GIRNE AMERICAN UNIVERSITY

SCHOLARSHIP & ENTERANCE EXAM

30TH JUNE 2017

SCIENCE

Duration of the exam is 160 minutes.
Science Exam consists of 160 questions.
Please use the answer key sheet for your final answers.
Wrong answers will not affect your correct aswers.
Calculators are not allowed to use in the exam.

GOOD LUCK :)

Name Surname:_____

Phone Number:_____

Signature:_____

ENGLISH

A. Read the following paragraph to answer the two questions below (Questions 1&2).

Tailgating another vehicle is unsafe and illegal. Many rear-end collisions are caused by drivers following too close to the vehicle in front of them. The rules state that a driver must keep sufficient distance from the vehicle in front in order to stop safely and avoid a collision. Drivers should allow a minimum two seconds' gap between their vehicle and the one ahead. At sixty kilometres an hour, this equates to thirty-three metres; at a hundred it equates to fifty-five metres. More distance is needed to safely stop in rain or poor visibility.

Question 1 - Tailgating another vehicle is unsafe because:

A: all rear end collisions are caused by drivers following too close to the vehicle in front.

B: it may not allow sufficient time and space to stop and avoid a collision.

C: it is against the road rules.

D: it is a reckless practice.

E: None of these.

Question 2 - 'More distance is needed to safely stop in rain or poor visibility.' We can infer from this that:

A: people drive faster in rain and poor visibility.

B: the writer is merely calculating on the safe side.

C: braking is more hazardous in rain and poor visibility.

D: the road rules state that this must be so.

E: All of these.

B. Read the following paragraphs to answer the next two questions (Questions 3&6).

There is a place forty kilometres north-east of Portland, Victoria, which makes for an unusual visit. It is Lake Condah. Here are to be found remains of aboriginal settlements: the circular stone bases of several hundred huts, rock-lined water channels, and stone tools chipped from rock not normally found in the area. One of the attractions of Lake Condah long ago was its fish and the most startling evidence of aboriginal technology and engineering to be found there are the systems built to trap fish. Water courses had been constructed by redirecting streams, building stone sides and even scraping out new channels. At strategic spots, they piled rocks across the water courses to create weirs and build funnels to channel eels and fish into conical baskets. This is an eel-fishing technique which has hardly changed to the present day. Beside some of the larger traps, there are the outlines of

rectangular, stone-lined ponds, probably to hold fish and keep them fresh. On the bluffs overlooking the lake, stone circles are all that remain of ancient dwellings. Not all of the stones were quarried locally. The huts vary in size, but all have gaps for doorways located on the lee side, away from the prevailing wind. One theory is that the stone walls were only waist to shoulder high, with the top roofed by branches and possibly packed with mud. The site presents a picture of a semi-settled people quite different from the stereotype of nomadic hunter-gatherers of the desert.

Question 3 - The word ‘stereotype’, as used in the above passage, means:

A: distant culture.

B: opposite picture.

C: electronic print version.

D: standard view.

E: None of these.

Question 4 - Lake Condah is seen as unusual, mainly because:

A: it is so close to a main town.

B: there are remains of buildings still to be seen.

C: it reveals a society that was at least partly settled and had building and engineering skills.

D: there is evidence that some of the building stone was imported.

E: it shows the lake dwellers were totally reliant on fish for a food source.

Question 5 - The sentence below does not have any punctuation. Choose the option with the correct punctuation. one of these days said mary youll get into trouble

A: One of these days, said Mary, you’ll get into trouble.

B: “One of these days,” said Mary “you’ll get into trouble”

C: “One of these days,” said Mary. “You’ll get into trouble.”

D: “One of these days,” said Mary, “you’ll get into trouble.”

E: “One of these days,” said Mary: “youll get into trouble.”

Question 6 - What does this sentence suggest? A bird in the hand is worth two in the bush.

A: Your own possessions are always worth more to you.

B: Birds are hard to catch, so hang on to one if you catch it.

C: To have something is better than having nothing at all.

D: A trained bird is twice the value of an untrained one.

E: There is no point in being envious.

C. Read the text below and decide which answer A, B, C or D best fits each space. There is an example at the beginning (0).

