

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
 இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்
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අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2026
 கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2026
 General Certificate of Education (Adv. Level) Examination, 2026

ඉංජිනේරු තාක්ෂණවේදය
 பொறியியற் தொழினுட்பவியல்
Engineering Technology

65 E I

පැය දෙකයි
 இரண்டு மணித்தியாலம்
Two hours

Instructions:

- * Answer all questions.
- * Consider the gravitational acceleration as 10 m s^{-2} .
- * Write your **Index Number** in the space provided in the answer sheet.
- * Instructions are given on the back of the answer sheet. Follow them carefully.
- * In each of the questions 1 to 50, pick one of the alternatives from (1), (2), (3), (4), (5) which is **correct** or **most appropriate** and **mark your response on the answer sheet with a cross (X)** in accordance with the instructions given on the back of the answer sheet.
- * Each question carries **01** mark totalling to **50**.
- * Use of **non-programmable** calculators is allowed.

1. On an engineering drawing, showing dimensions in millimetres, the diameter of a rod is shown

as $\phi 11.3^{+0.35}_{-0.25}$. The maximum diameter that can be present in this rod is

- (1) 11.05 mm. (2) 11.30 mm. (3) 11.40 mm. (4) 11.65 mm. (5) 11.90 mm.

2. Which is **not** a personality skill of an entrepreneur?

- (1) Creativity (2) capability of identifying business opportunities
 (3) Organising capability (4) Risk management capability
 (5) Innovativeness

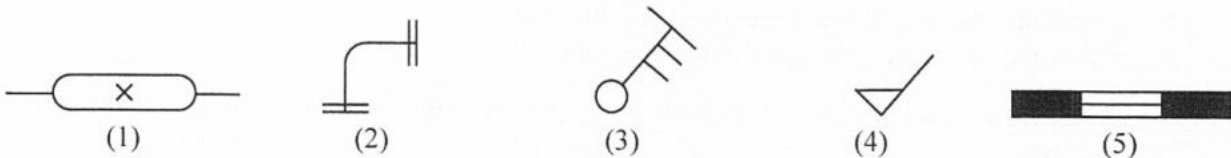
3. Consider the following statements.

- A - Usage of Artificial Intelligence (AI) is a turning point in technology.
 B - There is a relationship between commercialisation and technology.
 C - Technology creates a positive influence on local industries.

Out of the above statements, the correct statement/statements is/are

- (1) A only. (2) B only. (3) A and C only.
 (4) B and C only. (5) A, B and C all.

4. Which one of the following is **not** a standard symbol used in engineering drawing?



5. Consider the following statements regarding equipment being used in engineering drawing.

- A - The 'T' ruler is used to construct vertical lines.
 B - Using the pair of set squares, 30° , 60° , 90° and 135° angles can be drawn.
 C - According to the standard, '2B' pencils are used to draw centre lines.

Out of the above statements, the correct statement/statements is/are

- (1) A only. (2) B only. (3) C only.
 (4) B and C only. (5) A, B and C all.

6. Consider the following statements.

- A - When taken as a mathematical expression, hazards are the product of risk and possibility of its occurrence.
- B - Identification, estimation and control of hazard must be done for hazard management.
- C - Work postures influence ergonomic hazards.

Out of the above statements, the correct statement/statements is/are

- (1) A only.
- (2) B only.
- (3) A and C only.
- (4) B and C only.
- (5) A, B and C all.

7. Out of the following statements, which one is the **incorrect** statement?

- (1) The price of its associated substitute products influences the demand for a product.
- (2) Fuel can be considered as a complementary good/material for vehicles.
- (3) The supply of a product is influenced by the price of its inputs.
- (4) The price of a primary product and the demand of its alternatives is inversely proportional.
- (5) The price of a product is determined by the relationship between its demand and supply.

8. What is the **incorrect** statement regarding the financial statements of a business?

- (1) The gross profit can be calculated by the sales account.
- (2) The net profit can be calculated by the profit and loss account.
- (3) Net profit is the difference between the income by selling goods and services and the total cost.
- (4) The sales cost is the expenditure to convert the raw material into finished goods.
- (5) Institutional and administrative costs need to be presented in the profit and loss account of a business.

9. A factor that determines the grade of concrete is

- (1) correct water/cement ratio.
- (2) the water content in the concrete.
- (3) the method of laying concrete.
- (4) the type of compactor being used.
- (5) the curing time of concrete.

10. What is the main function of purlins of a roof?

- (1) Providing intermediate support to rafters.
- (2) Securing the roof covering.
- (3) Directing the loads of the roof on to the walls.
- (4) Increasing the height of the roof.
- (5) Being a strong alternative for struts.

11. A main factor that should be considered when deciding the slope of a roof is

- (1) distributing the loads appropriately to the walls.
- (2) providing an aesthetic finish.
- (3) minimising the influence of the environmental conditions.
- (4) minimising the raw material required for the walls.
- (5) minimising the water absorption into the roof.

12. What is the most suitable machine to push a big pile of earth for a short distance and flatten it?

- (1) Bulldozer
- (2) Grader
- (3) Crane
- (4) Excavator
- (5) Dumper

13. What is the chemical that is often used to disinfect drinking water?

- (1) Aluminium Sulphate (Alum)
- (2) Chlorine
- (3) Sodium Hydroxide
- (4) Calcium Carbonate
- (5) Potassium Permanganate

14. What is the process that allows suspended solids in water to descend under gravity in waste water purification?
- (1) Aeration (2) Disinfection (3) Sedimentation
(4) Filtration (5) Coagulation
15. What ions mainly contribute towards hardness of the water in water supply systems?
- (1) Sodium and Potassium (2) Chloride and Sulphate
(3) Calcium and Magnesium (4) Nitrate and Nitrite
(5) Hydrogen and Hydroxide
16. The compulsory component/factor associated with the waste water drainage system that is considered when approving a building to be constructed in a local government limit with a public drainage system is the
- (1) manhole. (2) angle of the connecting pipe.
(3) diameter of the connecting pipe. (4) connecting L junction.
(5) connecting T junction.
17. A main factor that needs to be considered regarding human comfort, when selecting a finishing for a building is the
- (1) water proofing. (2) condition of the external surface.
(3) condition of the footing. (4) heat insulation.
(5) openings for maintenance.
18. The amount of earth that has a soil shrinkage capacity of 12%, required for an earth fill of 1,000 m³ is
- (1) 833 m³. (2) 880 m³. (3) 893 m³. (4) 1,120 m³. (5) 1,136 m³.
- Use the table which includes readings that have been collected during a leveling process to provide answers to questions 19 and 20.

Level Station	Back Sight Reading	Intermediate Sight Reading	Fore Sight Reading	Rise	Fall	Reduced Level	Remarks
01	1.43					100.00	A
02	0.87		2.43				B
03		1.48					C
04		1.52					D
05			0.40				E

19. The reduced level of C is
- (1) 98.39 m. (2) 98.52 m. (3) 101.43 m. (4) 101.48 m. (5) 101.61 m.
20. During the construction process, place E needs to be cut or filled so that it is at the same level with A. For this place E must be
- (1) 0.40 m cut. (2) 0.53 m fill.
(3) 0.60 m cut. (4) 1.04 m fill.
(5) 1.60 m cut.
21. Following shows a few readings taken during a measuring process to determine the height of a tree using a theodolite.
- The angle of elevation to the top of the tree – 30°
 - The height of the theodolite – 1.5 m
 - The horizontal distance between the theodolite and the tree – 10 m
- Here, the theodolite and the tree are in the same horizontal plane.
(Take $\sin 30^\circ = 0.50$, $\cos 30^\circ = 0.87$ and $\tan 30^\circ = 0.58$)
- The height of this tree is
- (1) 5.0 m. (2) 5.8 m. (3) 6.5 m. (4) 7.3 m. (5) 10.2 m.

