

NEW/OLD

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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 Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2020
 கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2020
 General Certificate of Education (Adv. Level) Examination, 2020

සිවිල් තාක්ෂණවේදය I
 குடிசாரத் தொழினுட்பவியல் I
 Civil Technology I

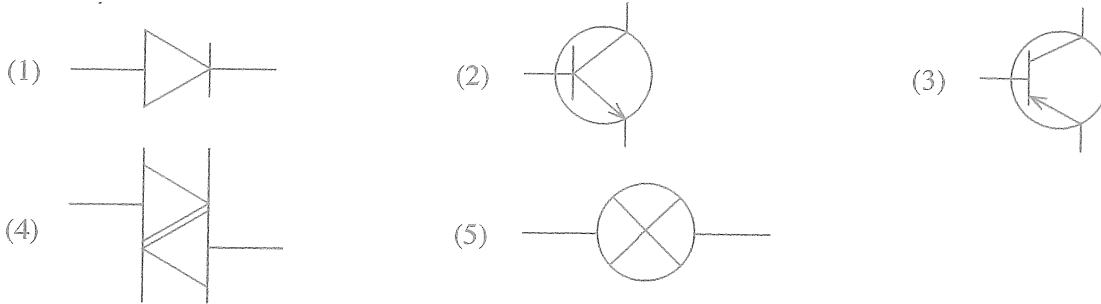
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පැය දෙකයි
 இரண்டு மணித்தியாலம்
 Two hours

Instructions:

- * Answer *all* the questions.
- * 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 in the back of the answer sheet.
- * Use of calculators is not allowed.

1. Select the symbol which denotes the NPN transistor.



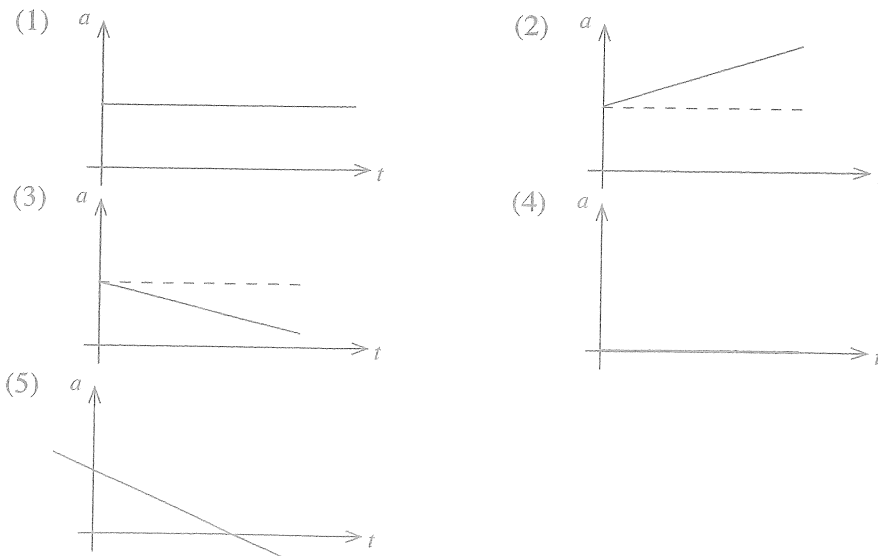
2. What is the nominal frequency of the domestic electricity supply in Sri Lanka?

- (1) 49.5 Hz (2) 50 Hz (3) 50.5 Hz (4) 55 Hz (5) 60 Hz

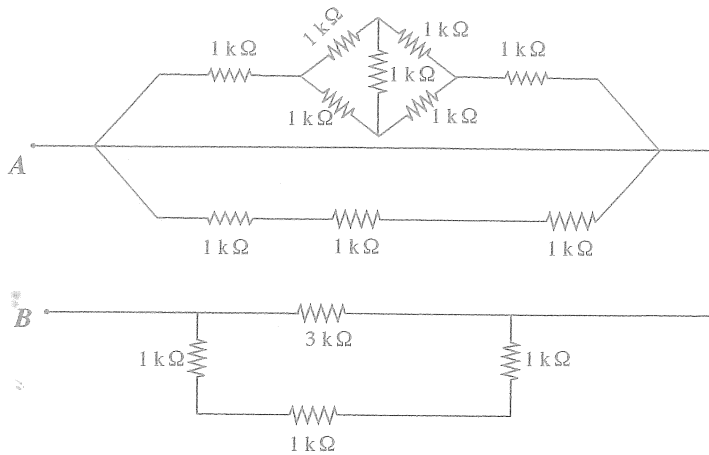
3. Mercury has a Specific Gravity of 13.6. The pressure exerted at the bottom of a 700 mm long mercury column is equal to (consider $g = 9.81 \text{ m s}^{-2}$)

