CANDIDATE – PLEASE NOTE!

PRINT your name on the line below and return this booklet with your answer sheet. Failure to do so may result in disqualification.

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TEST CODE **01238010**

FORM TP 2014099

MAY/JUNE 2014

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

PHYSICS

Paper 01 – General Proficiency

1 hour 15 minutes

05 JUNE 2014 (a.m.)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 1 hour and 15 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
4. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

   Sample Item

   The SI unit of length is the

   (A) newton
   (B) metre
   (C) kilogram
   (D) second

   Sample Answer

   The best answer to this item is "metre" so answer space (B) has been shaded.

5. If you want to change your answer, erase it completely before you fill in your new choice.
6. When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, go on to the next one. You may return to this item later. Your score will be the total number of correct answers.
7. Figures are not necessarily drawn to scale.
8. You may do any rough work in this booklet.
9. You may use a silent, non-programmable calculator to answer items.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. When used in front of a unit the prefix, 'mega' means

(A) 10^{-6}
(B) 10^{3}
(C) 10^{3}
(D) 10^{6}

2. If force = mass × acceleration, the unit of force could be written

(A) $kg^{-1}\ m\ s^{2}$
(B) $kg\ m^{-1}\ s^{2}$
(C) $kg\ m^{-1}\ s^{-2}$
(D) $kg\ m\ s^{-2}$

3. The base unit of temperature of the S.I. system is the

(A) Celsius
(B) Fahrenheit
(C) Kelvin
(D) Centigrade

4. Which of the following pairs consist(s) of fundamental quantities?

I. Mass and weight
II. Mass and length
III. Time and current

(A) I only
(B) II only
(C) I and III only
(D) II and III only

5. The time period of a simple pendulum oscillating with a small amplitude depends on the

(A) mass of the pendulum bob
(B) amplitude of the oscillation
(C) length of the pendulum
(D) force with which the pendulum is set into motion

6. Which of the following quantities is defined in terms of SI units?

(A) Current
(B) Charge
(C) Length
(D) Temperature

7. Which of the following measurements has THREE significant figures?

(A) 0.0293 kg
(B) 0.94 A
(C) 5.321 V
(D) 10.42 m

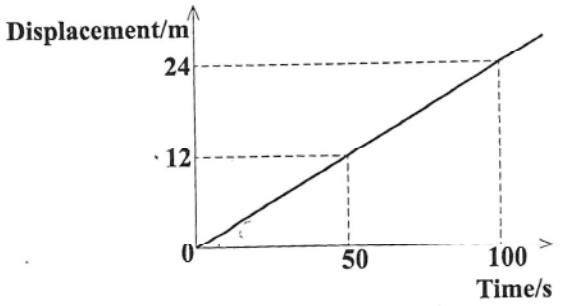
8. The newton-metre is the unit used to measure

(A) force
(B) power
(C) momentum
(D) moment of a force

9. Two forces of 8 N and 10 N CANNOT give a resultant of

(A) 1 N
(B) 2 N
(C) 9 N
(D) 18 N

Item 10 refers to the following graph.



10. The graph above shows how the displacement of a runner from a starting line varies with time. This runner is

(A) not moving
(B) going at a steady speed
(C) going faster and faster
(D) going slower and slower

11. A body moving with a constant acceleration has applied to it

(A) a constant force
(B) a decreasing force
(C) an increasing force
(D) a resultant zero force

12. Two smooth spheres, A and B, collide head on. Which of the following statements is/are TRUE?

I. The momentum of A is the same after collision as it was before.
II. The momentum of B is the same after collision as it was before.
III. The total momentum of A and B is the same after collision as it was before.

(A) I only
(B) III only
(C) II and III only
(D) I, II and III

13. A hydroelectric power station uses a renewable source of energy, X. This energy raises water to the top of a mountain so that it has gravitational potential energy. As the water runs down the mountain, it turns a turbine which converts Y energy into Z energy. Which set of answers for X, Y and Z is correct?