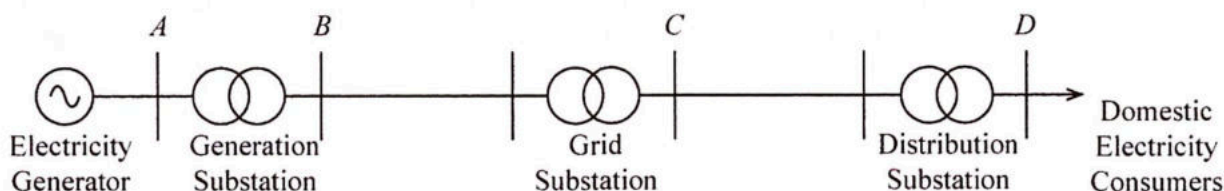
22. Consider the following statements associated with chain surveying.

- A - The land is divided into triangles and quadrilateral.
- B - The offset method is used to obtain measurements of land features.
- C - The tie measurements are used to investigate the accuracy of the readings.

Out of the above statements, the correct statement/statements is/are

- (1) A only.
- (2) B only.
- (3) A and B only.
- (4) B and C only.
- (5) A, B and C all.

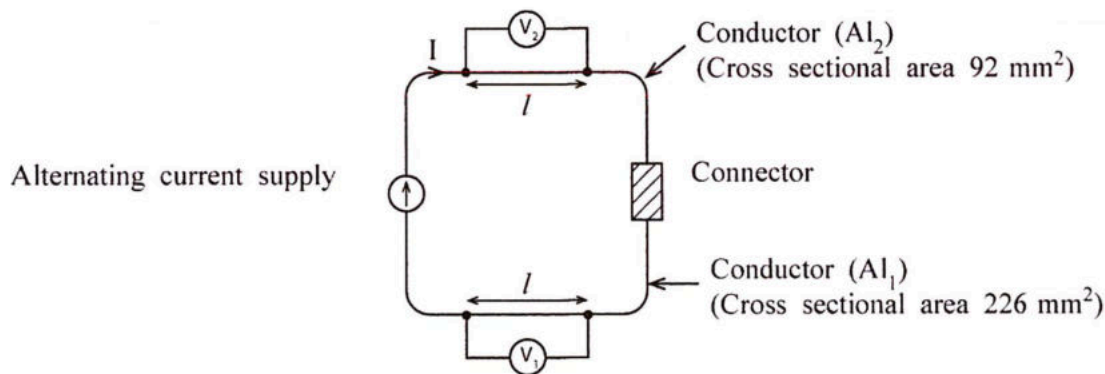
23. A simple representation of an electrical power grid is shown in the figure below.



As per the standard voltages used in Sri Lanka, the voltages at A, B, C and D places in the diagram, respectively, are

- (1) 15 kV, 220 kV, 33 kV, 0.4 kV.
- (2) 15 kV, 220 kV, 0.4 kV, 0.23 kV.
- (3) 33 kV, 132 kV, 11 kV, 0.4 kV.
- (4) 220 kV, 33 kV, 15 kV, 0.23 kV.
- (5) 15 kV, 220 kV, 132 kV, 0.4 kV.

24. An experimental setup that can be used to calculate the resistance offered by two Aluminium conductors (Al_1 , Al_2) with different cross sectional areas for alternating current is shown in the figure below.



V_1 and V_2 voltmeters have been connected to measure the voltages across equal lengths of the Al_1 and Al_2 conductors. The alternating current supply provides I current to the circuit. Thermocouples have been used to measure the temperature of each conductor.

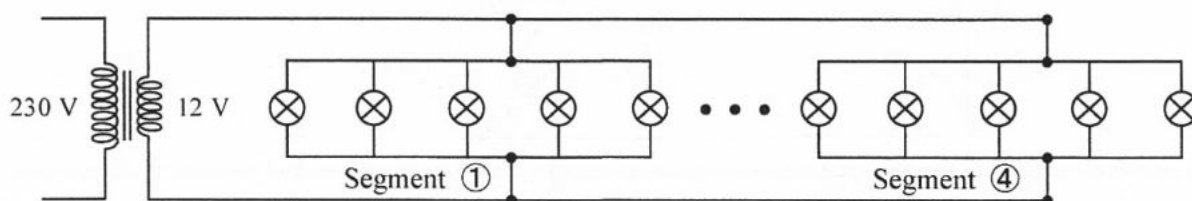
Consider the following statements regarding this experiment.

- A - Readings of V_1 and V_2 voltmeters are equal.
- B - Resistance of Al_1 is less than the resistance of Al_2 .
- C - Temperature of Al_2 is greater than the temperature of Al_1 .

Out of the above statements, the correct statement/statements is/are

- (1) B only.
- (2) A and B only.
- (3) A and C only.
- (4) B and C only.
- (5) A, B and C all.

25. A electric lamps decoration with 20 bulbs (12 V, 6 W) are connected across a 230/12 V alternating current step down transformer as four parallel segments as shown in the figure below.



Five electric lamps are connected parallelly in each segment. Consider the statements given below regarding this circuit.

- A - All electric lamp light up in the same brightness.
- B - There is no impact on other electric lamps even if one electric lamp deactivates.
- C - 10 A current passes through 12 V winding of the step down transformer.

Out of the above statements, the correct statement/statements is/are

- (1) A only.
- (2) C only.
- (3) A and B only.
- (4) A and C only.
- (5) A, B and C all.

26. The active power and reactive power supplied by three phase transmission conductors of a three phase electric power system at a certain time are 240 MW and 5.3 MVar respectively. If the voltage between two phases of the transmission conductors is 220 kV at this time, the approximate line current in one transmission conductor is,

- (1) 14 A.
- (2) 24 A.
- (3) 364 A.
- (4) 630 A.
- (5) 1091 A.

27. A 2 kW single phase induction motor pump used in a house was used to supply water to a cultivated land. It was observed that this pump heavily heats up when it was placed near the well at the cultivated land and was operated by connecting to the domestic electricity supply. Statements noted as reasons for this observation by a student is shown below.

- A - The increase of the inductive resistance proportionality to the distance between the motor and the domestic electric supply.
- B - Along with the exposure to the environment, the insulation resistance increases and due to it electric current decreases.
- C - Along with the increase of the length of the supply wire, the resultant electric resistance increases and reducing the voltage supplied to the motor.

Out of the above statements, the correct statement/statements is/are

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

28. A direct current shunt motor is connected to a load using a belt drive. What could happen if the load disconnects suddenly?

- (1) Motor speed will heavily increase and get destroyed.
- (2) Motor will completely stop suddenly.
- (3) Motor speed will gradually decrease and the rotational direction will reverse.
- (4) Motor speed will slightly increase and then will come to a constant speed.
- (5) Armature current of the motor will heavily increase and the windings will get burned.

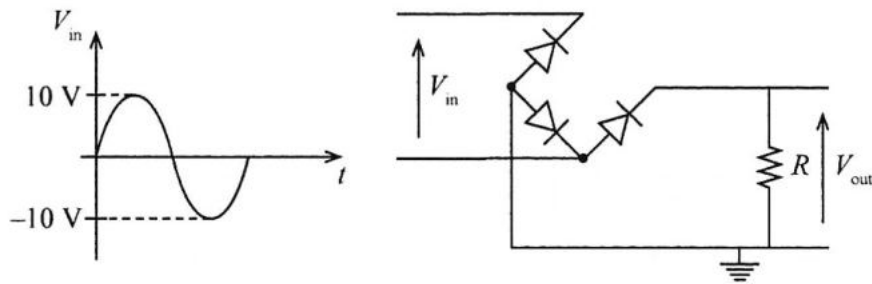
29. Earth terminal of a 13 A electric plug is produced with more length and cross sectional area than the other two terminals. Consider the statements given below regarding this.

