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88 E I, II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2021(2022)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2021(2022)
General Certificate of Education (Ord. Level) Examination, 2021(2022)

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

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

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

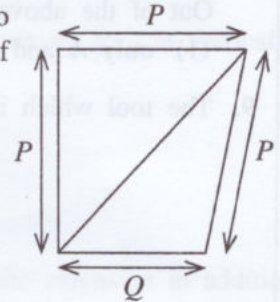
Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Design and Construction Technology I

Instructions:

- * Answer all questions.
- * In each of the questions 1 to 40, pick one of the alternatives (1), (2), (3), (4) which is 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.

1. Two triangles also are shown due to the diagonal which connect two vertices of the quadrilateral shown in the figure. What are the types of those triangles according to the data shown on the figure?

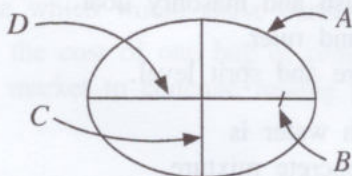


- (1) An isosceles triangle and scalene triangle.
- (2) Two isosceles triangles.
- (3) An equilateral triangle and an isosceles triangle.
- (4) Two scalene triangles.

2. It is needed to enwrap and paste 10 plys of strings around an empty can which is 140 mm in diameter to make an ornamental product. The total length of the string required for this purpose is
- (1) 440 mm.
 - (2) 2200 mm.
 - (3) 4200 mm.
 - (4) 4400 mm.

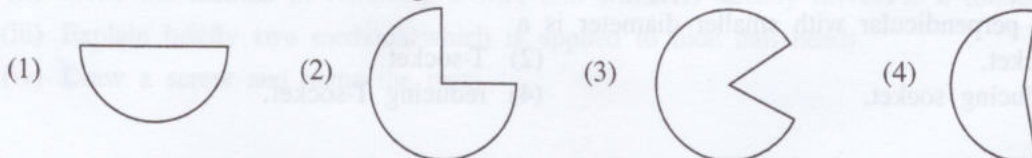
3. Value of an internal angle of a regular polygon is 108° . Accordingly, this polygon is a
- (1) rectangle.
 - (2) pentagon.
 - (3) hexagon.
 - (4) heptagon.

4. A diagram of an ellipse is shown below. What is the choice that A, B, C and D parts in the diagram are respectively and correctly indicated?



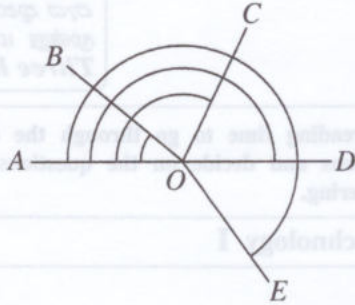
- (1) Locus, Focus, Minor axis, Major axis
- (2) Focus, Locus, Major axis, Minor axis
- (3) Minor axis, Major axis, Focus, Locus
- (4) Major axis, Minor axis, Locus, Focus

5. In order to make an artistic creation, a quadrant of a circle was cut and removed. What is the figure which remains after cutting?



6. What is the set of geometrical tools used to divide a line of 8 cm length into 5 equal parts?
- (1) Two set squares, protractor and ruler
 - (2) Two set squares, pencil and divider
 - (3) Protractor, pencil and divider
 - (4) Two set squares, protractor and pencil

7. Select the straight angle of following figure.



- (1) $\hat{A}OB$
- (2) $\hat{A}OC$
- (3) $\hat{A}OD$
- (4) $\hat{A}OE$

8. Consider the following statements.

A – All triangles have three sides and three angles. The sum of the angles is 360° .

B – All the items with a center hole or without a center hole can be developed.

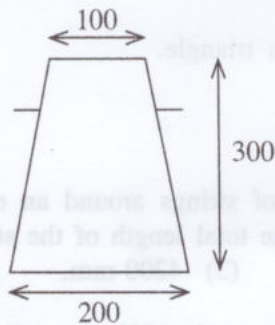
C – A point which is moving with a fixed length around a point creates a circle.

D – To draw an isometric figure of a given item, length, width and the height of that item are basically needed.

Out of the above, correct statements are

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

9. The tool which is essential to carry out the test using equipment given in following figure is



- (1) Claw hammer.
- (2) Mallet.
- (3) 16 mm steel rod.
- (4) level tube.

10. The essential tool kit for external plastering of a brick wall is

- (1) masonry trowel, straight edge, plumb bob, masonry float and ruler.
- (2) masonry trowel, spirit level, plumb bob, coir brush and masonry float.
- (3) masonry trowel, spirit level, square, coir brush and ruler.
- (4) masonry trowel, straight edge, plumb bob, square and spirit level.