	X	Y	Z
(A)	Electrical	potential	kinetic
(B)	Solar	kinetic	electrical
(C)	Geothermal	potential	electrical
(D)	Chemical	kinetic	electrical

14. A glass marble, X, moving with a speed of 6 m s^{-1}, collides 'head on' with an identical stationary glass marble, Y. What is the velocity of Y after collision assuming that X is brought to rest?

(A) 0 m s^{-1}
(B) 3 m s^{-1}
(C) 6 m s^{-1}
(D) 12 m s^{-1}

15. On which of the following features does the pressure at a point in a liquid depend?

I. Density of the liquid
II. Depth from the surface
III. Area of the cross section of the container

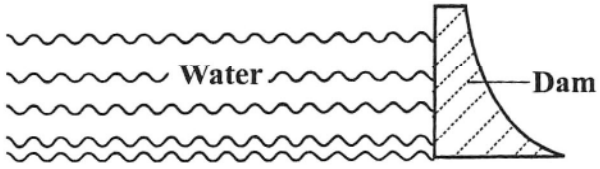
(A) I only
(B) III only
(C) I and II only
(D) I, II and III

16. Which of the following implements are designed to take advantage of a large moment provided by a relatively small force?

I. Claw hammer
II. Crowbar
III. Pair of tweezers
IV. Pair of wire cutters

(A) I and IV only
(B) III and IV only
(C) I, II and III only
(D) I, II and IV only

Item 17 refers to the following diagram which shows a dam.



17. The pressure on the dam at the bottom of the reservoir depends on the

(A) depth of the water
(B) volume of water held by the dam
(C) mass of water held back by the dam
(D) length of the reservoir

18. A piece of string is tied onto a small stone and the stone is then suspended, totally immersed, in water. The tension in the string will be

(A) zero
(B) equal to the weight of the stone
(C) less than the weight of the stone
(D) more than the weight of the stone

19. Which of the following would explain why an ordinary 0–110°C laboratory thermometer is NOT used to measure human body temperature?

I. The reading would change when the thermometer is taken from the patient's mouth.
II. It is not sensitive enough to measure small changes in temperature.
III. It does not have a large enough range.

(A) I only
(B) I and II only
(C) II and III only
(D) I, II and III

20. Which of the following is the MOST suitable range for a clinical thermometer?

(A) 0 °C to 44 °C
(B) –10 °C to 110 °C
(C) 35 °C to 100 °C
(D) 35 °C to 44 °C

21. In which of the following is conduction the MAIN method of energy transfer?

(A) Food heated in a microwave oven
(B) Energy transferred from the sun to earth
(C) Food being cooked on a barbecue grill
(D) Food being cooked in a pot on an electric stove

22. When illuminated smoke is viewed through a microscope, small, bright specks can be seen moving in a jerky haphazard manner. These specks are

(A) atoms
(B) molecules
(C) smoke particles
(D) light particles

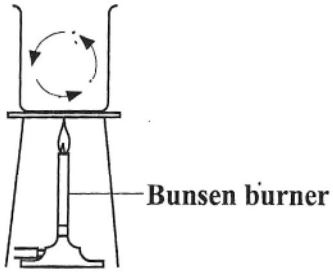
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23. Most refrigerators are painted white because a white suface is

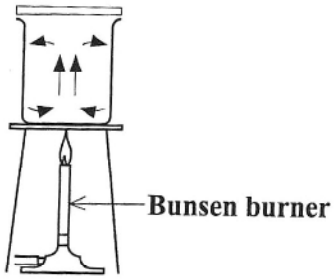
(A) easily cleaned
(B) a good reflector of thermal radiation
(C) a good absorber of radiation
(D) a poor reflector of radiation

24. Which of the following diagrams BEST illustrates convection current in a liquid?

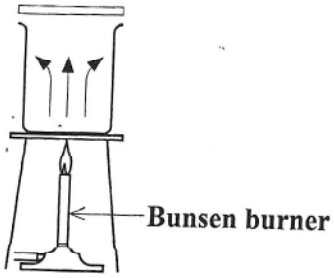
(A)