- A - To avoid earth terminal getting connected to other terminals
- B - To connect first and disconnect last
- C - To allow connection of other terminals by removing the protective shutter of the socket outlet

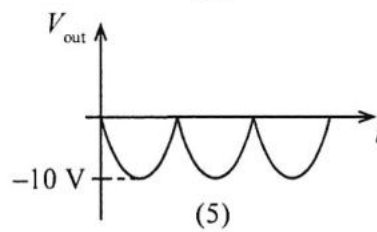
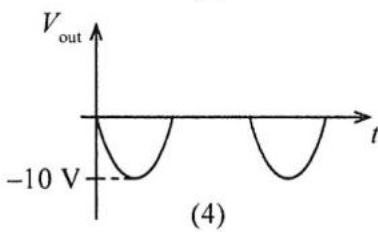
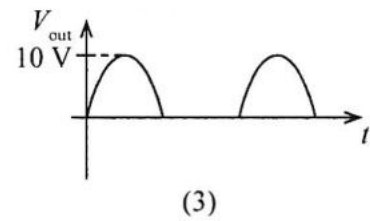
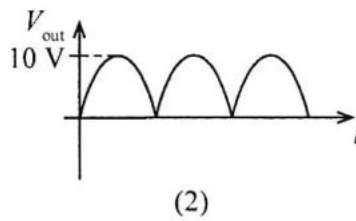
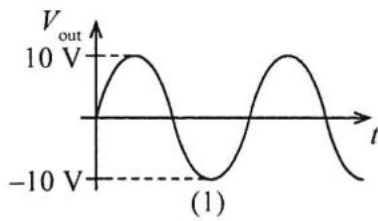
Out of the above statements, the correct statement/statements is/are

- (1) A only.
- (2) B only.
- (3) A and C only.
- (4) B and C only.
- (5) A, B and C all.

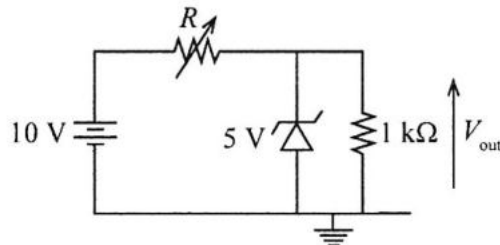
30. Consider the following input signal (V_{in}) and the circuit with ideal diodes.



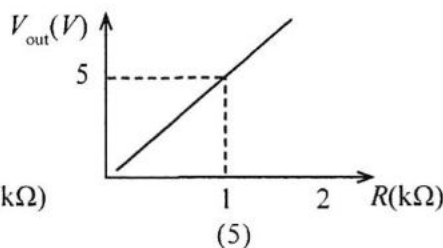
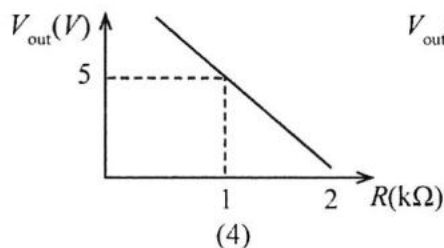
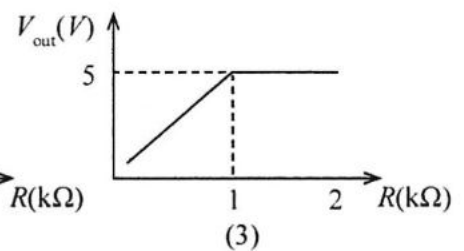
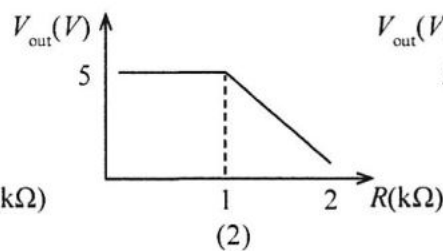
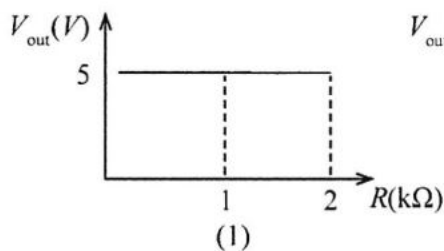
Which figure shows its output signal (V_{out}) in the above instance?



31. Consider the circuit with a Zener diode shown in the figure.



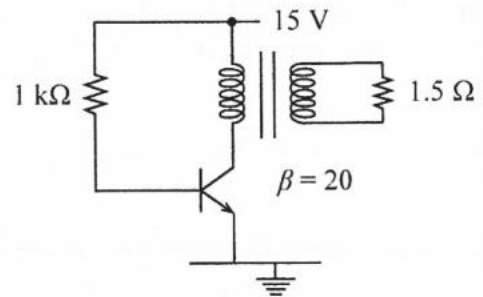
Here, what is the graph which shows the relationship between voltage V_{out} and resistance R ?



[See page seven]

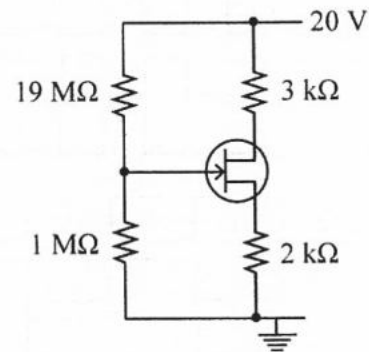
32. A transistor amplifier circuit with an ideal transformer is shown in the figure. At the Q point of the transistor, base current (I_{BQ}), collector current (I_{CQ}) and voltage across collector and emitter (V_{CEQ}), respectively, are

- (1) 14.3 mA, 286 mA, 0.2 V.
- (2) 14.3 mA, 286 mA, 7.5 V.
- (3) 14.3 mA, 286 mA, 15 V.
- (4) 15 mA, 300 mA, 7.5 V.
- (5) 15 mA, 300 mA, 15 V.

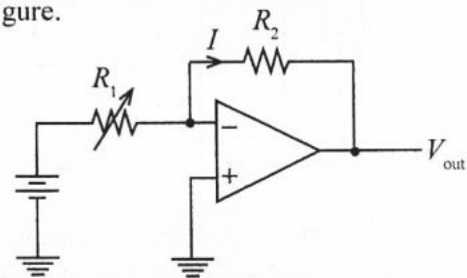


33. The circuit shows a Junction Field Effect Transistor (JFET) used as an amplifier. If voltage across gate and source $V_{GS} = -2$ V, drain current (I_D) and voltage across drain and source (V_{DS}), respectively, are

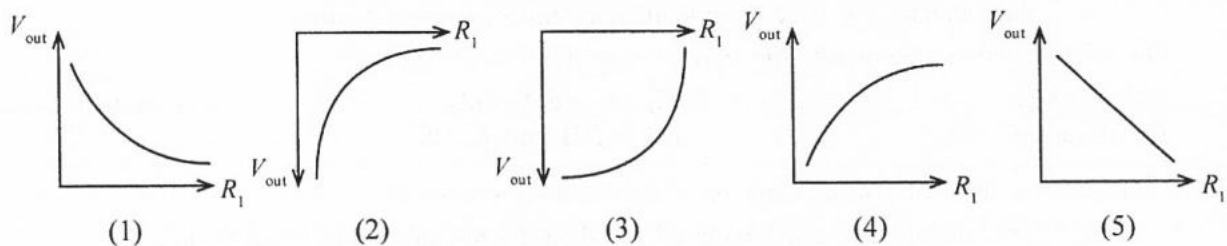
- (1) 1 mA, 12.5 V.
- (2) 1 mA, 15 V.
- (3) 1.5 mA, 12.5 V.
- (4) 4 mA, 0 V.
- (5) 4 mA, 12.5 V.



