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

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka
ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
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අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2018 අගෝස්තු
கல்விப் பொதுத் தராதர் பத்திர (உயர் தர்ப் பரீட்சை, 2018 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2018

15.08.2018 / 0830 – 1030

තාක්ෂණවේදය සඳහා විද්‍යාව I தொழினுட்பவியலுக்கான விஞ்ஞானம் I **Science for Technology** I	**67 E I**	පැය දෙකයි இரண்டு மணித்தியாலம் ***Two hours***

Instructions:

- *Answer **all** the questions.*
- *Write your **Index Number** in the space provided in the answer sheet.*
- *Read the instructions given on the back of the answer sheet 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 (×) in accordance with the instructions given on the back of the answer sheet.***
- *Use of calculators is not allowed.*

1. *Corynobacterium glutamicum* bacteria is used to produce
(1) antibiotics. (2) ethanol. (3) amino acids. (4) vinegar. (5) beer.

2. Consider the following microorganisms.
(A) *Streptococcus lactis*
(B) *Clostridium tetani*
(C) *Lactobacillus spp.*
Which of the above microorganism/s is/are used in curd production?
(1) (A) only. (2) (B) only. (3) (C) only.
(4) (A) and (B) only. (5) (A) and (C) only.

3. Two monosaccharides present in beetroot are
(1) glucose and sucrose. (2) glucose and galactose.
(3) galactose and fructose. (4) glucose and fructose.
(5) glucose and lactose.

4. Anerobic microbial activity of a wastewater treatment plant is used at the step of,
(1) primary treatment. (2) secondary treatment. (3) settling tank.
(4) sludge digestion. (5) disinfection and release.

5. Consider the following statements.
The reaction between vinegar and sodium hydroxide solution is an
(A) acid base reaction.
(B) exothermic reaction.
(C) endothermic reaction.
Of the above, the correct statement/s would be
(1) (A) only. (2) (B) only. (3) (C) only.
(4) (A) and (B) only. (5) (A) and (C) only.

6. Heat can be defined as the
(1) temperature of a system. (2) total amount of energy of a system.
(3) flow of energy between two systems. (4) amount of work done on a system.
(5) amount of work done by a system.

7. Activation energy for a given reaction is the
(1) average energy of reactants.
(2) average energy of reactants at 25 °C and 1 atmospheric pressure.
(3) energy difference between reactants and products.
(4) minimum amount of energy required to initiate the reaction.
(5) amount of energy released from the reaction.

8. Consider the following statements.
Vulcanized rubber
(A) has more cross links than natural rubber.
(B) can be softened using heat and remoulded to a new shape.
(C) is stronger than natural rubber.
Of the above, the correct statement/s would be
(1) (A) only. (2) (A) and (B) only. (3) (A) and (C) only.
(4) (B) and (C) only. (5) All (A), (B) and (C).

9. Use of the 4R concept is more suitable than the 3R concept for the plastic recycling process in Sri Lanka. The newly added fourth R concept to the 3R concept is
(1) Reuse. (2) Recycle. (3) Reduce. (4) Rethink. (5) Refuse.

10. All natural products are
(1) produced using water, carbon dioxide and other compounds.
(2) produced only by plants.
(3) primary metabolites only.
(4) useful for the growth of living organisms.
(5) volatile organic compounds.

11. Which of the following can be used to draw the baseline when preparing a thin layer chromatographic plate?
(1) A ball-point pen (2) A sharp object (3) A marker pen
(4) A blunt object (5) A pencil

12. An investor refused to start a caustic soda production plant saying it will not be commercially viable in Sri Lanka. What can be the main reason for the above decision of the investor?
(1) Formation of by-products
(2) High cost of electricity
(3) High production cost of pure NaCl
(4) Pure NaCl is not commercially available.
(5) No market for caustic soda in Sri Lanka

13. Production of TiO_2 nano particles is a suitable industry for Sri Lanka. This is due to the
(1) availability of Ilmenite in Pulmude.
(2) availability of Apatite in Eppawala.
(3) popularity of the production of TiO_2 nano particles in Sri Lanka.
(4) availability of the industries based on TiO_2 nano particles in Sri Lanka.
(5) availability of TiO_2 nano particle deposits in Sri Lanka.