- (1) 1 atm. (2) 100 kN. (3) 100 kPa. (4) 93391 Pa. (5) 101396 Pa.

4. A ball is dropped from the top of a tall building. Which of the following acceleration-time graph shows the motion of the ball in air? (Assume that there is no air resistance.)

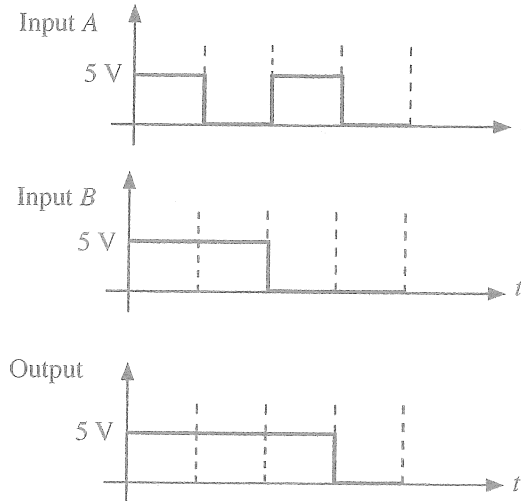


9. What is the resistance between points A and B in the following circuit?



- (1) 1.5 kΩ (2) 3 kΩ (3) 6 kΩ (4) 9 kΩ (5) 12 kΩ

10. Consider the following graphs.



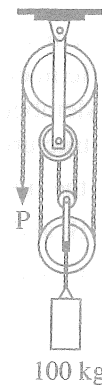
Above logic output was observed when Input A and Input B are connected to its inputs of a logic gate. Here 5 V and 0 V voltage represent logic '1' and logic '0', respectively.

Identify the logic gate referring the above graphs.

- (1) AND (2) OR (3) NOT (4) NOR (5) NAND

11. A 100 kg mass is hanging in a frictionless pulley system as shown in the figure. The force in Newton to be applied at the free end (P) in order to keep the system stable is (Neglect the weight of the pulleys, consider acceleration due to gravity ($g = 9.81 \text{ m s}^{-2}$))

- (1) 10g. (2) 25g. (3) 33g.
 (4) 50g. (5) 100g.

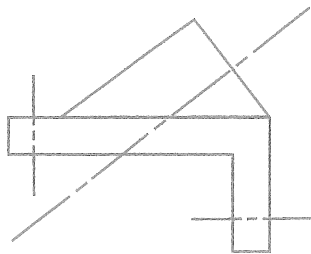
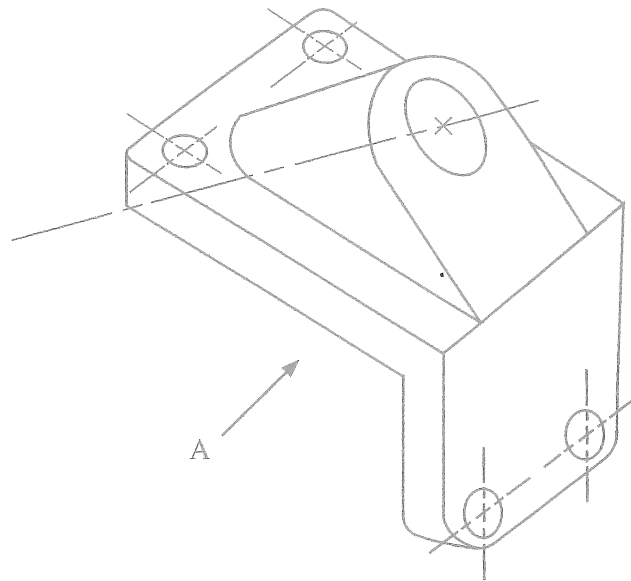


