

නව නිර්දේශය / புதிய பாடத்திட்டம் / New Syllabus

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

NEW

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

කාක්ෂණවේදය 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 (x) in accordance with the instructions given on the back of the answer sheet.
- * Use of non-programmable calculators is allowed.

1. The type of sugar present in RNA is
 (1) glucose. (2) fructose. (3) ribose. (4) lactose. (5) sucrose.
2. All bacteria are
 (1) anaerobic. (2) autotrophic.
 (3) pathogenic. (4) unicellular.
 (5) industrially beneficial.
3. Consider the following statements about viruses.
 A - Do not have a cell structure.
 B - Contain both DNA and RNA.
 C - All are obligate parasites.
 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.
4. Consider the following enzymatic reaction.

$$\text{Lactose} \xrightarrow{\text{hydrolysis}} \text{X} + \text{Y}$$
 Of the above reaction, X and Y represent
 (1) Glucose and Sucrose. (2) Fructose and Galactose.
 (3) Glucose and Galactose. (4) Glucose and Fructose.
 (5) Galactose and Maltose.
5. Rough endoplasmic reticulum transports,
 (1) lipids. (2) proteins. (3) fatty acids. (4) minerals. (5) carbohydrates.
6. What is the correct statement given below regarding amino acids?
 (1) A peptide bond is present.
 (2) Carboxylic acids (COOH) and amine (NH₂) groups are present.
 (3) Amine (NH₂) group is attached to the carboxylic acid (COOH) group.
 (4) α-carbon is the carbon atom which belongs to the carboxylic acid (COOH) group.
 (5) Only some amino acids contain a carboxylic acid (COOH) group.
7. What is the reason for mixing citric acid with soap, in the production of soap?
 (1) To neutralize (2) To make acidic (3) To add a colour
 (4) To make the soap dry (5) To remove unreacted fatty acids

8. Consider the following issues faced by a manufacturer in the process of production.
- A - High cost for the transportation of raw materials
 - B - Maintaining the quality of the final product
 - C - Losing raw materials during the pre-processing
- Of the above, what issue/s could be mitigated by maintaining the quality of raw materials?
- (1) A only. (2) B only. (3) C only.
(4) A and B only. (5) B and C only.
9. The amount of heat provided to a system from the surroundings was 100 J. The system retained 40 J and the rest was released to the surroundings. The total energy change in the universe is,
- (1) -40 J. (2) 0 J. (3) 40 J. (4) 60 J. (5) 100 J.
10. A chemical reaction occurs in a production process which involves a solid and a liquid as raw materials. Due to the exothermic nature of the reaction, rate of reaction increases throughout the process. What is the best possible way to maintain the reaction at a constant rate?
- (1) Heating the reaction mixture
(2) Stirring the reaction mixture
(3) Introducing the solid at once to the liquid
(4) Introducing the liquid slowly to the solid
(5) Crush the solid and mixing with the liquid
11. Secondary water treatment is mainly used to
- (1) remove dissolved gasses.
(2) destroy microorganisms.
(3) remove insoluble particles.
(4) remove dissolved metal ions.
(5) remove organic substances.
12. A student states that the usage of HCFC (hydrochlorofluorocarbon) instead of CFC (chlorofluorocarbon) reduces damage to the ozone layer due to the following reasons.
- A - Dissociation of C-H bond in HCFC before reaching the upper atmosphere.
 - B - Absence of Cl in HCFC.
 - C - The amount of HCFC used is less than that of CFC.
- Of the above, the correct reason/s would be
- (1) A only. (2) B only. (3) C only.
(4) A and B only. (5) B and C only.
13. Cleaner production approach used in industries
- (1) minimizes the usage of raw materials.
(2) increases the use of natural resources.
(3) increases the release of waste to the environment.
(4) disconnect industries to make them independent.
(5) redesign the production processes to use clean raw materials.
14. Which of the following statements regarding the water quality parameters is correct?
- (1) BOD represents the total microbial count.
(2) Turbidity indicates the total amount of suspended solids.
(3) COD expresses the amount of dissolved oxygen.
(4) Conductivity represents the amount of dissolved solid compounds.
(5) BOD expresses the amount of total dissolved organic matter.
15. What is expressed by the acid value regarding plant oil?
- (1) pH value
(2) Acidity
(3) Percentage of fatty acids
(4) Amount of free acids
(5) Percentage of triglycerides

16. Which of the following statements is correct, regarding the extraction methods of secondary metabolites?
- (1) Refluxing method requires a large volume of the solvent.
 - (2) Steam distillation produces an extract free of water.
 - (3) Refluxing method is suitable to extract thermally unstable compounds.
 - (4) For steam distillation, plant materials have to be mixed with water.
 - (5) Substances extracted into wax can be separated using ethanol.