14. Which of the following government institutions is responsible for issuing Sri Lankan Patents?
(1) Sri Lanka Inventors Commission
(2) Ministry of Science, Technology and Research
(3) National Intellectual Property Office
(4) National Science Foundation
(5) Ministry of Higher Education

15. Acid rains are produced due to dissolution of atmospheric acidic gases in atmospheric water. Which of the following statements is true about acid rains?
(1) Carbon dioxide can produce acid rains.
(2) The acidity of an acid rain depends on the amount of acidic gases dissolved.
(3) The acidity of an acid rain is independent of the strength of the acid produced.
(4) Atmospheric SO_2 does not produce acid rains.
(5) The pH value of acid rains is higher than 7.

16. Consider the following statements regarding compost fertilizers.

(A) The amount of primary nutrients in compost fertilizers is higher than that of chemical fertilizers.

(B) Compose fertilizers improve the cation exchange capacity of soil.

(C) Compost fertilizers mainly provide micronutrients to plants.

Of the above, the correct statement/s would be

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

17. The type of rays requires for the natural generation of ozone gas is,

(1) infrared rays. (2) X-rays. (3) visible light.
(4) ultra violet rays. (5) Gamma rays.

18. If 1 litre of paint is required to paint a surface area of 1000 cm^2, then the volume of paint needed (in litres) to apply on the surface of a closed right circular cone with a slant height 36 cm and base radius 14 cm is, $\left(\pi = \frac{22}{7}\right)$

(1) 1.584 (2) 2.200 (3) 616 (4) 1584 (5) 2200

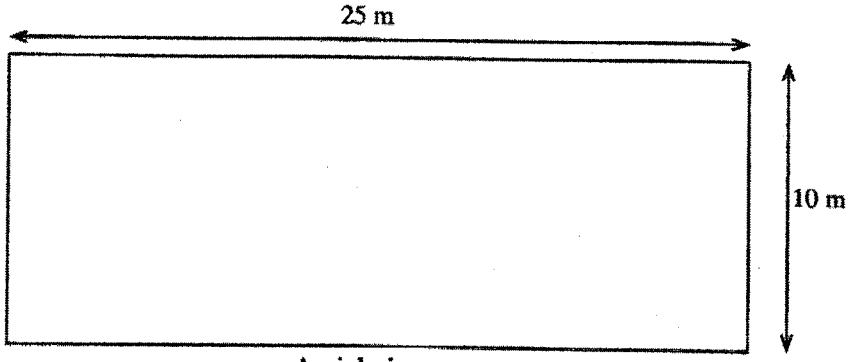
19. It is required to construct a staircase to climb 15 m vertically, when 25 m horizontal distance is travelled. How many steps are needed for this purpose when the width and the height of each step are 25 cm and 15 cm, respectively?

(1) 10 (2) 20 (3) 40 (4) 100 (5) 200

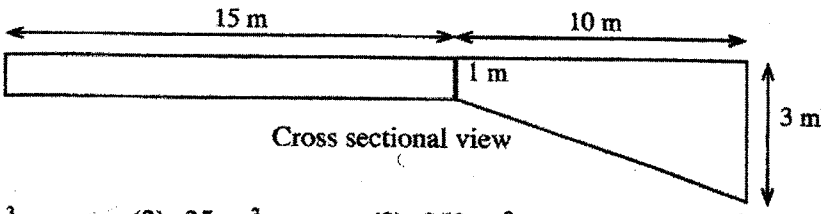
20. Consider a line segment AB, which connects points $A \equiv (1, 2)$ and $B \equiv (5, 4)$. The line which is perpendicular to AB and goes through the mid-point of AB cuts the Y-axis at the point of

(1) (9, 0) (2) (0, 9) (3) (4.5, 0) (4) (0, 4.5) (5) (0, 1.5)

21. Aerial and cross sectional views of a swimming pool are given below. The volume of water required to fill the pool is,



Aerial view



Cross sectional view

(1) 15 m^3. (2) 35 m^3. (3) 250 m^3. (4) 350 m^3. (5) 550 m^3.

22. The class limits of a grouped frequency distribution is given in the table and its mean is found to be 9. However, it was observed later that the grouped frequency distribution was constructed by incorrectly recording 16 instead of 8. Hence, it was corrected and the mean was recalculated and found to be 7. How many data points are there in the grouped frequency distribution?