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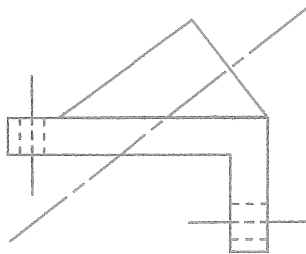
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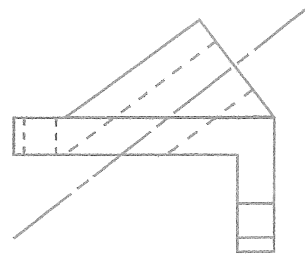
12. Which one shows correct view when projected from direction A?



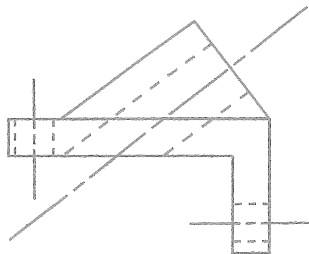
(1)



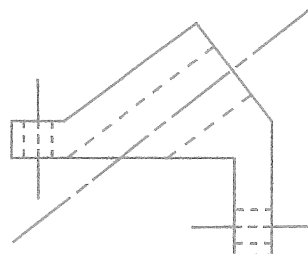
(2)



(3)



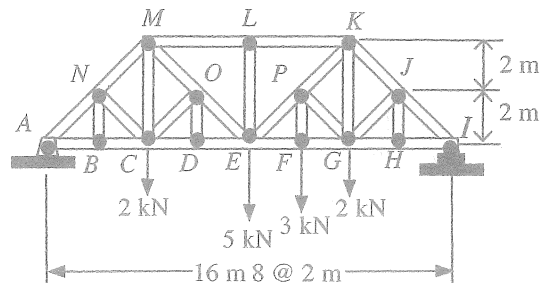
(4)



(5)

13. Figure shows a Baltimore truss structure used in a bridge. Following gives some statements of the truss structure.

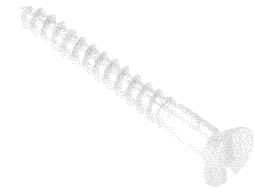
- A - LE member force is more than 5 kN.
- B - Member forces in ML and LK are compressive.
- C - Member forces in lower chord are tensile.
- D - Member NB and NC increase safety of truss structure.



Out of the above statements, the correct statements are,

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

14. Consider the following statements regarding a typical Brass screw used in a common door hinge which is shown in the figure.



- A - Tapered shape helps it to be screwed in, using a screwdriver.
- B - The screw is held tight by the frictional resistance of the helical thread.
- C - The screw shaft is expected to provide a tensile resistance.
- D - The screw shaft is expected to carry the force due to the weight of the door.

Which of the above statements are true regarding its use?

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

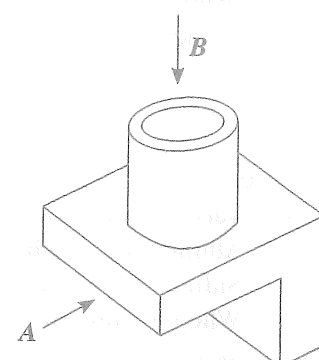
15. Consider the following statements.

- A. Fine carbon particles in human lungs cause respiratory issues.
- B. Mercury accumulation in fish.
- C. Accumulation of heavy metals in fly-ash heaps due to burning of coal.
- D. Motor vehicle emissions building up in birds.

Which of the above statements describe the effects of bioaccumulation?

- (1) A, B and C
- (2) A, B and D
- (3) A, C and D
- (4) B, C and D
- (5) A, B, C and D

16. The figure shows an isometric view of a bar holder bracket. What are the correct orthographic projections when viewed from arrows A and B respectively?

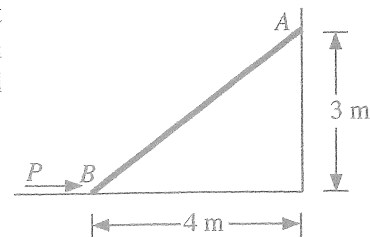


(1)	(2)	(3)	(4)	(5)

000095



17. 800 N weight rod AB positioned as shown in the figure. The contact surface at B is smooth, where as the coefficient of static friction (between the rod and the wall) at A is 0.2. The minimum force P to prevent rod AB from sliding is



- (1) 221 N. (2) 321 N. (3) 421 N.
 (4) 433 N. (5) 533 N.