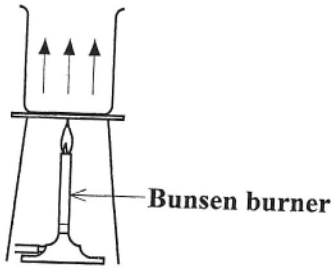
(B)



(C)



(D)



25. The heat from a nearby fire reaches us MAINLY by

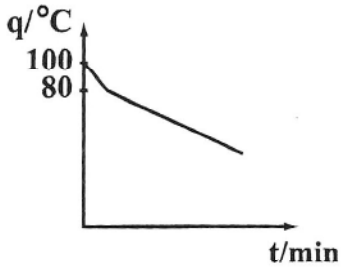
(A) conduction
(B) convection
(C) absorption
(D) radiation

26. A flask contains air under pressure. Some of the air is let out slowly over a period of 10 seconds. When the flask is closed the

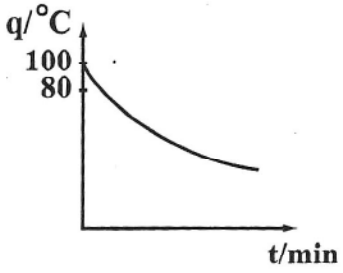
(A) pressure of the air in the flask will have increased
(B) volume of air in the flask will have decreased
(C) temperature in the flask will have increased
(D) number of molecules striking the wall per second will have decreased

27. Some molten naphthalene at 100 °C is allowed to cool down to room temperature. If naphthalene has a melting point of 80 °C, which of the following graphs BEST represents the cooling curve?

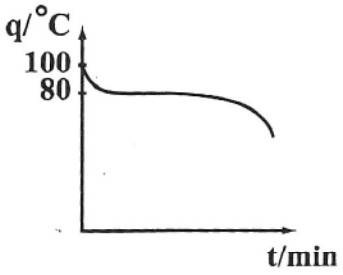
(A)



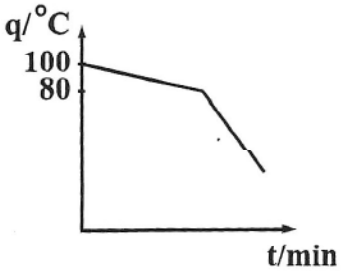
(B)



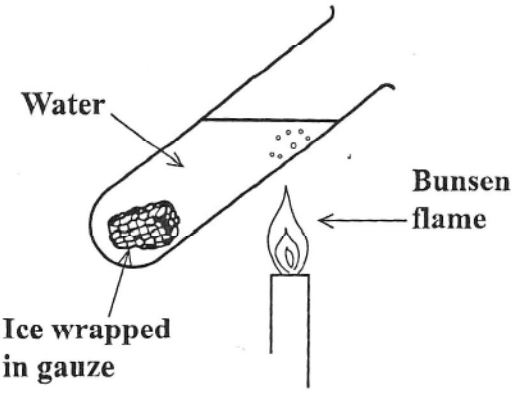
(C)



(D)



Item 28 refers to the diagram below which shows water boiling at the top of a glass test tube while a piece of ice remains unmelted at the bottom.



28. Which of the following statements is the reason for this occurrence?

(A) Water is a poor conductor of heat.
(B) Gauze is a poor conductor of heat.
(C) Water is a good conductor of heat.
(D) Glass is a good conductor of heat.

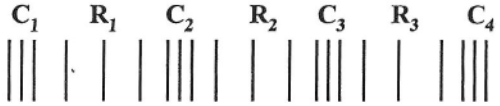
29. Which of the following waves travel(s) only as longitudinal waves?

I. Sound
II. Radio
III. Water

(A) I only
(B) II only
(C) II and III only
(D) I, II and III

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Item **30** refers to the following diagram which shows a longitudinal wave, where, C and R represent compressions and rarefractions respectively.



30. If λ = wavelength, the distance between C_1 and R_2 is

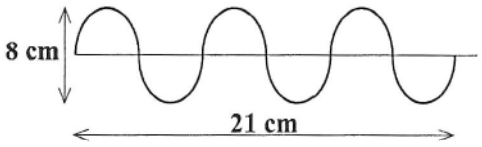
(A) $\frac{1}{2}\lambda$

(B) 1λ

(C) $1\frac{1}{2}\lambda$

(D) 2λ

Item **31** refers to the following diagram.



