

GENERAL CERTIFICATE OF EDUCATION BOARD
Technical and Vocational Education Examination

JUNE 2022

INTERMEDIATE LEVEL

Specialty Name and Acronym	ALL INDUSTRIAL SPECIALTIES
Centre No. & Name	
Candidate No.	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room.

5155 ENGINEERING SCIENCE 1: MULTIPLE CHOICE QUESTION PAPER

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the examination begins:

3. Check that this question booklet is headed "**Intermediate Level – 5155 ENGINEERING SCIENCE1.**"
4. Insert the information required in the spaces above.
5. Insert the information required in the spaces provided on the answer sheet using your HB pencil:

Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number.

Take care that you do not erase or fold the answer sheet or make any marks on it other than those asked for in these instructions.

How to answer the questions in this examination:

6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Each question has **FOUR** suggested answers: **A, B, C** and **D**. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.
For example, if **C** is your correct answer, mark **C** as shown below:
[A] [B] **[C]** [D]
8. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
9. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
10. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
11. **You must not take this booklet and the answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.**

Turn Over

1. An example of a scalar quantity is
 - A mass.
 - B momentum.
 - C force.
 - D velocity.
2. Passengers in a fast moving car jerks forward when the car suddenly stops in accordance with
 - A Newton's first law of motion.
 - B Newton's second law of motion.
 - C Newton's third law of motion.
 - D Newton's law of gravitation.

3. A material that has been stretched such that it does not return to its original length is said to have exceeded its
 - A elastic limit.
 - B breaking point.
 - C end point.
 - D rupture point.

4. **Figure 1** shows the readings on a measuring cylinder before and after a small cube of sugar is added.

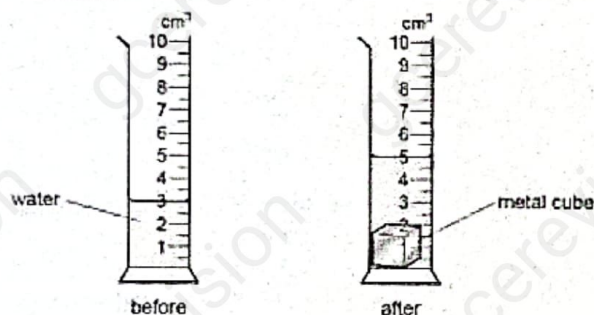


Figure 1

How many more identical cubes can be added to the cylinder, without causing the water to overflow? Do not include the cube already in the cylinder.

- A 1
 - B 2
 - C 3
 - D 4
5. A container is fitted with 500 g of paint. The density of paint is 2 g/cm^3 . What is the volume of the container?
 - A 10 cm^3
 - B 250 cm^3
 - C 250 m^3
 - D 1000 cm^3
6. A 1 kg sample of aluminium is stored in a laboratory. In a different laboratory in the same town, there is a 1 kg sample of iron. Which quantity must these two samples **always** share in common?
 - A The same density.
 - B The same mass.
 - C The same volume.
 - D The same surface area.

7. The property that makes metals good for making cooking utensils is
 - A high coefficient of expansion.
 - B high heat conductivity.
 - C high specific heat capacity.
 - D high electrical conductivity.

8. **Figure 2** shows all the horizontal forces acting on a car that moves along a level road.



Figure 2

Which statement is correct?

- A The car is slowing down.
 - B The car is speeding up.
 - C The car is moving at a constant speed.
 - D The car is moving backwards.
9. The form of energy that sustains life is
 - A potential.
 - B heat.
 - C electrical.
 - D chemical.
10. Which type of energy is converted to thermal energy when atomic nuclei combine?
 - A Chemical.
 - B Kinetic.
 - C Nuclear.
 - D Solar.
11. Which of these sources of energy does not produce noise when used to generate electricity?
 - A Waves
 - B Tidal
 - C Wind
 - D Solar
12. What are the main energy changes taking place in the hydroelectric system shown in **Figure 3**?

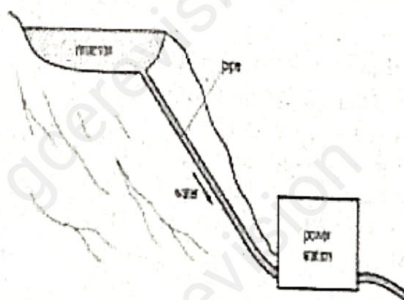


Figure 3

- A Chemical $\rightarrow$ kinetic $\rightarrow$ electrical
 B Electrical $\rightarrow$ gravitation $\rightarrow$ kinetic
 C Potential $\rightarrow$ kinetic $\rightarrow$ electrical
 D Kinetic $\rightarrow$ electrical $\rightarrow$ gravitational

13. A water pump used for irrigation pumps 1000kg of water to a height of 10m in 2s. What is the power of the pump?
 A 5000 W
 B 500 W
 C 500 KW
 D 5000 KW

14. The building material obtained when cement is mixed with sand and water is
 A concrete.
 B glass.
 C gravel.
 D mortar.