18. Consider the following statements.

- A - When using a meter ruler to measure a length, the smallest estimate is 0.0005 m.
 B - The SI unit for measuring energy is Calorie.
 C - Candela (Cd) is the SI unit for luminous cell voltage of 1.5 V.
 D - Zinc-carbon AA type batteries have a nominal cell voltage of 1.5 V.

Which of the above statements are true?

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

19. Consider the following statements.

- A - Switch off the power supply to the motor prior to mounting or removing accessories.
 B - Ensure that the emergency stop button is functioning.
 C - The floor should be clean and non-slippery.
 D - Reduce rotating speed when taking measurements.

Which of the above statements describe safety measures when operating a lathe machine?

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

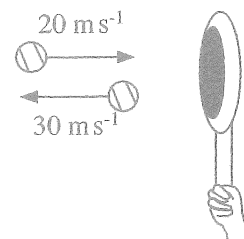
20. Consider the following statements.

- A - Varnish used to preserve timber may consist of natural resins that dissolve in turpentine.
 B - Aluminium Sulphate is a flocculating agent used to remove suspended solids in water.
 C - Sillica is the main ingredient used when manufacturing glass.
 D - When gluing two objects, high surface roughness causes good bonding.

Which of the above statements are true regarding the use of chemical compounds?

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

21. A player hits a tennis ball of mass 150 g with a racket. It changes its velocity as shown in the figure. What is the momentum increase?



- (1) 1.5 kg m s^{-1} (2) 2.5 kg m s^{-1} (3) 5.5 kg m s^{-1}
 (4) 7.5 kg m s^{-1} (5) 10.0 kg m s^{-1}

22. Consider the following statements.

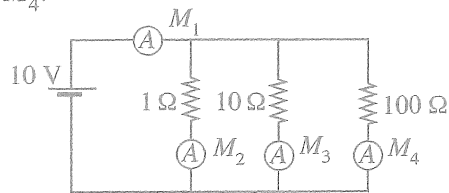
- A - Ability to track the order and stating the delivery date.
 B - Providing product information, availability in stock, price and alternatives.
 C - Providing customer reviews on products.
 D - Reduced transaction time and associated costs.

Which of the above statements describe entrepreneurship traits of a reputable online shopping enterprise?

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

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23. Consider the following circuit. To this circuit ideal ammeters are connected and their readings are M_1 , M_2 , M_3 and M_4 .



Which of the following statement is **incorrect**?

- (1) Value of $M_1 = M_2 + M_3 + M_4$
 - (2) Value of $M_3 = 1\text{ A}$
 - (3) M_4 is the smallest reading.
 - (4) M_1 is the largest reading.
 - (5) Value of $M_1 > (M_2 + M_3 + M_4)$
24. Ten 5 W LED bulbs are used in a house. Each bulb is lit for 5 hours, daily. What is the daily electrical energy consumption?
- (1) 0.025 kW h
 - (2) 0.25 kW h
 - (3) 2.5 kW h
 - (4) 25 kW h
 - (5) 250 kW h
25. Which statement correctly explains the reason for faster corrosion of a steel structure in coastal areas?
- (1) The coastal areas do not have sufficient trees to provide oxygen.
 - (2) The wind in the coastal areas contains salt which accelerates corrosion.
 - (3) Extreme heat in coastal areas cause the rapid corrosion.
 - (4) High solar irradiation in coastal areas accelerates corrosion.
 - (5) Tidal waves of the sea affect rapid corrosion of steel.

26. Consider the following statements.

- A - Load bearing walls transmit the weight of super-structure to the foundation base.
- B - Non-load-bearing walls transmit its self-weight to the foundation base.
- C - A thin hollow block wall can be made a load-bearing wall by filling the cavities with concrete.
- D - Load bearing walls may transmit the weight of the super-structure on to a beam.