31. The diagram above illustrates the side view of a water wave. The amplitude of the wave is

(A) 4 cm
(B) 7 cm
(C) 8 cm
(D) 21 cm

Item **32** refers to the following diagram.

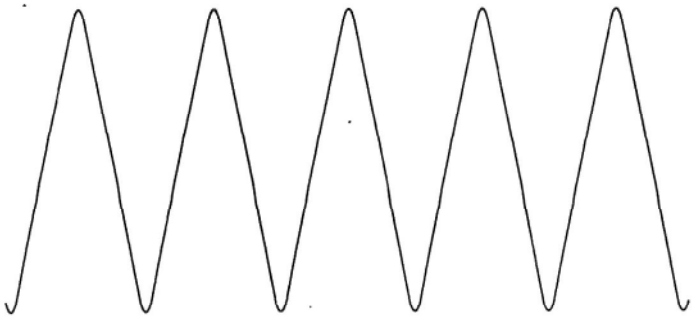


32. The figure above shows the profile of a water wave. Using the same scale, which diagram below represents a wave twice the frequency and half the amplitude in the same tank of water?

(A)



(B)



(C)



(D)



33. Which of the following statements provides a reason why the diffraction of light is NOT usually observed?

(A) Its wavelength is too small.
(B) Its frequency is too high.
(C) Its speed is too high.
(D) Its wavelength is too large.

34. On which of the following would the position of an image formed by a plane mirror depend?

(A) Distance of the observer from the mirror
(B) Distance of the object from the mirror
(C) Angle at which the image is viewed
(D) Angle at which the object is viewed

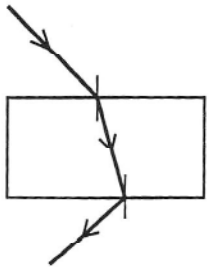
35. Which of the following can produce a diminished virtual image of a real object?

I. A plane mirror
II. A diverging lens
III. A converging lens

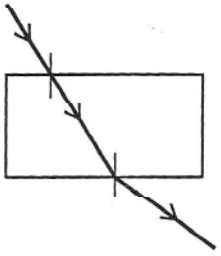
(A) I only
(B) II only
(C) II and III only
(D) I, II and III

36. Which diagram BEST shows the path taken by the ray of light through the rectangular block?

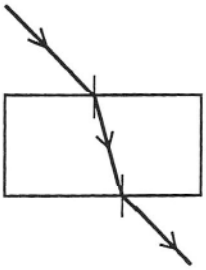
(A)



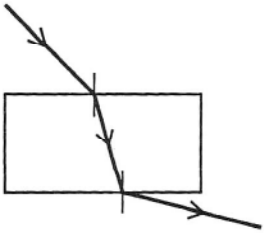
(B)



(C)

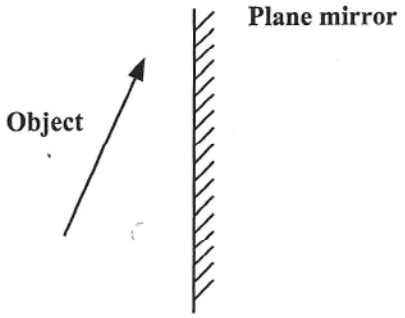


(D)



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Item 37 refers to the following diagram.



37. The diagram above represents an object placed in front of a plane mirror. Which of the following BEST represents the image produced by the plane mirror?

(A) 

(B) 

(C) 

(D) 

38. Which of the following statements about waves is TRUE?

(A) Only transverse waves undergo reflection.
(B) Longitudinal waves do not undergo refraction, but may be reflected.
(C) Diffraction can only take place with light waves.
(D) All waves undergo reflection, refraction and diffraction.