HAPPINESS

In recent years there has been a remarkable increase in (0) A into happiness. The researchers have (7) _____ a number of factors which contribute to a definition of happiness. First of all, there is, in some people, a moderate genetic predisposition to be happy: in other words, happiness (8) _____ in families. It seems to correlate quite (9) _____ with the main dimensions of personality: extroverts are generally happier, neurotics are less so. Second, people often (10) _____ good social relations as a reason for their happiness. In particular, friends are a great (11) _____ of joy, partly because of the agreeable things they do together, partly because of the way friends use positive non-verbal (12) _____, such as caressing and touching, to affirm their friendship. Marriage and similar (13) _____ relationships can also form the basis of lasting happiness. Third, job satisfaction undoubtedly (14) _____ overall satisfaction, and vice versa-perhaps this is why some people are happy in boring jobs: it (15) _____ both ways. Job satisfaction is caused not only by the essential nature of work, but (16) _____ by social interactions with co-workers. Unemployment, on the (17) _____ can be a serious cause of unhappiness. Fourth, leisure is important because it is more under individual (18) _____ than most other causes of happiness. Activities (19) _____ sport and music, and participation in voluntary work and social clubs of various kinds, can give great joy. This is partly because of the (20) _____ themselves, but also because of the social support of other group members- it is strong (21) _____ the case of religious groups.

0. A. research	B. inquiry	C. examination	D. study	E.investigation
7. A. fallen back on	B. gone in for	C. got down to	D. come up with	E.go on
8. A. arrives	B. runs	C. goes	D. descends	E.doubled
9. A. strongly	B. nearly	C. firmly	D. hardly	E.well
10. A. explain	B. prefer	C. talk	D. report	E.invest

11. A. meaning	B. origin	C. base	D. source	E.original
12. A. movements	B. motions	C. slogans	D. signals	E.crises
13. A. near	B. close	C. tight	D. heavy	E.easy
14. A. consists of	B. applies to	C. contributes to	D. counts on	E.go on
15. A. works	B. effects	C. makes	D. turns	E.next
16. A. too	B. as well	C. also	D. plus	E.extra
17. A. common	B. contrast	C. comparison	D. contrary	E.opposite
18. A. check	B. power	C. control	D. choice	E.contrast
19. A. like	B. such	C. so	D. thus	E.However
20. A. facilities	B. activities	C. exercises	D. amenities	E.join
21. A. by	B. for	C. in	D. with	E.buy

D. Choose the option which best completes each of the following sentences.

22. Never _____ business with that company. They are unreliable.

a) make b) do c) run d) come e) play

23. Can you help me with this suitcase?

a) It doesn't close. b) It can't close. c) It won't close. d) – e) It wouldn't close

24. "What did you say?" " _____ It wasn't important."

a) Don't worry. b) Give up! c) I don't care. d) I don't mind e) Never mind.

25. No one knows why he resigned, _____ ?

a) does one b) don't they c) do they d) have they e) haven't they

26. The red curtains began to _____ after they had been hanging in the sun for three months.

a) dissolve b) fade c) melt d) pure e) hard

27. It is said that _____ people in the region have lost their homes.

a) thousands of b) several thousands c) almost fifty thousands

d) nearly thousand e) a thousand

28. “Would you mind spelling your surname?” “ _____ .”

a) No, not at all. b) You’re quite right. c) No, of course. d) never mind e) I never.

29. Why didn’t she let _____ ?

a) them go b) them to go c) to go them d) be them e) to their

30. A shop - _____ is somebody who steals from shops.

a) thief b) shoplifter c) robber d) cage e) lifter

31. She is always so naughty I can’t imagine how anyone puts _____ with her.

a) up b) off c) – d) in e) on

32. He _____ her of marrying him for his money.

a) blamed b) warned c) accused d) threaten e) hit

33. The party lasted _____ all night.

a) through b) - c) for d) thus e) despite

34. “Why are your hands dirty?” “ I _____ my motorbike.”

a) repaired b) have been repairing c) was repairing d) had repaired e) would repair

35. Watch out! This pile of books _____ !

a) will fall b) will be falling c) is going to fall d) didn’t fall e) would fall

36. They are hoping to _____ an in-house magazine next year.

a) begin b) eject c) launch d) stop e) crack

37. This meat is tough. You have to _____ it for a long time.

a) eat b) bite c)break off d) twitch e) chew

38. How long _____ French before she went to France?

a) has she been studying b) she studied c) had she been studying d) did she studied e) would studied she

39. They were made _____ it.

a) do b) to do c) done d) doing e) did

40. They congratulated her _____ doing so well in her exams.

a) on b) for c) of d) with e) off

41. She feels really _____. She's been doing this job for too long.

a) broke b) tied up c) burnt out d) come over e) turn up

42 "Stop laughing!" "We can't _____."

a) help it b) hold ourselves c) do anything against it d) steal that! e) stopped

43. _____ you hurry, you won't catch the train.

a) There b) Except c) If d) Never e) Unless

44. When it's his _____ to buy a drink he says he doesn't have enough money to pay .

a) time b) term c) turn d) take e) try

45. I'm afraid I'll never understand my children. The generation _____ is unbridgeable.

a) gap b) conflict c) hole d) space e) crisis

46. What would you do if you _____ Susan?

a) meet b) would meet c) did met d) had met e) met

E. Choose the option which best completes each of the following sentences.

47. "Pass the sugar, will you?" „ _____ ."

a) Please. b) Here you are. c) Help yourself to it. d) you welcome. e) why not.