Which of the above statements are true regarding load-bearing and non-load bearing walls?

- (1) A, B and C only.
 - (2) A, B and D only.
 - (3) A, C and D only.
 - (4) B, C and D only.
 - (5) A, B, C and D all.
27. Consider the following statements.
- A - It acts as a carbon sink which reduces atmospheric carbon dioxide.
 - B - It acts as a flood control reservoir thereby reducing the potential for flooding.
 - C - It acts as a storm and wind buffer by dissipating energy.
 - D - It acts as a pollution filter against coastal contamination.

Which of the above statements describe the benefits of having marshy areas in a coastal peneplane?

- (1) A, B and C only.
 - (2) A, B and D only.
 - (3) A, C and D only.
 - (4) B, C and D only.
 - (5) A, B, C and D all.
28. Consider the following statements.
- A - Evapotranspiration from the reservoir surface reduces water availability for cultivation.
 - B - Water infiltration in the reservoir bed increases with pressure head.
 - C - Siltation is more when the catchment area is unprotected.
 - D - Dead storage is the volume of water that cannot be distributed efficiently under gravity.

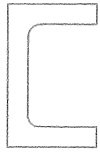
Which of the above statements describe processes in an artificial reservoir?

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

29. Bulking of sand is caused due to

- (1) surface moisture. (2) air voids. (3) viscosity.
 (4) surface texture. (5) grain size.

30. Five members of steel sections shown below has the same cross-sectional area. Which section is the most efficient steel section to be used in a column?



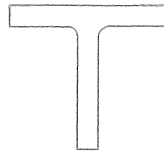
Channel section

(1)



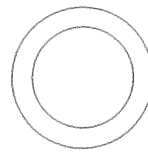
Angle section

(2)



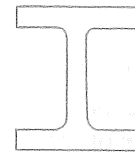
T section

(3)



Circular hollow section

(4)



Rolled steel joister section

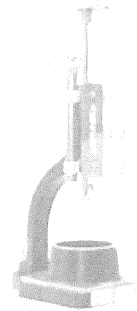
(5)

31. Inner part of a timber log surrounding the pith, is called

- (1) sapwood. (2) heart wood. (3) cambium layer.
 (4) medullary rays. (5) phloem.

32. The equipment shown in the figure is used to determine the

- (1) compressive strength of concrete.
 (2) concrete slump.
 (3) setting time of cement.
 (4) water cement ratio.
 (5) bulking of sand.



33. The built-up area of a building as defined in building By-laws is the total area of

- (1) the ground floor.
 (2) all floors above and below ground level.
 (3) ground floor excluding the area of porch.
 (4) all floors above and below ground level excluding roof top area.
 (5) all floors including ground floor excluding roof top area.

34. An 'all in' labour rate is

- (1) calculation of total operative costs.
 (2) rate of pay an operative receives.
 (3) tax and deductions charged from an operative's wage.
 (4) cost of welfare provided to operatives.
 (5) cost of paid leave to operatives.

35. The purpose of a cavity in a cavity wall is to

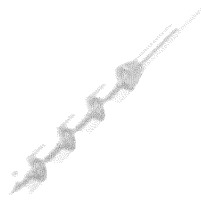
- (1) allow space to install a DPC.
 (2) give strength to the building walls.
 (3) prevent moisture penetrating into the building.
 (4) increase the wall thickness.
 (5) prevent vermin entering the building.

36. A suspended floor consists of a

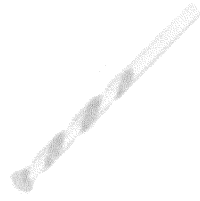
- (1) Pre-cast block and beams. (2) Solid concrete. (3) Laminate.
 (4) Pile and ring beams. (5) Cast in situ beams and slab.

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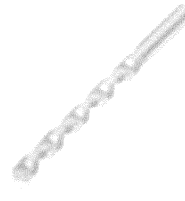
37. Three types of drill bits are shown below.



A



B



C.