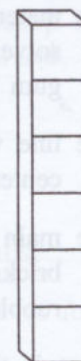
11. The mixture obtained by mixing fine aggregates with water is

- (1) mortar mixture.
- (2) concrete mixture.
- (3) plaster mixture.
- (4) wet sand mixture.

12. The component required for a PVC pipe extension at an intermediate point of a PVC water supply line, in perpendicular with smaller diameter is a

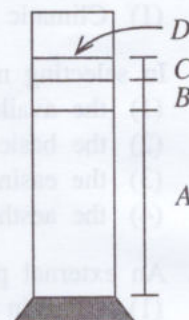
- (1) socket.
- (2) T-socket.
- (3) reducing socket.
- (4) reducing T-socket.

13. The figure below shows a tool used for the construction of brick walls. What is the correct statement regarding this figure?



- (1) A straight edge used to align bricks
- (2) A straight edge used to level bricks
- (3) A marking gauge used to check the height of brick courses
- (4) A marking gauge used to check the verticality of a brick wall

14. The figure below shows a measuring jar test carried out to measure the impurities of sand. What is the correct statement of materials positioned at A, B, C, D at the end of the test?



Choice	A	B	C	D
(1)	water	sand	sediment	floating impurities
(2)	sand	water	sediment	floating impurities
(3)	sand	sediment	water	floating impurities
(4)	sediment	sand	water	floating impurities

15. It is required to fix a bib tap at end of a PVC pipe line. For that, the part to be fixed at the end of the pipe line is
- (1) joining socket.
 - (2) faucet socket.
 - (3) valve socket.
 - (4) reducing socket.
16. What is the correct statement regarding semi burnt (Dambu) bricks?
- (1) Well burnt bricks
 - (2) Over burnt bricks
 - (3) Less burnt bricks
 - (4) The clay bricks used without burning
17. Commonly, mixed lime and sand mortar mixtures are stacked for a day or two before use. It can be seen that the external surface of the mortar stack is harden when starting to use it. What is the reason for this?
- (1) Calcium hydroxide of the lime mortar has turned into calcium oxide.
 - (2) Calcium hydroxide of the lime mortar has turned into calcium carbonate.
 - (3) Calcium oxide of the lime mortar has turned into calcium hydroxide.
 - (4) Calcium carbonate of the lime mortar has turned into calcium hydroxide.
18. The minimum width of a brick wall constructed using English bond method is
- (1) $\frac{1}{4}$ of a brick.
 - (2) $\frac{1}{2}$ of a brick.
 - (3) 1 brick.
 - (4) 2 bricks.
19. What is the correct statement regarding concrete compaction?
- (1) Excess water will be removed during the compaction.
 - (2) Inner air bubbles will be removed during the compaction.
 - (3) The heat emitting from cement will be controlled during the compaction.
 - (4) The concrete will be cured during the compaction.
20. Below A, B, C and D groups show building materials.
- A – clay, sand, cement
 B – cement, sand, stones
 C – cement, lime, clay
 D – cement, lime, sand
- Among the above what is the group which is consisted only with binding materials?
- (1) A
 - (2) B
 - (3) C
 - (4) D

21. The material which is used to stop leaking water in fixing a water tap is
 (1) solvent cement. (2) thread seal.
 (3) gum tape. (4) adhesives.
22. The line which is marked firstly when setting out a building on the ground is
 (1) center line. (2) external line. (3) internal line. (4) base line.
23. The main material to be used to build a random rubble masonry wall is
 (1) bricks. (2) cement hollow blocks.
 (3) rubble. (4) laterite.
24. What is the name of the type of loads such as wind load, rain load and flood load which are impacted on a building other than live or dead loads?
 (1) Climatic load (2) Temporary load (3) External load (4) Dead load
25. In selecting materials for constructions, the main factor should be considered is
 (1) the availability of those materials.
 (2) the basic properties of those materials.
 (3) the easing for usage.
 (4) the aesthetic qualities of those materials.
26. An external property of a monocotyledon tree is
 (1) the vein of leaves looks like a net.
 (2) expanding branches from the main stem.
 (3) leaves are widen or compound leaves.
 (4) leaves are narrow and lengthy.
27. Which is the institute to purchase National Competency Standards for a person who wants to apply National Vocational Qualifications (NVQ) through Recognition of Prior Learning (RPL)?
 (1) National Apprenticeship and Industrial Training Authority (NAITA)
 (2) Vocational Training Authority (VTA)
 (3) Tertiary and Vocational Education Commission (TVEC)
 (4) University of Vocational Technology (UNIVOTEC)
28. Consider the following statements.
 * Removing the excess weights of timber.
 * Increasing the strength appropriately.
 * Increasing the workability.
 * Increasing the durability.
- Above characteristics will be developed during the process of
 (1) sawing the timber. (2) planing the timber.
 (3) seasoning the timber. (4) polishing the timber.
29. In sharpening a blade of plane or a blade of chisel, the angle of the bevel to be maintained in between
 (1) 15° – 20° . (2) 20° – 25° . (3) 25° – 30° . (4) 30° – 35° .
30. In sharpening a saw, already worn away flat file is brushed several times on teeth of the saw from the start to the end. This process is called as, the teeth of saw
 (1) topping. (2) franking. (3) shaping. (4) sharpening.
31. When sharpening a drill bit by using a hand operated grinder, the grinder was not functioning smoothly. The action to be taken to fix it up is
 (1) dismantled the machine in to pieces and clean.
 (2) wipe and clean the machine.
 (3) submit to the producer and repair.
 (4) lubricate the machine.