17. Consider the following statements regarding essential oils.

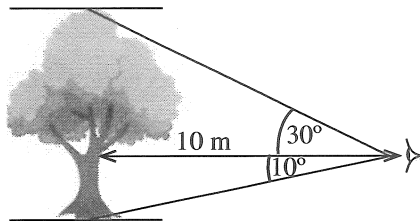
A - Insoluble in water.

B - Volatile organic compounds.

C - Have a characteristic colour.

Of the above, the correct statement/s would be

- (1) A only.
 - (2) B only.
 - (3) A and B only.
 - (4) A and C only.
 - (5) B and C only.
18. Which of the following industries produce glycerol as a byproduct?
- (1) Soap and biodiesel
 - (2) Enamel and emulsion paints
 - (3) Soap and essential oil
 - (4) Biodiesel and essential oil
 - (5) Vinegar and phosphate fertilizer
19. $\frac{7\pi}{6}$ radians in degrees is
- (1) 190.
 - (2) 200.
 - (3) 210.
 - (4) 220.
 - (5) 230.
20. The diagram below shows the angle of depression of the base of the tree and angle of elevation of the top of the tree taken by a wildlife officer from eye level in order to calculate the height of a tree. What is the approximate height of the tree?

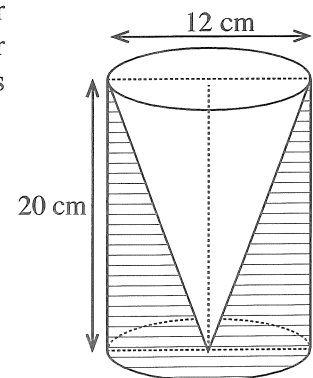


- (1) 5.0 m.
- (2) 5.8 m.
- (3) 6.7 m.
- (4) 7.5 m.
- (5) 18.5 m.

	$\theta = 10^\circ$	$\theta = 30^\circ$
$\sin \theta$	≈ 0.1737	$= 0.5000$
$\cos \theta$	≈ 0.9848	≈ 0.8660
$\tan \theta$	≈ 0.1763	≈ 0.5773

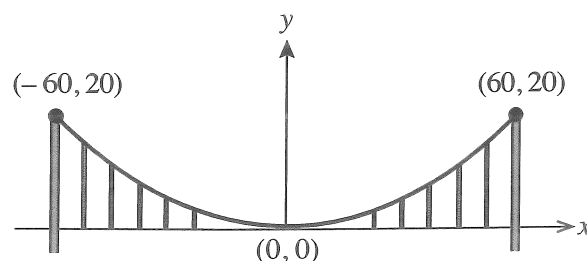
21. To make a hollow wooden toy, a conical cavity of height 20 cm and diameter 12 cm is carved out from a wooden cylinder of the same height and diameter as shown in the figure. What is the **volume** of wood in the toy, in terms of π ?

- (1) $240\pi \text{ cm}^3$
- (2) $480\pi \text{ cm}^3$
- (3) $720\pi \text{ cm}^3$
- (4) $960\pi \text{ cm}^3$
- (5) $1920\pi \text{ cm}^3$



22. The diagram shows a suspension bridge with a parabolic cable hanging between two towers. Coordinates of the two end points of the cable are given. Which of the following equation models the parabolic shape of the cable?

- (1) $y = 180x^2$
- (2) $180y = x^2$
- (3) $180y = -x^2$
- (4) $y = x^2 + 60x + 20$
- (5) $y = x^2 - 60x + 20$



- Questions 23 and 24 are based on the information given below.

A conical shaped strainer of base radius 6 cm (Figure 2) is made by connecting the edges AO and BO of a sector shaped metal sheet of radius 10 cm (Figure 1), without an overlap.