15.



Figure 4

Figure 4 shows a tennis player that hits a ball hard and 0.40 s later he hears the echo from a wall. If the speed of sound in air is 330 m/s, how far away is the player from the wall?

- A 66 m
 B 132 m
 C 264 m
 D 825 m
16. If a load of 2 N causes a string of length 50 cm to extend by 10 cm, what will be the new length of the string when a load of 4 N is used?
 A 10 cm
 B 60 cm
 C 30 cm
 D 20 cm

17. A student adds weights to a spring. He measures the length of the spring for each weight. Which law can be verified using this procedure?
 A Newton's second law
 B Hooke's law
 C Ohm's law
 D Joule's law

18. Rainbow is formed when white light passes through clouds because of
 A diffraction.
 B refraction.
 C reflection.
 D dispersion.

19. The reason why someone on the earth sees the moon to be bright in the night though the moon does not produce light is because
 A the moon reflects sunlight to the earth.
 B the earth reflects sunlight to the moon.
 C the moon reflects its shadow to the earth.
 D the earth reflects its shadow to the moon.

20. In figure 5, a thin converging lens is used to produce a focused image of a candle on a screen. Various focused images are produced on the screen by moving the lens and the screen backwards and forwards.

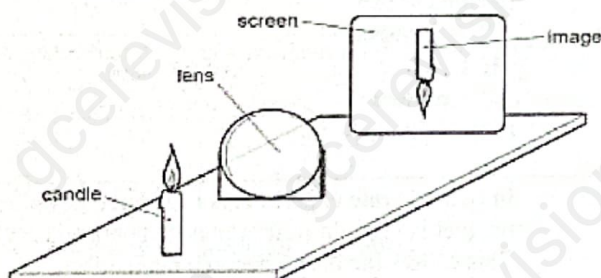


Figure 5

Which statement is **always** correct?

- A The image is at the principal focus.
 B The image is bigger than the object.
 C The image is closer to the lens than object.
 D The image is inverted.
21. The time taken for a wave to undergo one complete oscillation is called
 A period.
 B amplitude.
 C wavelength.
 D frequency.
22. Calculate the wavelength of a wave signal from a radio broadcasting station that sends out signals at a frequency of 2×10^7 Hz. (speed of light in air is 3.0×10^8 m/s)
 A 15 m
 B 6.7 m
 C 1.5 m
 D 10^{14} m

23. Figure 6 represents two sound wave with the two diagrams having the same scale.

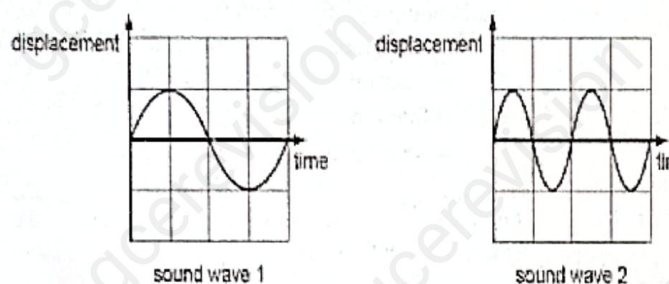


Figure 6

Which statement describes the wave?

- A They are different in loudness and pitch.
 B They are different in loudness but same in pitch.
 C They are same in loudness and same in pitch.
 D They are same in loudness but different in pitch.
24. The flow of current in an electrolyte is due to the movement of
 A electrons.
 B ions.
 C protons.
 D neutrons.

25. In two separate experiments illustrated in figure 7, a magnet is brought near a non-magnetised iron bar. This causes the bar to become magnetised.

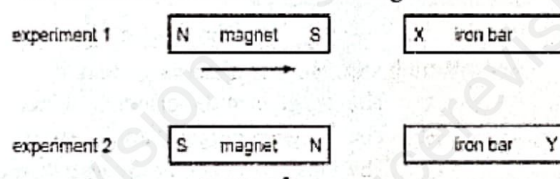


Figure 7

Which magnetic poles are induced at X and at Y?

	Pole induced at X	Pole induced at Y
A	N	N
B	N	S
C	S	N
D	S	S

- 26.

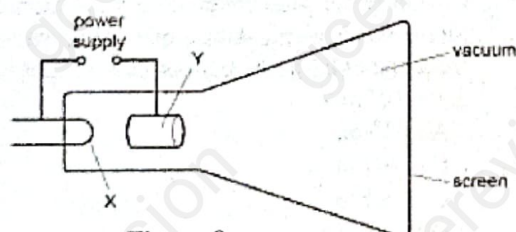


Figure 8

What are the correct labels for X and Y, in the cathode ray tube represented in figure 8?