Figures A, B and C, respectively, show

- (1) Masonry bit, Auger bit and High speed steel drill bit.
 - (2) Auger bit, Masonry bit and High speed steel drill bit.
 - (3) High speed steel drill bit, Masonry bit and Auger bit.
 - (4) Auger bit, High speed steel drill bit and Masonry bit.
 - (5) Masonry bit, High speed steel drill bit and Auger bit.
38. The depth of an arch is the distance between the
- (1) ground level and springing line.
 - (2) crown and springing line.
 - (3) crown and ground level.
 - (4) crown and skewback.
 - (5) intrados and extrados.
39. The platform at the end of a series of steps in a stairway is called
- (1) a stop. (2) a rest. (3) a relief. (4) a landing. (5) a tread.
40. A level line is a
- (1) horizontal line between two points.
 - (2) plumb line between two points.
 - (3) line parallel to the mean spherical surface of earth.
 - (4) line passing through center of cross hairs and the center of eye piece.
 - (5) line passing through the objective lens and the eye piece of a levelling instrument.
41. From the traps shown below, the most suitable trap for a kitchen wash basin is,



(1)



(2)



(3)



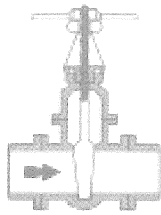
(4)



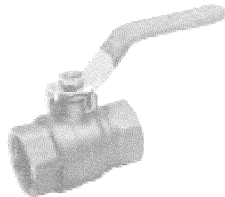
(5)

42. BOD for treated pipe-born water of potable quality should be
- (1) 0 ppm. (2) 10 ppm. (3) 50 ppm. (4) 100 ppm. (5) 150 ppm.
43. The two main causes of hardness in water is due to the presence of
- (1) gold and silver. (2) calcium and magnesium.
 - (3) phosphate and nitrate. (4) oxygen and methane. (5) chlorine and alum.
44. The valve used to prevent water flowing in the opposite direction is a
- (1) Gate valve. (2) Stop valve. (3) Check valve. (4) Ball valve. (5) Globe valve.

45. Three types of valves used in water supply are shown below.



A



B

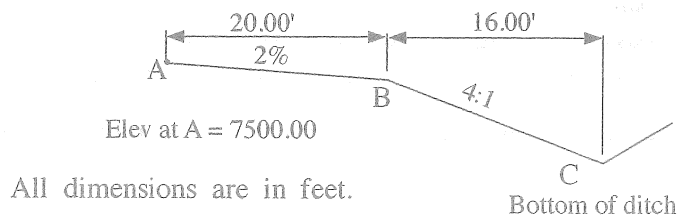


C

Figures A, B and C, respectively, are

- (1) Float valve, Ball valve and Gate valve.
 - (2) Gate valve, Ball valve and Float valve.
 - (3) Ball valve, Gate valve and Float valve.
 - (4) Gate valve, Float valve and Ball valve.
 - (5) Ball valve, Float valve and Gate valve.
46. Damaged power cables on portable tools must be
- (1) replaced.
 - (2) taped.
 - (3) soldered and taped.
 - (4) spliced and taped.
 - (5) twist jointed and taped.
47. The two most important safety concerns when entering a confined space is due to the presence of
- (1) corrosive chemicals and falls.
 - (2) bad odours and claustrophobia.
 - (3) extreme air temperatures and slippery surfaces.
 - (4) oxygen deficiency and hazardous gasses.
 - (5) poor light and insects.
48. Figure shows the elevation view of a road section. The respective elevations of the edge of the shoulder and the bottom of the ditch are,

- (1) 7499.6' and 7495.6'
- (2) 7504.0' and 7508.0'
- (3) 7496.0' and 7498.0'
- (4) 7496.6' and 7495.6'
- (5) 7499.6' and 7498.6'



49. Linear method is one of the methods used in setting out a road curve.

A. Chain

B. Tape

C. Theodolite

D. Compass

Which of the above surveying instruments can be used in the linear method of curve setting?

- (1) A, B and C only.
 - (2) A, B and D only.
 - (3) A, C and D only.
 - (4) B, C and D only.
 - (5) A, B, C and D all.
50. Road shoulder is an integral part of a road section, provided at the road edge. A shoulder should be
- (1) rougher than the traffic lane.
 - (2) smoother than the traffic lane.
 - (3) having same roughness as the traffic lane.
 - (4) of very low load bearing value.
 - (5) of same colour that of the traffic lane.

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