39. An echo is quieter than the original sound that produced it. This shows that, compared to the original sound, the echo has a

(A) smaller amplitude
(B) shorter wavelength
(C) lower frequency
(D) slower speed

40. Which of the following electromagnetic waves has the SHORTEST wavelength?

(A) Gamma rays
(B) Infrared waves
(C) Radio waves
(D) Ultraviolet radiation

41. Which of the following objects can detect X-rays?

(A) Thermometers
(B) Photographic film
(C) Oscilloscopes
(D) Television aerials

42. Which of the following is NOT one of the ways in which the strength of the magnetic field near a solenoid (long coil) carrying a current can be increased?

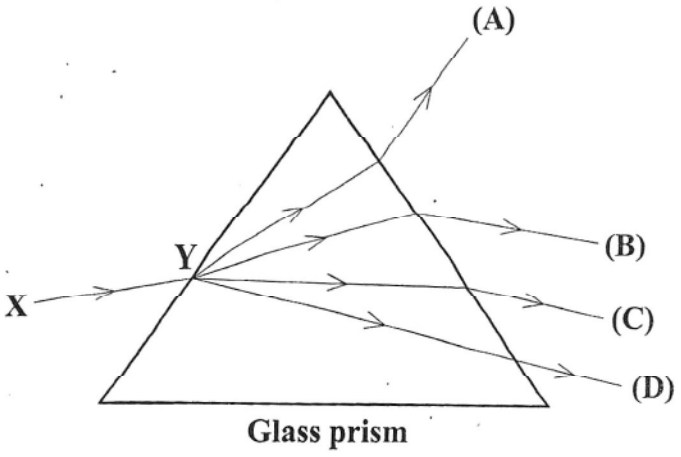
(A) Increasing the resistance of the coil
(B) Increasing the current in the coil
(C) Increasing the number of turns per unit length of the coil
(D) Placing a soft iron core inside the coil

43. Which of the following statements is/are TRUE about the image formed by a plane mirror?

I. It is virtual.
II. It is laterally inverted.
III. It is magnified.

(A) I only
(B) I and II only
(C) II and III only
(D) I, II and III

44. Which of the labelled paths, A, B, C or D in the diagram below, is correct for the ray XY?



45. Total internal reflection in glass occurs when

(A) the angle of incidence is 90°
(B) the critical angle is exceeded
(C) all the light is transmitted
(D) the incident ray is perpendicular to the glass boundary

46. Which of the following circuit symbols represents a fuse?

(A) 
(B) 
(C) 
(D) 

47. An ammeter has a very low resistance so that it can be placed

(A) in parallel with a component and not affect the circuit
(B) in series with a component and not affect the circuit
(C) in parallel with a component and the ammeter does not heat up
(D) in series with a component and the ammeter does not heat up

48. Which of the following materials is MOST suitable for the core of an electromagnet?

(A) Copper
(B) Steel
(C) Carbon
(D) Soft iron

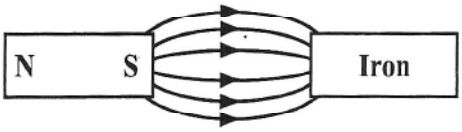
49. Which of the following pairs of statements is true for BOTH iron and steel?

	Iron	Steel
(A)	easily magnetised	does not retain its magnetism
(B)	not easily magnetised	retains its magnetism well
(C)	easily magnetised	retains its magnetism well
(D)	not easily magnetised	does not retain its magnetism

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50. Which of the following shows the magnetic field between a bar magnet and a piece of iron?

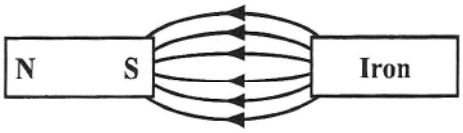
(A)



(B)



(C)



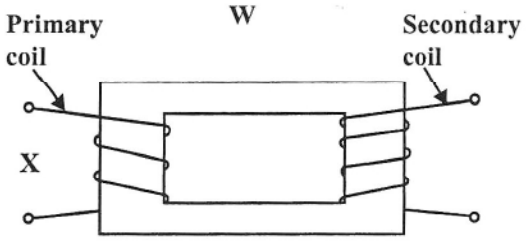
(D)