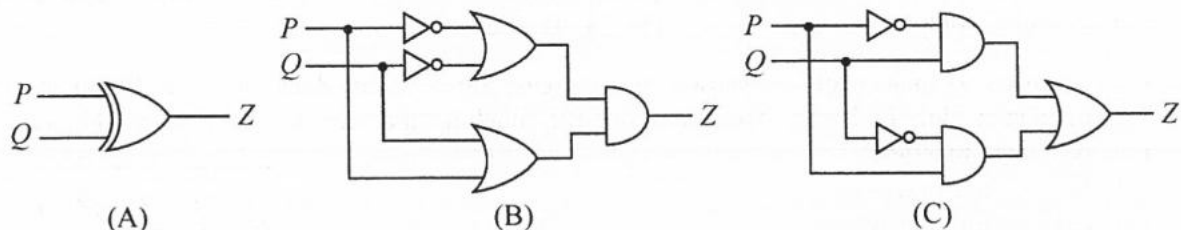
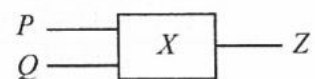
34. Consider the operational amplifier circuit shown in the figure.



What is the graph which shows the relationship between voltage V_{out} and resistance R_1 correctly?



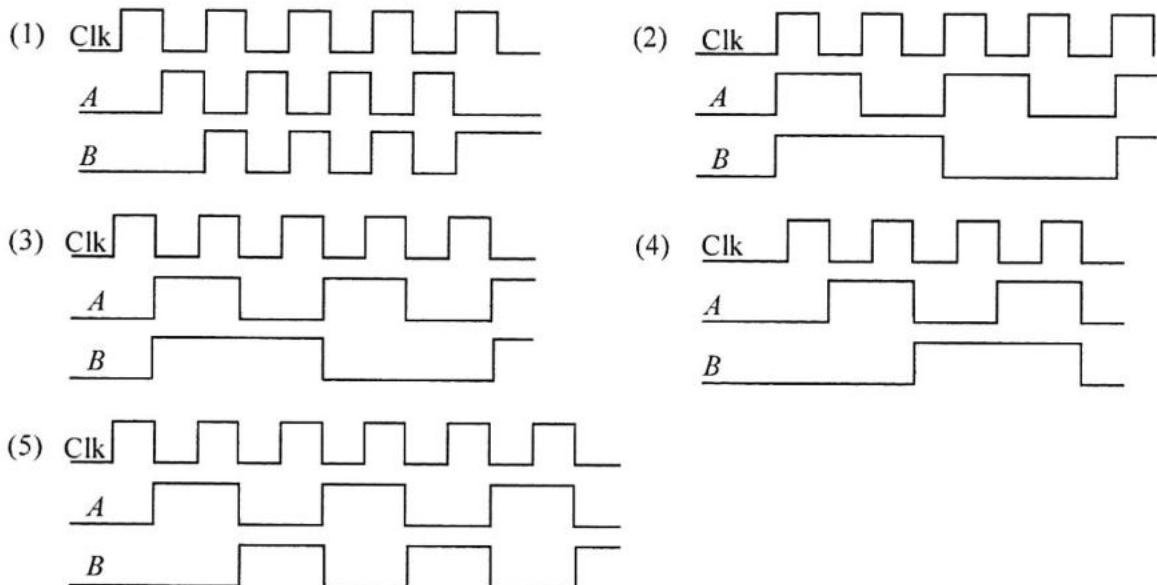
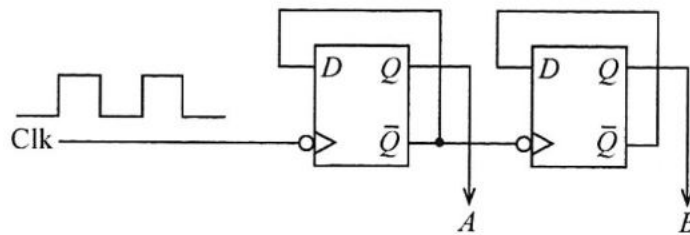
35. In the given circuit diagram, X is a digital electronic circuit. P and Q are its inputs while Z is its output. In this, when P equals 'logic one' the output Z equals $\bar{Q}$ while P equals 'logic zero' the output Z equals Q . Three proposed circuits for X are shown in A, B and C.



Out of the above circuits the circuit/circuits suitable for output Z is/are

- (1) A only.
- (2) A and C only.
- (3) A and B only.
- (4) B and C only.
- (5) A, B and C all.

36. The following figure shows a digital electronic circuit with two *D*-type flip flops. Select the answer which correctly shows the relationship among Clk, *A* and *B*.



37. Consider the following statements regarding metals.

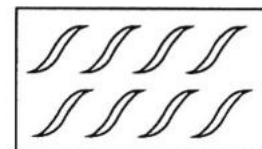
- A - Alloy metals has plasticity.
- B - Alloy metals are subjected to rusting.
- C - Pure metals are used to manufacture machine components.

Out of the above statements, the correct statement/statements is/are

- (1) C only.
 - (2) A and B only.
 - (3) A and C only.
 - (4) B and C only.
 - (5) A, B and C all.
38. Consider the following statements on manufacturing processes.
- A - The aluminium panels required for door frames are made by extrusion.
 - B - When hot forming, it is required to pay attention to expansion allowances.
 - C - Soldering is a semi-permanent assembling method while welding is a permanent assembling method.

Out of the above statements, the correct statement/statements is/are

- (1) A only.
 - (2) B only.
 - (3) A and B only.
 - (4) A and C only.
 - (5) A, B and C all.
39. It is required to make slots as shown in the figure on a 5 mm thick 20 cm × 20 cm steel plate. The hole in a slot, is 2 mm. The most suitable machine that can be used to do this is,
- (1) NC lathe machine.
 - (2) NC milling machine.
 - (3) CNC milling machine.
 - (4) CNC punch press machine.
 - (5) CNC electro-discharge machine.



[See page nine

40. Consider the following statements about four-stroke engines.

- A - When the cam shaft is located directly above the valves, rocker arms are commonly used to push the valves.
- B - When three valves are used in an engine cylinder, two of them are used as suction valves.
- C - Due to weakening of the seal between the valve face and valve seat, blow-by gas leaks into the crank case.

Out of the above statements, the correct statement/statements is/are

- (1) B only. (2) C only. (3) A and B only.
- (4) A and C only. (5) A, B and C all.

41. Which component adjusts the quantity of the fuel-air mixture flowing through the carburettor to the cylinder of a motor vehicle?

- (1) Needle valve (2) Float
- (3) Choke valve (4) Throttle valve
- (5) Idling adjusting screw

42. If the rotation speed of a four-cylinder four-stroke engine is 2,500 rpm, how many power strokes are generated in it within a minute?

- (1) 1,250 (2) 2,500 (3) 5,000 (4) 7,500 (5) 10,000

43. Consider the following statements about the cooling systems used in motor vehicles.

- A - Sending an air stream through the cooling fins using a blower is the nature of a direct natural air circulation system.
- B - Since the internal pressure of the radiator is higher than the atmospheric pressure, the probability of boiling of the coolant is minimal.
- C - Since the environment temperature of tropical countries is relatively high, thermostatic valves are taken out of use.

Out of the above statements, the correct statement/statements is/are

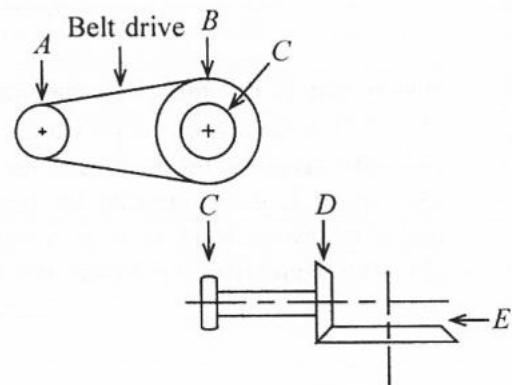
- (1) A only. (2) B only. (3) A and C only.
- (4) B and C only. (5) A, B and C all.