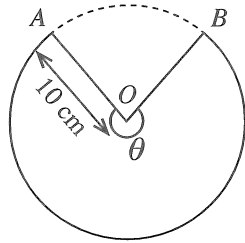


Figure 1

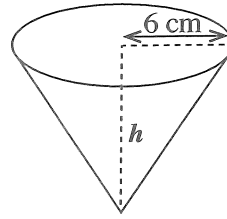
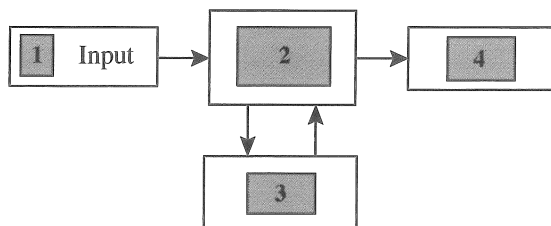
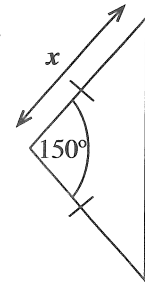


Figure 2

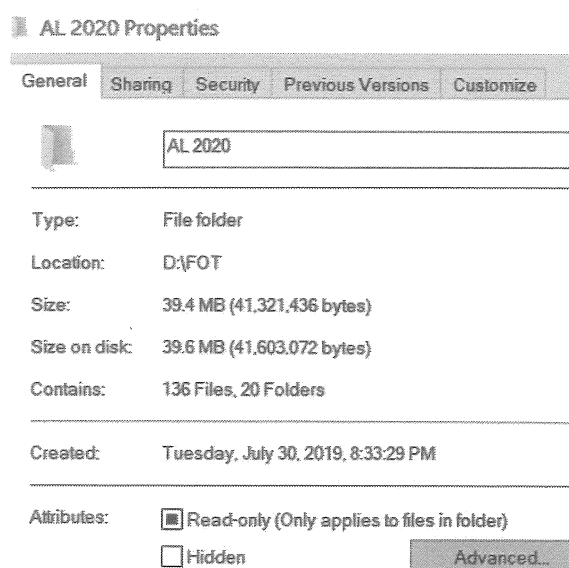
23. What is the perpendicular height h of the strainer?
 (1) 4.0 cm (2) 8.0 cm (3) 10.0 cm (4) 11.6 cm (5) 12.0 cm
24. What approximate angle θ subtended at the centre (Figure 1), in radians, must be used in the sector in order to make this strainer? (Consider $\pi = 3$.)
 (1) 0.64 (2) 0.85 (3) 1.29 (4) 2.51 (5) 3.60
25. The area of the isosceles triangular shaped vegetable plot shown in the figure is 16 m^2 . The equal side lengths are x each. What is the value of x in meters? ($\sin 150^\circ = \frac{1}{2}$)
 (1) $\sqrt{8}$ (2) $\sqrt{16}$ (3) $\sqrt{32}$
 (4) 8 (5) 32
26. What is the total surface area, in terms of π , of a solid hemisphere of base radius 15 cm?
 (1) $300\pi \text{ cm}^2$ (2) $450\pi \text{ cm}^2$ (3) $525\pi \text{ cm}^2$ (4) $675\pi \text{ cm}^2$ (5) $1125\pi \text{ cm}^2$
27. The annual profits/losses (in thousands of rupees) for the first seven years of a company are given below. The negative values indicate the losses.
 $-472, -600, -672, 125, 488, 525, 962$
 What is the range of the above data?
 (1) 290 (2) 490 (3) 837 (4) 1434 (5) 1634
28. The mean score of 20 students for Science for Technology self-marking online examination is 67. However, the class teacher later found that two students' scores of 89 and 72 were incorrectly recorded as 98 and 27 respectively. What is the correct mean value of the students' scores?
 (1) 65.2 (2) 66.1 (3) 67.0 (4) 67.9 (5) 68.8
29. The following diagram shows the relationship among the basic functions of a computer.



Box 1 represents 'Input'. Functions represented by boxes 2, 3 and 4 respectively are,

- (1) Storage, Processing and Controlling, Output.
 (2) Processing and Controlling, Storage, Output.
 (3) Storage, Output, Processing and Controlling.
 (4) Processing and Controlling, Output, Storage.
 (5) Output, Processing and Controlling, Storage.

30. The diagram below provides information about a folder in a computer.



What is the **incorrect** statement regarding the folder?

- (1) The folder contains 20 sub folders.
- (2) The date of creating the folder is 30.07.2019.
- (3) Name of the folder is 'AL 2020 Properties'.
- (4) The number of files in the folder is 136.
- (5) The folder is located in the D partition.

31. What is the name of the toolbar given in the figure?



- (1) Font
- (2) Styles
- (3) Paragraph
- (4) Editing
- (5) Clipboard

32. The bold words in the initial version were changed as shown in the edited version.

Initial version (Before editing)

The **new or** novel corona virus was reported in **Wuhan, China** in December 2019.

Edited version

The ~~new or~~ novel corona virus was reported in **WUHAN, CHINA** in December 2019.