Class limit
1 -5
6 - 10
11 - 15
16 - 20

(1) 3 (2) 4
(3) 5 (4) 8
(5) Insufficient information to calculate.

23. Consider the following data set.

$-1, -2, -2, 0, -5, 5, 3, 5, 6, 121, -4, 125$

The most suitable measure/s of central tendency for the data set is/are,

(1) mean. (2) median. (3) mode.
(4) mean and median. (5) median and mode.

24. A company wishes to design a water tank of a given volume. The proposed two shapes are a cylindrical tank with a radius of 3 units and a spherical tank with a radius of 3 units. The production cost per unit surface area for each shape is Rs. 10/-. If $\pi = 3$, the production costs for cylindrical and spherical shaped tanks respectively in rupees are,

(1) 1260 and 1080. (2) 1080 and 1260. (3) 1260 and 565.
(4) 1080 and 565. (5) 1260 and 377.

25. The perimeter of the triangle whose vertices are (2, 2), (10, 8) and (10, 17) in linear units is,

(1) 36 (2) $\sqrt{389}$ (3) $\sqrt{470}$ (4) 389 (5) 470

26. Consider the two lines given by $2x + 3y + 1 = 0$ and $4x + 6y + 1 = 0$. These two lines

(1) have the same intercept. (2) are perpendicular.
(3) coincide. (4) are passing through the origin.
(5) are parallel.

27. The point resides on the both lines $x - 2y = 1$ and $2x - y = 1$ is,

(1) (1, 0) (2) (0, 1) (3) $\left(\frac{1}{3}, -\frac{1}{3}\right)$ (4) $\left(-\frac{1}{3}, \frac{1}{3}\right)$ (5) (0, 0)

28. Which of the following is **not** an important factor to consider when purchasing a computer?

(1) Hard disk capacity (2) Random Access Memory (RAM)
(3) Processor type and speed (4) Printer type
(5) Number of USB ports

29. Consider the following statements about the memory of a computer.

(A) Memory of a computer consists of RAM, ROM and Cache memory.
(B) Cache memory and RAM are non-volatile memory devices.
(C) PROM stands for Programmable Read Only Memory.

Of the above, the correct statement/s is/are

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

30. In Graphical User Interface (GUI) designing, **WIMP** is abbreviated for the components

(1) Windows, Interactions, Mails, Pointer.
(2) Windows, Icons, Menu, Pointer.
(3) Web, Icons, Mails, Programmes.
(4) Web, Interactions, Menu, Programmes.
(5) Web, Icons, Mails, Pointer.

31. Which one of the following commands should be used to write the equation

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$ in a word processor?

(1) Subscript (2) Italics (3) Superscript (4) Strikethrough (5) Text effects

32. In a typical word processing software F1 key is used to

(1) open a new file. (2) get help.
(3) open 'find and replace' dialog box. (4) check spelling.
(5) save as a new file.

● The question numbers **33** and **34** are based on the following spreadsheet segment. It shows the marks and the corresponding grades obtained by four students for the subject of 'Science for Technology' at the year-end examination of a school.

	A	B	C
1	**Name**	**Marks**	**Grade**
2	**Student 1**	**68**	**B**
3	**Student 2**	**80**	**A**
4	**Student 3**	**75**	**A**
5	**Student 4**	**65**	**B**
6	**Average**	**72**	

33. The formula that should be included in B6 cell to obtain the average mark of the students is,
(1) =MEAN(B2:B5) (2) =AVERAGE(B2:B5)
(3) =AVERAGE(B2+B3+B4+B5) (4) =COUNT(B2+B3+B4+B5)
(5) =AVG(B2:B5)

34. The function that should be used to obtain the grade in column **C** is,
(1) SUM (2) COUNT (3) IF (4) MAX (5) MIN

35. Which of the following is **not** a view in PowerPoint?
(1) Presentation view (2) Slide sorter view
(3) Slide show view (4) Reading view
(5) Normal view

36. A web address belongs to Sri Lanka is
(1) www.gov.cn (2) www.ausregistry.com.au
(3) www.ox.ac.uk (4) www.nic.sl
(5) www.mohe.gov.lk