51. Steel is NOT suitable for use in an electromagnet because it

(A) is too difficult to magnetise
(B) retains magnetism too well
(C) loses its magnetism too easily
(D) contains too many domains

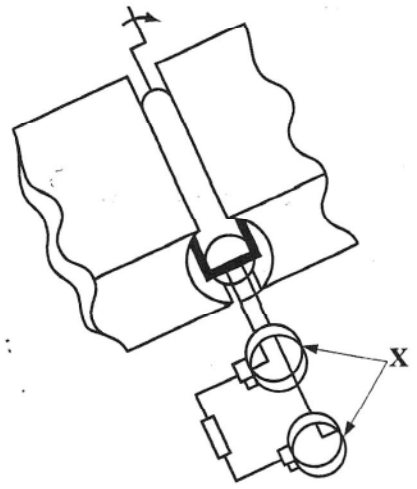
Item **52** refers to the following diagram.



52. Appropriate labels for W and X would be

	W	X
(A)	step-up transformer	a.c. input
(B)	step-up transformer	d.c. input
(C)	step-down transformer	a.c. input
(D)	step-down transformer	d.c. input

Item 53 refers to the following diagram of a simple a.c. generator.



53. The parts labelled X in the diagram are known as the

(A) coils
(B) armatures
(C) commutators
(D) slip rings

54. Which of the following is TRUE when a magnet is moved relative to a coil?

I. The induced current is in the same direction as the charge causing it.
II. The greater the number of turns of coil the smaller the induced e.m.f.
III. The faster the magnet moves relative to the coil the greater the induced e.m.f.
IV. The stronger the magnetic field the greater the induced e.m.f.

(A) I and III only
(B) I and IV only
(C) II and III only
(D) III and IV only

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55. Which of the following is TRUE for the relative charges on the neutron, proton and the electron?

	Relative charge on neutron	**Relative charge on proton**	**Relative charge on electron**
(A)	0	+1	-1
(B)	+1	0	-1
(C)	+1	-1	0
(D)	0	+1	0

Items **56–57** refer to the following table.

Nuclei	Atomic Mass	Neutron Number
P	16	8
Q	13	9
R	18	10
S	21	11

56. Which element follows $^{7}_{3}Li$ in the Periodic Table?

(A) P
(B) Q
(C) R
(D) S

57. The nuclide $^{234}_{90}Th$ contains

(A) 90 protons and 234 neutrons
(B) 235 protons and 90 neutrons
(C) 90 protons and 144 neutrons
(D) 144 protons and 90 neutrons

58. Which of the following symbols would be possible for an isotope of nuclide presented by $^{A}_{Z}X$?

I. $^{A-2}_{Z}X$

II. $^{A}_{Z-2}X$

III. $^{A+2}_{Z}X$

(A) I only
(B) II only
(C) III only
(D) I and III only

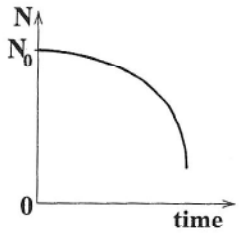
59. Which of the following scientists is associated with the relationship $E = mc^2$?

(A) Marie Curie
(B) Isaac Newton
(C) Albert Einstein
(D) J. J. Thompson

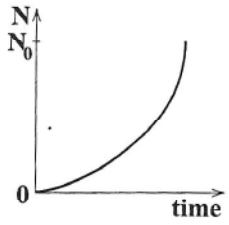
60. N_0 radioactive nuclei are present in a sample at time $t = 0$.

Which of the following graphs BEST represents the variation with time of the number, N, of undecay nuclei present?

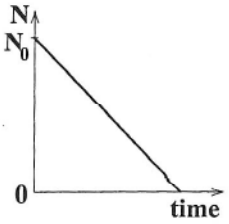
(A)



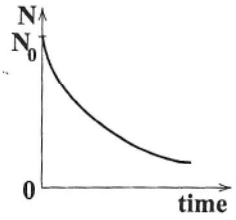
(B)



(C)



(D)



END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.