	X	Y
A	Negative anode	Positive cathode
B	Negative cathode	Positive anode
C	Positive anode	Negative cathode
D	Positive cathode	Negative anode

27. Which copper wire would have the smallest resistance?

- A Long and thick.
 B Short and thick.
 C Short and thin.
 D Long and thin.

28. What is the cost of using four 100 w bulbs for five hours if eneo charges 60 frs per Kwh ?

- A 60 frs
 B 1500 frs
 C 120 frs
 D 3000 frs

29. The combined resistance of two resistors R_1 and R_2 connected in parallel, with R_2 being greater than R_1 is

- A greater than R_1 .
 B the same as R_1 .
 C less than R_1 .
 D greater than R_2 .

30. A Polythene rod repels an inflated balloon hanging from a nylon thread. What charges must the rod and the balloon carry?

- A The rod and the balloon carry opposite charges.
 B The rod and the balloon carry like charges.
 C The rod is charged but the balloon is not.
 D The balloon is charged but the rod is not.

31. Which law is used in determining the the polarity of a solenoid ?

- A Lenz's law.
 B Faraday's law.
 C Ohm's law.
 D Right hand grip rule.

32. Alternating current is

- A current that flows in one direction.
 B current that flows in forward and backward directions.
 C current produced by dry cells.
 D current that opposes the flow of charges.

33. A simple a.c. generator is represented by figure 9 below. Which name is given to part X?

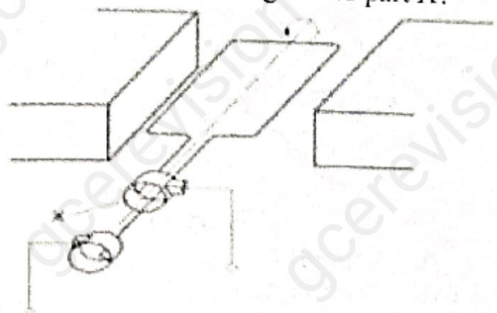


Figure 9

- A split ring
- B axle
- C brushes
- D carbon brush

34. The direction of induced current in a wire cutting a magnetic field can be determined using

- A Right hand grip rule.
- B Flemings left hand rule.
- C Flemings right hand rule.
- D Corkscrew rule.

35. What is the output voltage of a transformer that has 300 turns in the primary and 30 turns in the secondary if the input voltage is 100 V?

- A 5 V
- B 10 V
- C 15 V
- D 20 V

- 36.

Figure 10

The symbol in figure 10 represents a

- A transistor.
- B capacitor.
- C diode.
- D rheostat.

37. Semiconductors find more uses in electronics than conductors mainly because

- A they conduct electricity better.
- B they have two types of charge carriers.
- C they are easier to manufacture.
- D they are cheaper.

38. The means of heat transfer that does not need a material medium is

- A conduction.
- B radiation.
- C convection.
- D evaporation.

39. The temperature at which all molecular activities stop is

- A 0 K.
- B 0 °C.
- C 273 K.
- D 273 °C.

40. Which of the following is common between evaporation and boiling?

- A Takes place at all temperatures.
- B Involves change of state.
- C Brings about cooling.
- D Takes place at a particular temperature.

41. An atom of element X is represented by ${}^A_ZX$

- A It is in group III of the periodic table.
- B It is in group VII of the periodic table.
- C The total number of protons and neutrons is 6.
- D The total number of protons and neutrons is 10.

42. A metal that exist as a liquid at room temperature is

- A copper.
- B silver.
- C gold.
- D mercury.

43. The gas produced during photosynthesis is

- A carbon dioxide.
- B sulphur dioxide.
- C oxygen.
- D methane.

44. What is the electronic configuration of an element with atomic number 18?

- A 2:8
- B 2:8:8
- C 2:8:8:2
- D 2:8:1

45. Urea, $\text{CO}(\text{NH}_2)_2$ is used as a fertilizer. Which of the elements needed by plants is provided by urea.

- A Carbon
- B Hydrogen
- C Nitrogen
- D Oxygen

46. Which of the following processes is a physical change?

- A Rusting of iron.
- B Burning of papers.
- C Melting of ice.
- D Action of acid on metals.

47. The quantity of electricity transferred when a current of 2 A is passed through a copper(II)sulphate solution for 30 minutes is
- A 60 C
 - B 3600 C
 - C 15 C
 - D $\frac{1}{15}$ C

48. A sweating athlete is not comfortable in very humid air because
- A the rate of evaporation is low.
 - B the rate of sweating is low.
 - C there is no evaporation.
 - D the rate of evaporation is high.

49. A possible cause of acid rain is
- A creation of oil pipelines.
 - B creation of coal mines.
 - C discharge of industrial gases into the air.
 - D disposal of plastic wastes into the waters.

50. What is the meaning of the safety symbol in Figure 11?



Figure 11

- A Explosive
- B Harmful
- C Danger
- D Toxic

STOP

NOW GO BACK AND CHECK YOUR WORK