37. The most appropriate password for an email account is,
(1) Sachiperera (2) drged#23@BLo (3) Password123
(4) Birthday0910 (5) MataraColombo

38. Object *A* rotates at an angular velocity of 10 rad s^{-1} and its moment of inertia about the rotating axis is 3 kg m^2. Another object *B* of mass 12 kg is executing a linear motion with the same kinetic energy as that of the object *A*. The moving speed of the object *B* is,
(1) 1 m s^{-1} (2) 2 m s^{-1} (3) 3 m s^{-1} (4) 4 m s^{-1} (5) 5 m s^{-1}

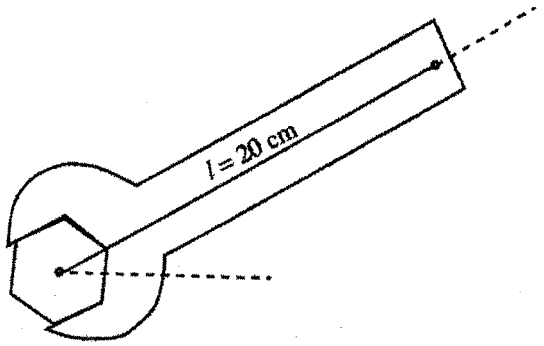
39. Two liquids in two identical calorimeters are at the same temperature. When heat is supplied to them for a same period of time at a constant rate, the final temperature of both liquids becomes equal. Select the correct statement out of the following.
(1) Densities of two liquids are equal.
(2) Masses of two liquids are equal.
(3) Volumes of two liquids are equal.
(4) Heat capacities of two liquids are equal.
(5) Specific heat capacities of two liquids are equal.

40. Under which given situation the maximum heat is dissipated from a circuit having a resistant wire and a cell with negligible internal resistance?
(1) Connecting the wire to the terminals of the cell.
(2) Connecting half of the wire to the terminals of the cell.
(3) Connecting one third of the wire to the terminals of the cell.
(4) Cutting the wire into two equal pieces and connecting them in parallel to the terminals of the cell.
(5) Cutting the wire into three equal pieces and connecting them in parallel to the terminals of the cell

41. A water-pump pumps out 1200 kg mass of water per minute from a tube well of 30 m depth. If water is released with a velocity of 3 m s^{-1}, how much work is done, when the pump runs for an hour? Consider the gravitational acceleration as 10 m s^{-2}

(1) 1.69 J (2) 6.09 kJ (3) 3.24×10^2 kJ (4) 2.16×10^4 kJ (5) 2.19×10^4 kJ

42. A 20 N m torque is needed to untight a tightened nut. A wrench of length 20 cm is used for this purpose as shown in the figure. What is the minimum force should be applied onto the handle of the wrench to untight the nut?



(1) 1 N (2) 5 N (3) 20 N (4) 100 N (5) 200 N

43. Consider the following statements about a transformer.

(A) Use to vary the magnitude of alternating voltage

(B) Step up transformers are used in direct current power supplies.

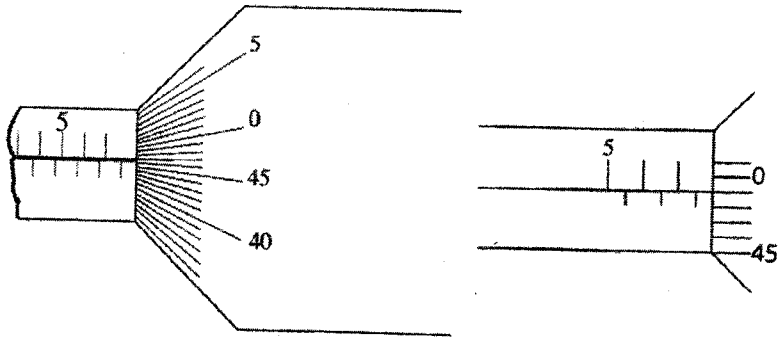
(C) In step down transformers, the number of turns in the secondary coil is greater than the number of turns in the primary coil.

Of the above, the true statement/s is/are

(1) (A) only. (2) (B) only. (3) (C) only.

(4) (A) and (B) only. (5) All (A), (B) and (C).

