaster - 1:3 ct. : sand

Thickness - 12 mm

Finish - semi rough

* The material cost of plaster per 1 m^2 - Rs. 175.00

* Time factor / 1 m^2

for Mason - $1 \frac{1}{4}$ hours

for Helper - $2 \frac{1}{2}$ hours

* Wages / Hour

for Mason - Rs. 200.00

for Helper - Rs. 150.00

* Wastage of Mortar - 5%

* Overheads - 30%

Calculate:

- (1) Expenditure for Plaster Mortar.
- (2) Expenditure for wages.
- (3) Total expenditure to plaster the entire wall.

* * *