44. Which is used to reduce the risk of roll-over when a motor vehicle is taking a turn?

- (1) Stabilizer bar (2) Damper (3) Coil spring
- (4) Tie rod (5) Axle

45. As shown in the figure, wheels *A* and *B* are connected by a driving belt. Wheels *B* and *C* are rigidly fixed. Wheel *C* is rigidly fixed to bevel gear wheel *D* through a shaft and wheel *D* is meshed with the bevel gear wheel *E*. The radii of wheels *A*, *B*, *C*, *D*, and *E* are respectively 15, 30, 15, 30, and 60 cm. If wheel *A* is rotating at 200 rpm, the rotating speed of wheel *E* is

- (1) 50 rpm. (2) 100 rpm.
- (3) 200 rpm. (4) 400 rpm.
- (5) 800 rpm.



46. A water wheel is used to lift an item with a mass of 10 kg to a platform with a height of 3.6 m. The energy loss in transmission is negligible, the quantity of energy that needs to be supplied from the water to lift the item to the platform is

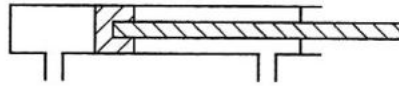
- (1) 36 J. (2) 360 J. (3) 360 W. (4) 36,000 J. (5) 36,000 W.

47. Using a pump, a specific volume of a liquid needs to be pumped during a specific time frame. The most suitable type of pump for this, is

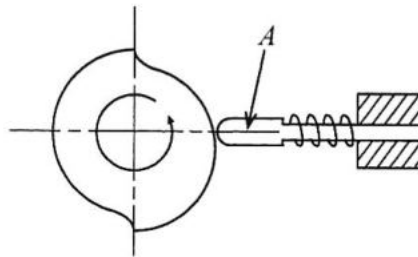
- (1) Screw type. (2) Vane type.
(3) Gear type. (4) Piston type.
(5) Rotary type.

48. The figure shows a

- (1) 3/2 directional control valve.
(2) 2/2 directional control valve.
(3) Safety valve.
(4) Single acting piston.
(5) Double acting piston.

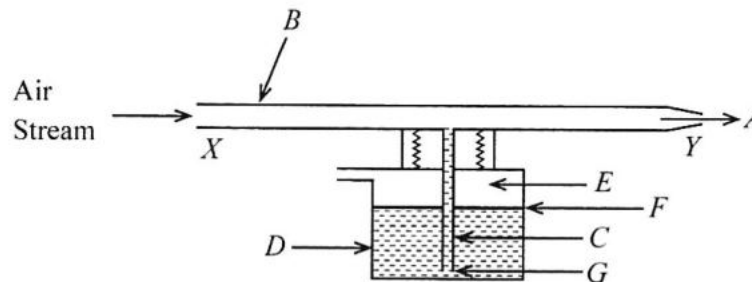


49. The cam shown in the figure rotates counter clockwise at 120 rpm. What is the frequency at which the plunger/slider *A* connected to it will move under reciprocating motion?



- (1) 2 Hz (2) 4 Hz (3) 40 Hz (4) 120 Hz (5) 240 Hz

50. In the liquid spraying device shown in the figure, air stream enters from *X*, goes through tube *B* and exits from *Y*. In tank *D*, the liquid is filled up to level *F*. Tank *D* is connected to the outside of tube *B* so that a tube *C* which is connected to tube *B* as shown in the figure, is submerged in the liquid.



Which one is the **incorrect** statement regarding fluid pressure in this device?

- (1) *A* is in atmospheric pressure.
(2) The pressure inside tube *B* is at a higher value than the atmospheric pressure.
(3) Space *E* is in atmospheric pressure.
(4) Pressure at level *G* is at a higher value than the atmospheric pressure.
(5) The liquid level *F* inside the tank is at atmospheric pressure.

සියලු ම හිමිකම් ඇවිරිණි/முழுப் பதிப்புரிமையுடையது/All Rights Reserved]

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

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2026
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2026
General Certificate of Education (Adv. Level) Examination, 2026

ඉංජිනේරු තාක්ෂණවේදය II
பொறியியற் தொழினுட்பவியல் II
Engineering Technology II

65 E II

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

අමතර කියවීමේ 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 you will answer and decide which of them you will prioritise.

Index No. :

Important :

- * This question paper comprises of **four** parts, **A, B, C and D**. The total time allotted for **all four parts** is **three hours**.
- * Use of **non-programmable** calculators is **allowed**.
- * Consider **gravitational acceleration** as 10 m s^{-2} .

PART A — Structured Essay : (pages 2 - 8)

Answer **all** the questions **on the question paper itself**. Write your answers in the space provided for each question. Note that the space provided is sufficient for the answers and that extensive answers are **not** expected.

PARTS B, C and D — Essay : (pages 9 - 14)

Essay question paper contains **six** questions, Answer **four** questions only selecting at least one question from each part. Use the papers supplied for this purpose.

At the end of the time allotted for this paper, tie the four parts **A, B, C and D together as a single answer script** so that Part A is on top and hand it over to the supervisor.

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65 - Engineering Technology II

Part	Question Nos.	Marks Awarded
A	1	
	2	
	3	
	4	
B	5	
	6	
C	7	
	8	
D	9	
	10	
Total		

Total

In numbers	
In words	

Code Number and
Signature

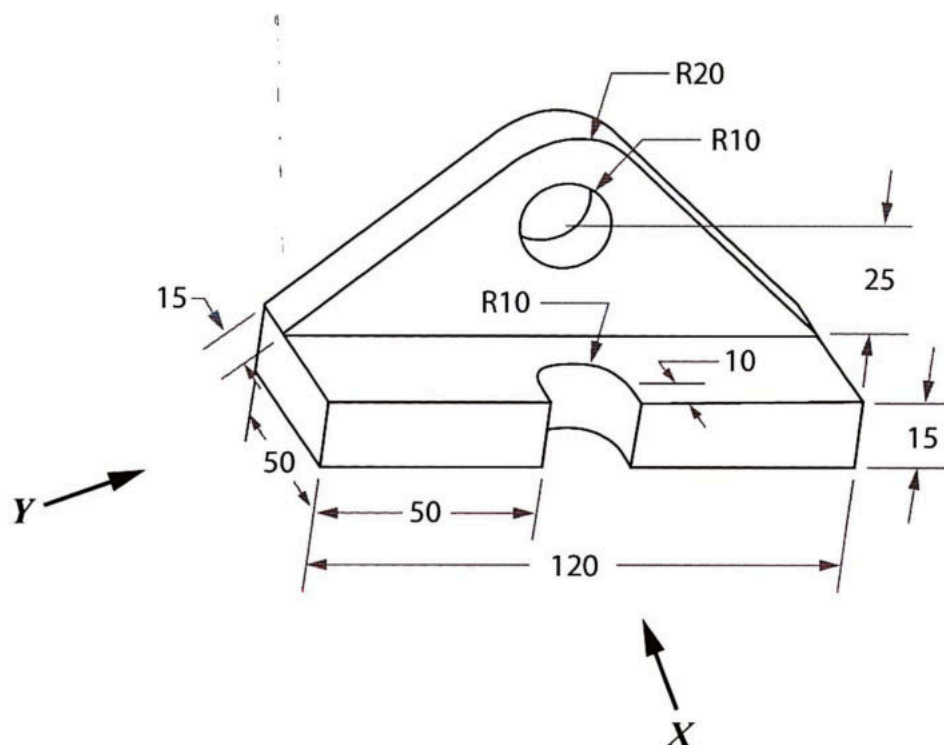
Marking Examiner 1	
Marking Examiner 2	
Marks checked by	
Supervised by	

PART A — Structured Essay

*Answer all four questions on this question paper itself.
(Marks allocated for each question is 75.)*

1. Shown below is a three-dimensional drawing of a machine component made of mild steel. According to the given dimensions, draw the front elevation, end elevation and plan by taking the front elevation in the direction of arrow *X* of the machine component and the end elevation in the direction of arrow *Y*, according to the method of **first angle** projection on the given grid sheet using **geometric instrument set**. The scale to be used is 1:1. On the given grid sheet, consider one small square as 5 mm × 5 mm. Mark the **least number of dimensions** required for production of the machine component. **Correct placement** of the three views within the grid sheet is a **must**. All dimensions are in millimetres.