44. A micrometer screw gauge is having a thimble with 50 divisions and a pitch of 0.5 mm. The reading of it as shown in the figure is,



(1) 7.01 mm (2) 7.49 mm (3) 7.51 mm (4) 7.99 mm (5) 8.00 mm

45. When a car is started, its starter motor draws 50 A of current from the battery of 12 V for 1.2 s. How much electrical energy does the battery supply if its internal resistance is negligible?

(1) 5 J (2) 60 J (3) 500 J (4) 600 J (5) 720 J

46. Which of the following statements on thermal radiation is correct?

(1) A good absorber of thermal radiation is not a good emitter.

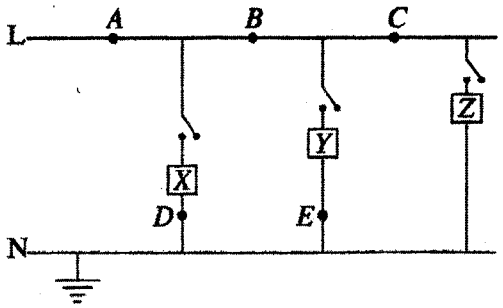
(2) Silver plated glass walls in thermos flask minimize the radiation loss.

(3) Thermal radiation does not belong to electromagnetic waves.

(4) Black clothes are recommended for the warm sunny places, as they do not absorb more heat radiation.

(5) Heat transfers from one place to another only by radiation.

47. A part of a domestic electrical circuit is shown in the figure. *X*, *Y* and *Z* are three electrical apparatus in it. Which is the best position to fix a circuit breaker in order to protect the circuit in the event of short-circuit at any apparatus?

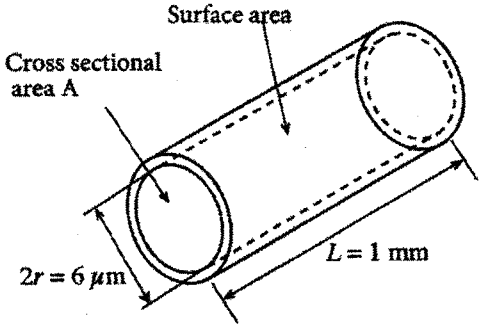


(1) *A* (2) *B* (3) *C* (4) *D* (5) *E*

48. Which of the following statements on stretched wire is correct?

(1) The product of tension and extension gives elastic potential energy stored in it.
(2) Even if the wire is stretched beyond its elastic limit, it will return to the initial length upon removal of the stress.
(3) Tension of the wire is proportional to its extension within the proportional limit.
(4) Stress is equal to the product of the force applied and the cross-sectional area of the wire.
(5) The wire can be stretched only after its elastic limit.

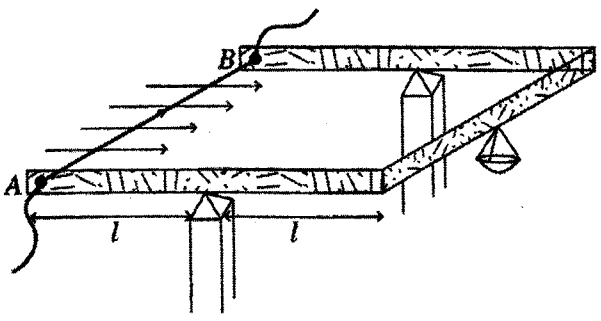
49. The blood flowing rate from the heart of a person at rest is 6 litres per minute and this volume passes through the capillaries at an average speed of 1 mm s^{-1}. A schematic of one capillary is given below. Assume that blood is an incompressible fluid having laminar flow.



If π = 3, the number of capillaries in the body is,

(1) 7.3×10^6 (2) 9.3×10^8 (3) 3.7×10^9 (4) 5.6×10^{10} (5) 2.2×10^{11}

50. In a part of a current balance, a conducting wire is connected between *A* and *B* points of the plastic frame and the system is balanced on the horizontal plane as shown in the figure. The length of the wire is 10 cm and a uniform horizontal magnetic field with 2×10^{-3} T flux density is applied across the wire. If an electric current of 10 A flows in the wire from *A* to *B*, what is the mass required to keep on the pan in order to balance the system on the same horizontal plane? Consider the gravitational acceleration as 10 m s^{-2}.



(1) 0.02 g (2) 0.20 g (3) 2.00 g (4) 0.20 kg (5) 2.00 kg

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