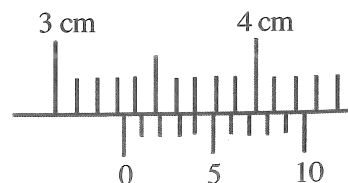
What commands in the 'Font' toolbar were used to make the changes in the edited version?

- (1) Underline, All Caps
- (2) Underline, Small Caps
- (3) Strikethrough, Small Caps
- (4) Strikethrough, All Caps
- (5) Double strikethrough, All Caps

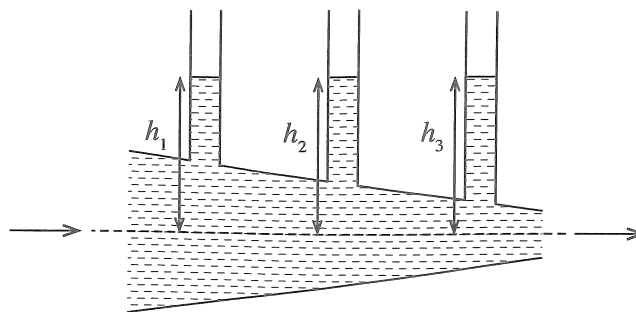
33. How can a 'column width' of a spreadsheet be fit to its 'content width'?

- (1) Single-click on the left boundary of the column heading
- (2) Double-click on the left boundary of the column heading
- (3) Single-click on the right boundary of the column heading
- (4) Double-click on the right boundary of the column heading
- (5) Press **Alt** and single-click anywhere in the column

34. Which set of three cell references given below correctly shows 'absolute column reference' and 'relative row reference'?
- (1) A\$1, A\$10:\$A17, \$X255
 - (2) \$A1, \$A10:\$A17, X\$255
 - (3) \$A1, \$A10:\$A17, \$X255
 - (4) A\$1, \$A\$10:\$A17, \$X255
 - (5) \$A\$1, \$A\$10:\$A17, X\$255
35. What are the correct steps to add a new slide to an existing presentation?
- (1) File, Open
 - (2) File, New
 - (3) Insert, Object
 - (4) Insert, New slide
 - (5) File, Add a new slide
36. In internet terminology IP stands for
- (1) Internet Provider.
 - (2) Internet Password.
 - (3) Internet Protocol.
 - (4) Internet Processor.
 - (5) Internet Programs.
37. What is the **incorrect** recommendation regarding the safe use of e-mails?
- (1) Change your password frequently.
 - (2) Do not reply to spam emails.
 - (3) Always keep the antivirus software up-to-date.
 - (4) Logout from the email account after completing the work.
 - (5) Always enable the auto-saving password mode.
38. What activity is **not** supporting social distancing?
- (1) Internet hacking
 - (2) Online banking
 - (3) e-commerce
 - (4) Video conferencing
 - (5) e-channelling
39. Joule (J) is,
- (1) N m.
 - (2) N m⁻¹.
 - (3) N⁻¹ m⁻¹.
 - (4) N m⁻².
 - (5) N⁻¹ m.
40. The amount of electric charge flowing through a wire per unit time is defined as,
- (1) current.
 - (2) power.
 - (3) resistance.
 - (4) resistivity.
 - (5) voltage.
41. A man of mass 80 kg takes 10 s to climb up a staircase of vertical height 10 m at a constant speed. What is the rate of work done by him? ($g = 10 \text{ N kg}^{-1}$)
- (1) 0.8 kW
 - (2) 8 kW
 - (3) 80 kW
 - (4) 800 kW
 - (5) 8000 kW
42. An electric kettle spends 9 minutes and 20 seconds to raise the temperature of 2 kg of water from 10 °C to 90 °C. What is the power of the kettle?
(Specific heat capacity of water = $4200 \text{ J kg}^{-1} \text{ °C}^{-1}$)
- (1) 1.0 kW
 - (2) 1.2 kW
 - (3) 672 kW
 - (4) 840 kW
 - (5) 1500 kW
43. A spring with a spring constant 40 N cm^{-1} shows an extension of 2.3 cm when an object is hung from it. What is the mass of the object? (Neglect the mass of the spring.)
- (1) 9.0 kg
 - (2) 9.1 kg
 - (3) 9.2 kg
 - (4) 9.3 kg
 - (5) 9.4 kg
44. What is the measurement indicated by the given reading face of a Vernier caliper with the least count of 0.01 cm?
- (1) 0.34 cm
 - (2) 3.04 cm
 - (3) 3.30 cm
 - (4) 3.34 cm
 - (5) 3.40 cm