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write
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column



(This figure is not drawn to scale)

0402

DRAWN BY : ABC PERERA	
CHECKED BY : S SIVAM	
SCALE : 1:1	

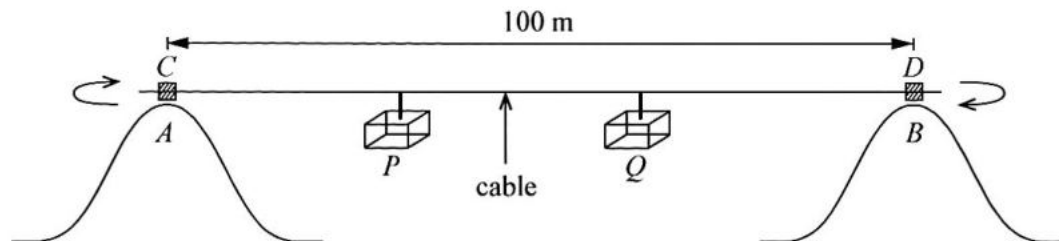
Q.1

(75 marks)

75

[see page four]

2. To attract tourists, a cable car system that drives along with cable has been proposed. This is to be installed between two mountain peaks A and B which are 100 m apart as shown in the figure below. The cable is passed around pulley C which is on A and pulley D which is on B are rotated clockwise about vertical axes driving cable cars such as P and Q between A and B mountain peaks. Here, the passengers get in when the cable cars arrive at mountain peak A , and get down when they come back to A completing one cycle.



- (a) (i) State how passenger safety is ensured by using cables in this system.

.....
(05 marks)

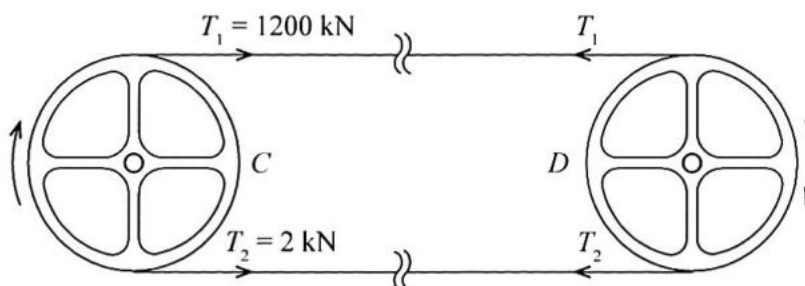
- (ii) Propose **two** mechanical strategies that can be used to limit sagging of the cable due to weights of the cable and the cable cars as required when the cable is used with a 100 m span as per the figure.

(1)

(2)

(05 × 2 = 10 marks)

- (b) Cable cars must travel carefully and slowly between the mountains. The plan view of the C and D pulleys which operate maintaining the appropriate tensile force, T_1 and T_2 for this is shown in the figure below.



- (i) Calculate the horizontal force acting on an axis of a pulley in kilonewton.

.....
.....
.....
(05 marks)

- (ii) In pulley systems for power transmission, there are driving and driven pulleys. What is the driving pulley out of these two pulleys C and D ?

.....
(10 marks)

- (iii) Here, diameter of a pulley is 3.5 m. The distance between the centres of *C* and *D* is 100 m. Calculate the capacity of the motor required to drive this system in kilowatt if a cable car starts from mountain peak *A* and takes 45 minutes to complete one cycle and come back to the starting point. (Assume that this cable car goes on a complete cycle in a horizontal planar which parallel to earth at constant speed continuously.)

.....

(20 marks)

- (c) A 100 kW, 400 V, 50 Hz three phase induction motor was proposed to be used for this cable car system. Its power factor is 0.9.

- (i) Why a starting is strategy required for this motor?

.....
 (05 marks)

- (ii) State the most suitable starting strategy for this motor.

.....
 (05 marks)

- (iii) Calculate the current passing through a single phase conductor after this motor reaches the steady condition.

.....
 (15 marks)

Q.2

75

3. It is essential to compliance with the relevant building regulations and waste management regulations when constructing a building.

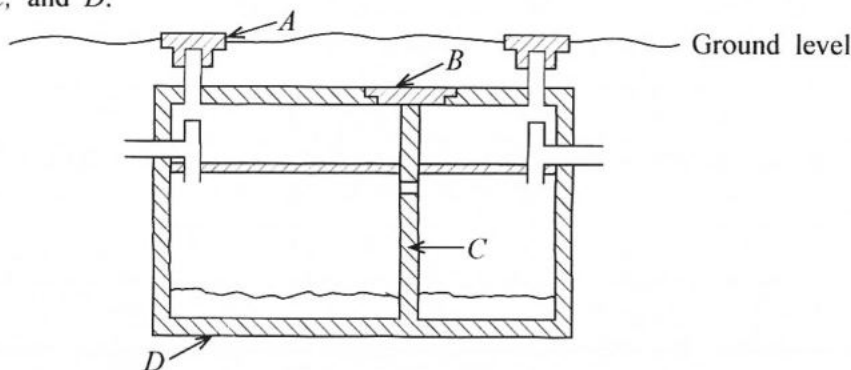
- (a) Write down **two** types of water borne wastes produced in a building.

(1)

(2)

(05 × 2 = 10 marks)

- (b) A cross-sectional sketch of a septic tank is shown below. Write down the functions of *A*, *B*, *C*, and *D*.



A – Inspection hole

B – Manhole

C – Separator wall

D – Outer wall

(05 × 4 = 20 marks)

- (c) Following actions shown in the table below have been taken to manage the solid waste that gets generated in a building. Classify these solid waste management related actions according to the frequently used waste management concepts.

	Actions	Waste Management Concept
1.	Using glassware for food and beverage consumption.	
2.	Getting the required furniture made using the wooden pallets being used in stores.	

(05 × 2 = 10 marks)

- (d) The scale of a map is stated as '1 cm represents 10 m'.

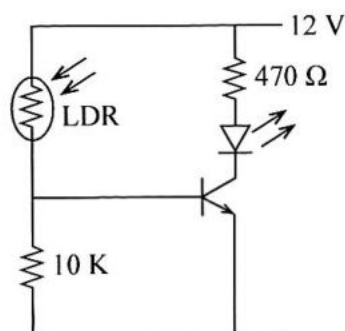
- (i) Show this scale as a ratio.

.....
(05 marks)

- (ii) According to this scale, what is the length on the map that represents a 500 m distance on the actual ground?

.....
(05 marks)

- (e) An electronic circuit that can be used for a light sensitive switch is shown in the figure below. Here, the resistance of the LDR decreases with increasing the intensity of light.



- (i) What are the operating regions of the transistor in the above circuit?

.....
(05 marks)

- (ii) Derive an algebraic expression for the collector current (I_C) of the above circuit.

.....
.....
.....
.....
(10 marks)

- (iii) With the aid of a circuit diagram, show how the above circuit should change to control a 230 V bulb.

Do not
write
in this
column

Q.3

75

(10 marks)

4. Existing occupations in many fields will be lost in the future due to the use of artificial intelligence. A few technologists who are vigilant about this trend have got together and decided to start a vehicle maintenance workshop.

- (a) State **two** entrepreneurial qualities that these technologists have that can be drawn from the facts mentioned above.

(1)

(2)
(05 × 2 = 10 marks)

- (b) Why is it important to plan and organize at the initiation of this vehicle maintenance workshop?

.....
(05 marks)

- (c) State **two** factors of production required by the aforementioned entrepreneurs to start this business.

(1)

(2)
(05 × 2 = 10 marks)

- (d) State **three** planning details, that must be present in a business plan being prepared for the development of this business.

(1)

(2)

(3)
(05 × 3 = 15 marks)

- (e) Microfinancing loans is a method that can be used to obtain capital funds. State a reason why entrepreneurs tend to obtain microfinancial loans?

.....

.....
(05 marks)

- (f) It is required to prepare a management plan for this business. State **three** main constituents to be included in this.