32. The main reason to use shadow board to store the tools and equipment at a workshop is
 (1) in order to make easy the identification of tools and equipment by on the quivive.
 (2) in order to maintain the aesthetic value of the workshop.
 (3) in order to avoid the misplacing tools, equipment and their safety.
 (4) in order to store the additional tools and equipment securely.
33. The suitable nails to fix glass to a window casement is
 (1) Panel pins. (2) Gimp nails. (3) Tintex. (4) Hook nails.
34. Tools and equipment are classified based on the method of their use. Which couple of following statements illustrate such classification?
 A – Hand tools and equipment
 B – Power tools and equipment
 C – Cutting/shaping tools and equipment
 D – Holding/bearing tools and equipment
 (1) A and B (2) A and C (3) B and C (4) B and D
35. 'Overhead cost' when calculating the selling price of timber product is
 (1) expenditures related to product transportation cost.
 (2) expenditures related to purchasing trees for timber.
 (3) 25% total expenditures as additional expenditures.
 (4) expenditures related to rental of buildings, taxes, electricity and insurances etc.
36. How many square meters of timber is included in 6 pieces of timber of each length is 3 m, width 250 mm and thickness 20 mm?
 (1) 0.09 (2) 2.43 (3) 4.50 (4) 4.86
37. Which of the following tools is cutting by scraping?
 (1) Chisel (2) Planer (3) Saw (4) Brace bits
38. Which is the appropriate finishing method for a toy made out of timber?
 (1) Finishing by applying French polish (2) Water based finishing
 (3) Finishing by applying enamel paints (4) Finishing by using lac
39. Following four figures are shown the angle for setting a ladder to reach a higher level. Which is the figure shows the correct angle?
- (1)

(2)

(3)

(4)
40. The purpose of producing roofing sheets with corrugates is
 (1) strengthening. (2) adding aesthetic value.
 (3) to flow the water easily. (4) to maintain the temperature.

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வடிவமைப்பும் நிருமாணத் தொழினுட்பவியலும் I, II
Design and Construction Technology I, II

Design and Construction Technology II

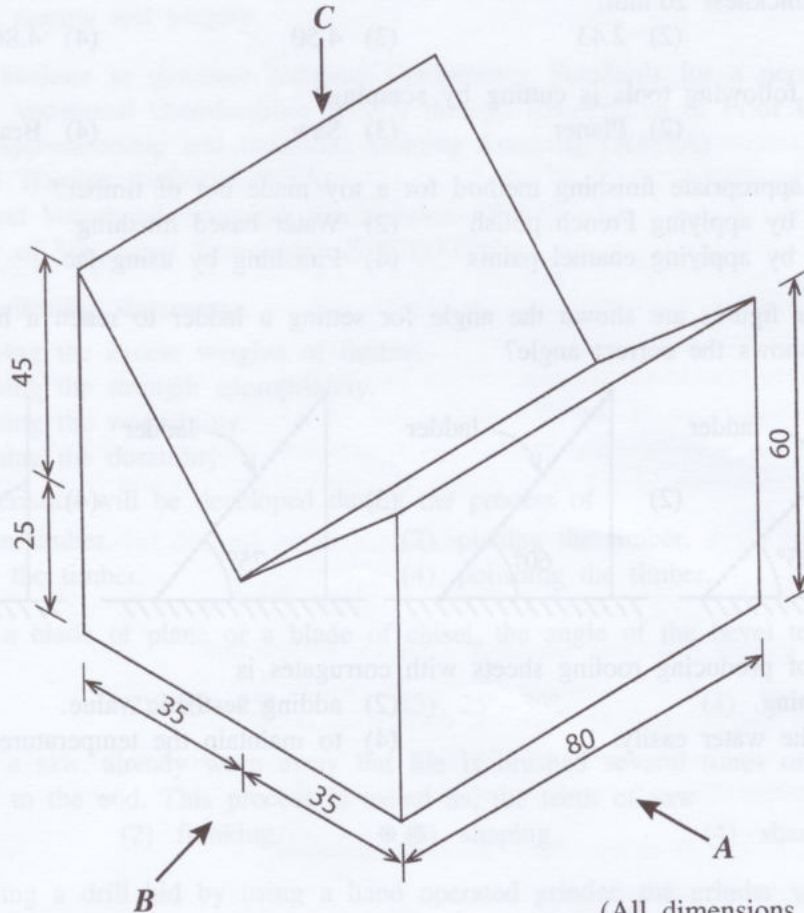
* Answer **five** questions including the **first** question and **four** other selected questions.