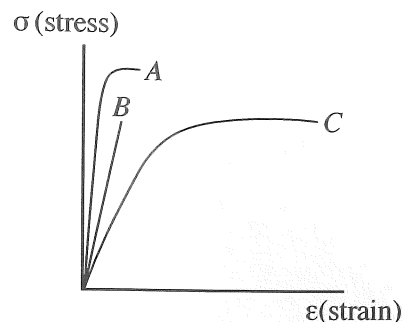


45. When water is at rest, heights of the water columns, h_1 , h_2 and h_3 are the same as given in the setup. What is the correct relationship among the heights of the water columns, when water flows steadily and nonturbulently (streamline flow) to the right at a constant rate?



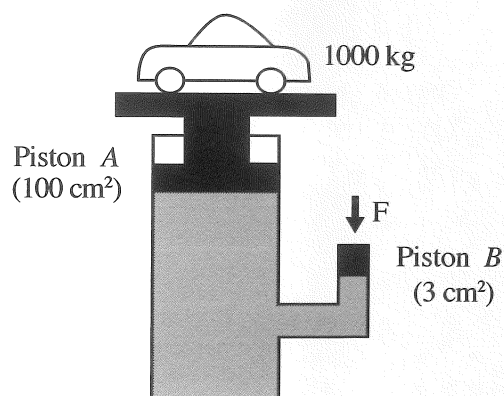
- (1) $h_1 = h_2 = h_3$ (2) $h_1 = h_3 > h_2$
 (3) $h_1 = h_3 < h_2$ (4) $h_1 < h_2 < h_3$
 (5) $h_1 > h_2 > h_3$

46. Figure shows stress versus strain curves for three materials A, B and C. Material with the highest ductility, material with the highest brittleness and the strongest material are respectively represented by graphs



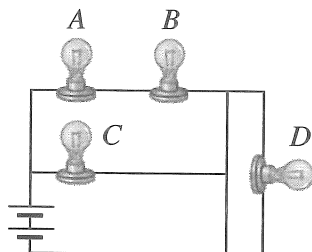
- (1) C, A and B.
 (2) C, B and A.
 (3) B, A and C.
 (4) B, C and A.
 (5) A, B and C.

47. A car of 1000 kg is lifted by a hydraulic pressure system as shown in the figure. If the area of piston A is 100 cm^2 and piston B is 3 cm^2 , what is the minimum force F, that should be applied on the piston B to lift and hold the car? ($g = 10 \text{ N kg}^{-1}$)



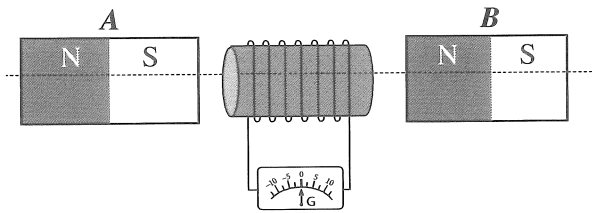
- (1) 3 N
 (2) 25 N
 (3) 30 N
 (4) 100 N
 (5) 300 N

48. Four identical filament bulbs are connected to a battery as shown in the diagram below. What is the correct statement regarding the brightness of the bulbs?



- (1) Bulbs A, B and D glow with the same brightness.
 (2) Brightness of bulbs glow is in the descending order of $C > A > B > D$.
 (3) Bulbs A, B and C glow with the same brightness while D does not light up.
 (4) Bulbs A and B glow with the same brightness while D does not light up.
 (5) Bulb C glows with the highest brightness and D glows with the lowest brightness.

49. A conducting coil is attached to a centre zero galvanometer. Two identical bar magnets, *A* and *B*, are placed besides the coil from equidistance as shown in the figure. What movements of the pair of magnets along the dotted line at a constant speed create a minimum deflection on the galvanometer?



*Right side movement is denoted by \longrightarrow and the left side movement is denoted by \longleftarrow .

	<i>A</i>	<i>B</i>
(1)	At rest	\longleftarrow
(2)	\longrightarrow	At rest
(3)	\longrightarrow	\longleftarrow
(4)	\longleftarrow	\longrightarrow
(5)	\longrightarrow	\longrightarrow

50. Consider the following statements regarding the vacuum region in a thermo flask.

A - It minimizes the heat loss through conduction.

B - It minimizes the heat loss through convection.

C - It minimizes the heat loss through radiation.

Of the above, the correct statement/s would be

(1) A only.

(2) B only.

(3) A and B only.

(4) A and C only.

(5) all A, B and C.