(1)

(2)

(3)

(05 × 3 = 15 marks)

- (g) Few hazards that can be present in this type of motor vehicle maintenance workshop are given below.

- Use of coatings and paints
- Use of machinery
- Presence of a slippery floors
- Exerting effort
- Crawling under vehicles
- Presence of fuel types
- Presence of flammable substances
- Presence of high temperature
- Use of lubricating oil
- Working under vehicles
- Working at heights

Identify one physical, chemical and ergonomic hazard each from the above list of hazards and complete the table below.

Classification	Hazard
Physical	
Chemical	
Ergonomic	

(05 × 3 = 15 marks)

* *

Q.4

75

සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved

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இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2026
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2026
General Certificate of Education (Adv. Level) Examination, 2026

ඉංජිනේරු තාක්ෂණවේදය II
பொறியியற் தொழினுட்பவியல் II
Engineering Technology II

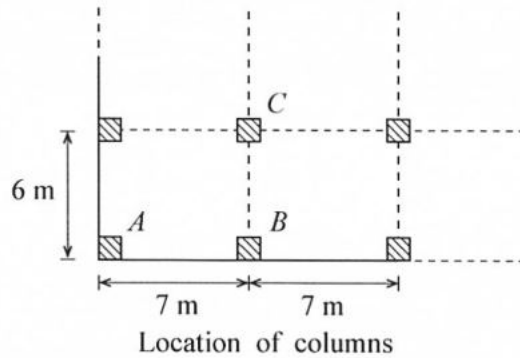
65 E II

Instructions:

- * Answer **four** questions only selecting at least **one** question each from parts B, C, and D.
- * Marks allocated for each question is **100**.

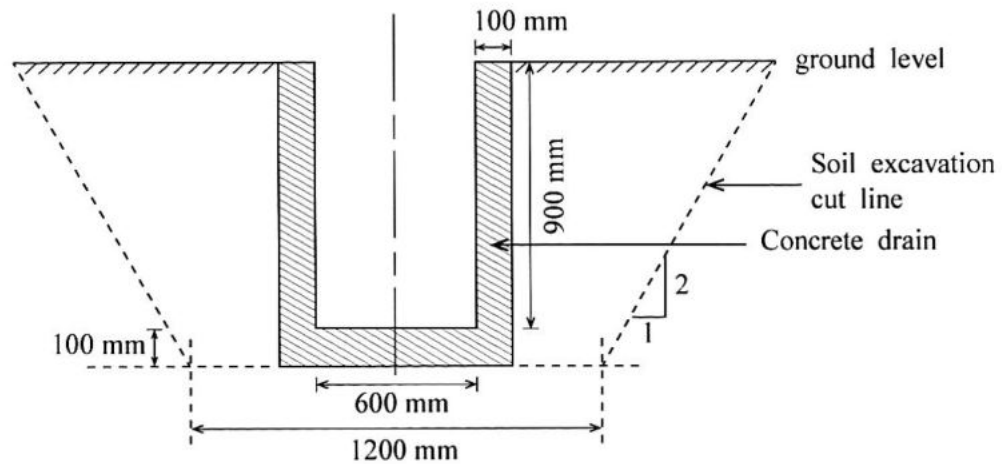
Part B - Essay (Civil Technology)

5. A 150 mm thick concrete slab is located on concrete columns of 225 mm × 225 mm cross section. A 10 kN m⁻² dead load is acting on this slab. Location of these columns are given in the figure below. Consider unit weight of reinforced concrete as 25 kN m⁻² for calculations.



- (a) Explain the main structural function of a concrete column. (15 marks)
- (b) Explain the requirement of reinforcements for concrete columns while stating a technical fact. (10 marks)
- (c) Calculate the following showing steps:
 - (i) The total load acting on the top of the column A. (15 marks)
 - (ii) The total load acting on the top of the column B. (15 marks)
 - (iii) The total load acting on the top of the column C. (15 marks)
 - (iv) Average compressive stress acting on the cross-section of the top of the column C. (10 marks)
- (d) The wall between two columns is built using English bond walls. Draw a labelled figure of **two** layers of this bond type. (20 marks)

6. (a) It is proposed to construct a concrete drainage system on either side of a 30 m long access road runs towards a housing scheme to remove storm-water. The cross section of the drain and excavation limits are shown in the figure below.



Cross section of the drain and excavation limits

The unit rates for the above construction are shown in the table below.

Work item	Unit rate (Rs)/m ³
1. Soil excavation and removal	2,500.00
2. Laying concrete	32,000.00
3. Formwork (per m ³ of concrete)	2,000.00
4. Soil filling and compaction	1,000.00

- (i) According to SLS 573, take quantities for **two** work items 'excavation of soil for the drain' and 'concrete for the drain'. (20 marks)
 - (ii) Using the given unit rates, calculate the direct cost for making the drainage system while mentioning the steps. (20 marks)
 - (iii) If the profit and overheads of the contractor are 15% of the direct cost associated with the drainage system, calculate the total cost for this drainage system while mentioning the steps. (10 marks)
- (b) It is proposed to use theodolite surveying method to measure a small bare land.
- (i) Explain the entire process in steps to prepare the survey plan by measuring the land using only one survey station. (30 marks)
 - (ii) Describe **two** technical factors that must be considered when selecting a survey station for the above survey. (10 marks)
 - (iii) Closed traverses are used to survey the land when there is a building constructed on the small land above. Describe **two** advantages of using closed traverses mentioning technical facts. (10 marks)

Part C - Essay (Electrical and Electronic Technology)

7. (a) A consumer whose monthly electricity consumption is 300 units generates 200 units per month by installing a roof-mounted Grid-Connected Solar PV System. According to the electricity tariff system given below, calculate while mentioning steps, the saving in the monthly electricity bill that this consumer achieves by installing the solar PV system. Neglect the capital expenditure for the installation of the solar PV system and the associated taxes. Consider that there are 30 days per month.

Monthly consumption (kWh)	Unit charge (Rs/kWh)	Fixed charge (Rs/month)
0 – 60	14.00	00.00
61 – 90	20.00	400.00
91 – 120	28.00	1,000.00
121 – 180	44.00	1,500.00
> 180	85.00	2,100.00

(30 marks)

- (b) A 220 V DC shunt wound motor draws 42 A current when it operates under full load while its rotational speed is 1000 rpm. When the load connected to this motor is completely disconnected (no load), the current it draws drops to 22 A. The resistance of the armature and the field windings of this motor are $0.5\ \Omega$ and $110\ \Omega$, respectively. Assuming that the magnetic flux does not change and the armature reaction does not have any impact on the operation of the motor, calculate the motor speed under no load.

(40 marks)

- (c) In a repaired water pump, three wire leads of the motor are externally seen. However, these wire leads have neither been named as common, starting and running nor arranged as per the standard colour codes. In order to identify them as common, starting and running, a student labeled the wire leads as A, B and C, and measured the resistance values between those using a multimeter. The readings are given in the following table.