* Question No.1 carries **20** marks and each of the other selected questions carry **10** marks each.

1. (i) According to the isometric figure given below, draw

- (1) Front elevation seen through direction **A**,
- (2) Side elevation seen through direction **B**,
- (3) Plan seen through direction **C**,

Using third angle orthographic projection principles to full scale as per the given dimensions.
(Given drawing is not to scale)

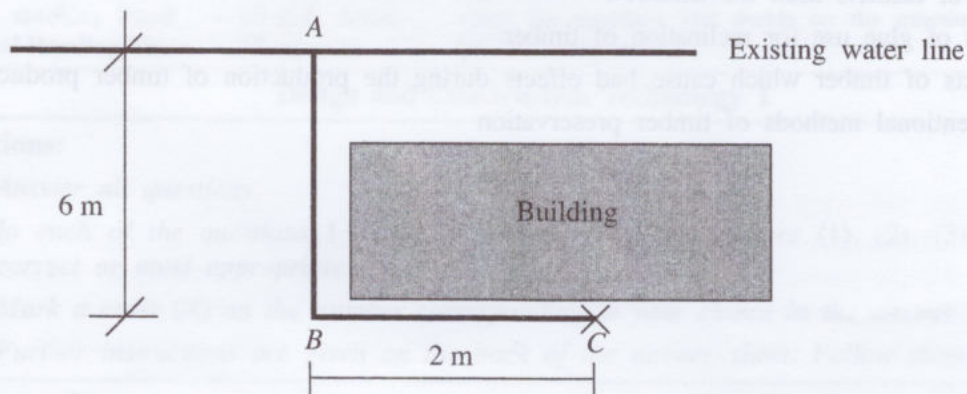


(All dimensions are in millimeters)

(ii) Below dimensions are given for the construction of a triangle.

Length of one side 90 mm, length of another side 50 mm and the length of the third side 60 mm. Construct the triangle.

2. Correct mixing of concrete, placing, compaction and curing are affecting the quality of concrete.
- State in order, the main steps of mixing a small quantity of concrete by hand.
 - It was seen that the surface of concrete is crannied and stones are protuberant or honeycombed surface when removing the formwork after a few days of placing the concrete. State **two** reasons which could cause this situation.
 - Height to the opened edge of a 2 m high concrete column form the ground is 2 m. Briefly explain with reasons the method should be followed of placing concrete of the column.
3. The plan of a PVC pipe extension laid in costal area is shown below.



A, B and C is the pipe extension. The new supply pipe fixed at 'C' and run up to 1 m vertically on the external wall surface. A bib tap to be fixed at the top edge.

- Diameter of the existing pipe is 50 mm
 - Diameter of the pipe AB is 32 mm
 - Diameter of the pipe BC is 20 mm
 - Diameter of the pipe which runs vertically at 'C' is 12 mm
- Prepare a list of components and number of component required for the extension in addition to the PVC pipes required.
 - State **four** factors which would be considered as disadvantages or obstacles if use galvanized pipes instead of PVC pipes.
4. Number of 50 kg cement bags required to mix 1 m^3 of concrete is 28.
 Cost of 1 cement bag 50 kg is Rs. 2350/=
- The cost of transporting 28 cement bags to the mixing place is 2% of the cost of cement.
 Rs. 20/= should be paid per bag of cement for loading and unloading.
- The waste which would cause during transportation is 1% of the cost of cement.
- Calculate the cost of one bag of cement to the nearest rupee including storage and transportation from the market to concrete mixing place.
5. Nails are used in assembling timber products.
- Write **two** procedures that could apply to avoid cracks on timber when driving wire nails.
 - Write the method of removing a wire nail which is already driven to a timber piece.
 - Explain briefly **two** methods which is applied to hide nail heads.
 - Draw a screw and name the parts.

6. Emergency accidents would occur when working on any task. It is important to commemorate "Safety first" when work with tools and equipment in a workshop.
- Write **four** factors which cause accidents.
 - Explain the meaning of behavioural safety.
 - What are the procedures to be applied for the safety of tools and equipment during work?
 - Write **four** factors which need to be considered for the safety when working with power tools.
7. Write short notes for **two** topics below with diagrams appropriately.
- Type of fasteners used for windows
 - Types of glue use for reclination of timber
 - Defects of timber which cause bad effects during the production of timber product
 - Conventional methods of timber preservation