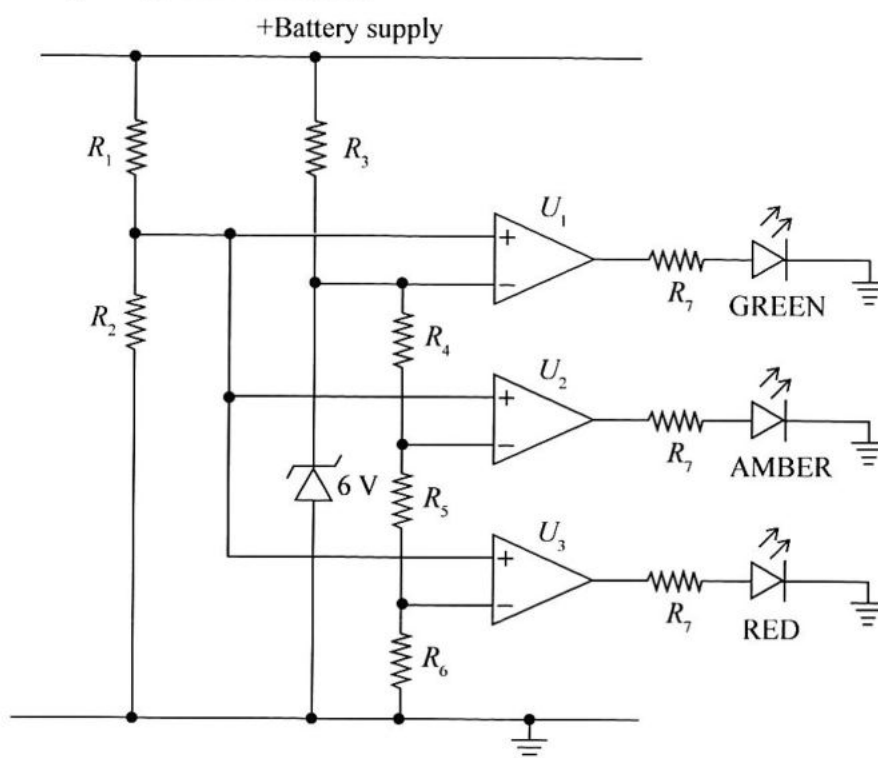
Wire leads	Resistance
Between A and B	$110\ \Omega$
Between A and C	$380\ \Omega$
Between B and C	$490\ \Omega$

- (i) Determine the common, starting and running wire leads according to the given data while providing reasons. (15 marks)
- (ii) Draw a labelled diagram, indicating how these **three** wire leads and the capacitor should be connected to the electricity supply. (15 marks)

8. (a) It is required to prepare a full wave rectified 12 V stable direct current single supply to operate an electronic equipment using the domestic electric supply. A Zener circuit with a transistor was proposed for this since the current passing through the Zener diode is not enough for the load.

- Draw the circuit diagram for this power supply. (10 marks)
- What are the operating regions of the transistor in the above circuit? (05 marks)
- State an observation related to the transistor, when the above circuit supplies the maximum current. (05 marks)

- (b) The following diagram shows an electronic circuit that can be used to indicate the voltage of a 12 V battery using LED indicators.



In this circuit,

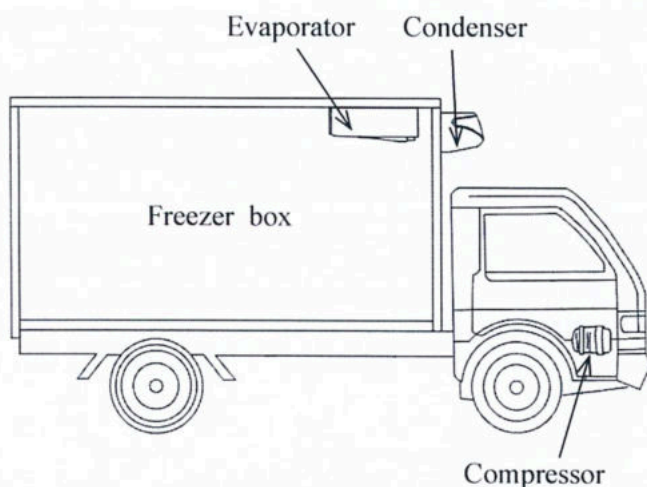
- Explain the operation of operational amplifiers in relation to the above circuit. (05 marks)
- Calculate the ratio between R_4 , R_5 , and R_6 resistances in order to maintain fixed voltages 6 V, 5.5 V and 5 V respectively at the inverting inputs of U_1 , U_2 , and U_3 . (10 marks)
- Calculate R_3 resistance by taking the maximum battery voltage as 14 V and the maximum 6 V Zener diode current as 0.5 A. (10 marks)
- Calculate the voltage of the battery for the above calculated R_3 resistance and the minimum Zener current. If the minimum Zener current is 20 mA. (10 marks)
- Calculate the ratio between R_1 and R_2 for lighting up the green LED bulb when the battery voltage is above 11 V. (10 marks)
- According to the ratio in (v) above, calculate the respective battery voltages to start lighting up red and amber bulbs. (15 marks)
- Illustrate by drawing a circuit diagram to indicate how the above circuit should be changed if the battery needs to be disconnected from the load when the battery voltage drops below the voltage indicated by the red indicator. (Hint: Consider that a relay cannot be directly connected to an operational amplifier.) (20 marks)

Part D - Essay (Mechanical Technology)

9. (a) Forced feed method is used to lubricate multi-cylinder engines.

- (i) Name the component that stores the lubricating oil in such engine. (05 marks)
- (ii) Name the component used to determine whether the quantity of lubricating oil in the system is at the level recommended by the manufacturer. (05 marks)
- (iii) Explain the safety mechanism used in the lubrication system to prevent the lubricating oil pressure from exceeding the required level. (20 marks)
- (iv) Explain the purpose of the strainer in this lubrication system. (20 marks)

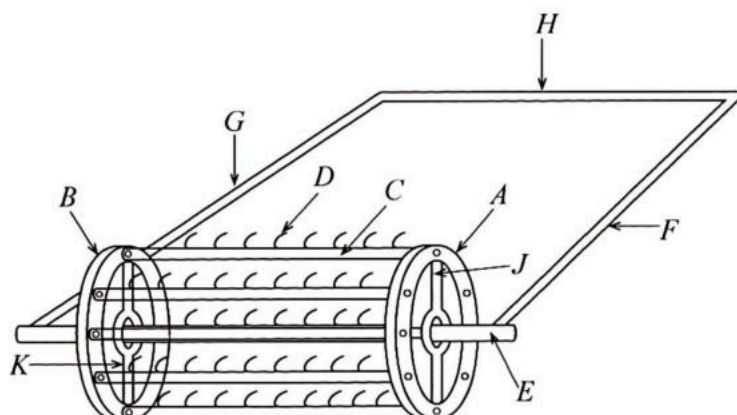
(b) A labelled figure of a freezer truck used to transport ice cream is shown below.



- (i) When manufacturing the freezer box, state **two** strategies used to keep its internal temperature at a low value. (10 marks)
- (ii) Explain how the power is provided to the compressor. (15 marks)
- (iii) Explain the technological advantage obtained by mounting the condenser at the front of the freezer box. (25 marks)



10. To uproot and remove weeds from agricultural plots, a team of engineering technologists have designed an equipment as shown in the following figure.



In this, parts *A* and *B* are identical and have been designed using 3 mm thick steel plates. The outer diameter of parts *A* and *B* is 30 cm. Part *C* of this is one of eight identical 8 mm steel rods which are fixed between *A* and *B*. To entangle and uproot weeds, *D* steel hooks with spikes have been assembled to them. For the *A*, *B*, *C*, *D* assembly to rotate around axle *E*, the parts *J* and *K* are designed and they have been designed using 8 mm rods with a collar each at the middle as shown in the figure. The *E* axle is a 20 mm pipe. *F* and *G* parts are assembled to the ends of the axle and *H* is the handle of the equipment. All the components are made of Galvanized Iron (GI) steel. Here, *A* and *J*, *B* and *K*, *C* and *D* should be separately assembled using a permanent joining method, and the equipment should be assembled so that '*AJ*', '*BK*' and '*CD*' assemble parts are able to be easily disassembled.

- Describe how one item of '*A*' can be manufactured. (20 marks)
- Describe how a '*CD*' assembly can be manufactured. (20 marks)
- Describe how an '*AJ*' assembly can be manufactured. (20 marks)
- Giving reasons, describe an approach that can be employed to assemble the eight '*CD*' assemblies between the '*AJ*' assembly and '*BK*' assembly as given in the figure. (20 marks)
- Giving reasons, describe an approach that can be employed to assemble parts *G* and *F* to the axle *E*. (10 marks)
- Giving reasons, propose **two** technological strategies that can be employed, in order for the assembly '*ABCDJK*' to rotate around axle *E* without inhibition. (10 marks)

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