48. The weather wasn't _____ to go for a walk so they decided to stay at home.

a) too good b) good enough c) so good d) not bad e) worse than

49. She’s never met _____ friendly people before.

a) such b) that c) so d) so far e) enough

50. Mr Brown _____ forty cigarettes a day.

a) used to smoke b) used to smoking c) uses to smoke d) don’t smoked e) smoked

51. We are _____ into our new flat next month.

a) arriving b) entering c) moving d) falling e) willing

52. John _____ every day after school.

a) gets riding b) goes on a bike c) goes cycling d) went to cycle e) didn’t cycle

53. I’m sure the book _____ into Polish soon.

a) will be translated b) will translate c) was translated d) won’t speak e) doesn’t say

54. They’ve had this house _____ twenty years.

a) from b) for c) since d) during e) then

55. Let me _____ what happened.

a) to explain b) that I explain c) explain d) don’t say e) been said

56. We were all very _____ when we saw her new boyfriend.

a) surprised b) surprising c) surprise d) shock e) shocked

57. Don’t give the waiter a _____. The service was very slow.

a) bill b) money c) tip d) trip e) said

58. Look at _____ ! Why are they so dirty?

a) themselves b) them c) their d) us e) our

59. Could you buy _____ bread on the way home?

a) a b) any c) some d) a lot of e) such

60. Who _____ to do that?

a) wants b) does want c) want d) will you e) would not

MATHS

61. What are the solutions of the quadratic equation

$$4x^2 - 8x - 12 = 0$$

(A) $x = -1$ and $x = -3$

(B) $x = -1$ and $x = 3$

(C) $x = 1$ and $x = -3$

(D) $x = -1$ and $x = -2$

(E) $x = 1$ and $x = 2$

62. Which of the following is equivalent to the sum of the expressions $(a^2 - 1)$ and $(a + 1)$?

(A) $a^2 + a$

(B) $a^3 - 1$

(C) $2a^2$

(D) a^3

(E) $a + 1$

63. If $a^2 + b^2 = z$ and $ab = y$, which of the following is equivalent to $4z + 8y$?

(A) $(a + 2b)^2$

(B) $(2a + 2b)^2$

(C) $(4a + 4b)^2$

(D) $(4a + 8b)^2$

(E) $(2a + b)^2$

64. Which of the following is equivalent to $9^{\frac{5}{4}}$?

(A) $\sqrt[5]{9}$

(B) $\sqrt[4]{9}$

(C) $\sqrt{3}$

(D) $3\sqrt{3}$

(E) $2\sqrt{3}$

65. $2(p+1)+8(p-1)=5p$

What value of p is the solution of the equation above?

(A) $\frac{2}{5}$

(B) $\frac{4}{5}$

(C) $\frac{6}{5}$

(D) 1

(E) $\frac{5}{6}$

66. $\frac{(x^2-1)(x-1)}{(x+1)}$

Which of the following is equivalent to the expression above?

(A) x^2-1

(B) $x+1$

(C) $(x+1)^2$

(D) x^2+1

(E) $(x-1)^2$

67. A linear function has two coordinates $(-2,-5)$ and $(-5,-3)$. What is the slope of this function?

(A) $-\frac{3}{2}$

(B) $-\frac{2}{3}$

(C) $\frac{2}{3}$

(D) $\frac{3}{2}$

(E) $\frac{1}{3}$

68. $f(x) = \frac{2}{x} + 3x$

According to the function above, what is the value of $f(\frac{2}{3})$?

(A) $\frac{2}{3}$ (B) 1 (C) 5 (D) 6 (E) 2

69. If $\frac{x-1}{3} = k$ and $k = 3$, what is the value of x?

(A) 2

(B) 4

(C) 9

(D) 7

(E) 10

70. $3x+4y=-23$
$2y-x=-19$

What is the solution (x, y) to the system of equations above?

(A) $(-5,-2)$

(B) $(3,-8)$

(C) $(4,-6)$

(D) $(9,-6)$

(E) $(2,-8)$

71. If $16 + 4x$ is 10 more than 14, what is the value of $8x$?

(A) 8

(B) 4

(C) 16

(D) 32

(E) 2

72. In $xy - plane$, the point $(3,6)$ lies on the graph of the function $f(x) = 3x^2 - bx + 12$. What is the value of b?

(A) 10

(B) 11

(C) 12

(D) 13

(E) 14

73. If h hours and $30\ minutes$ is equal to $450\ minutes$, what is the value of h?

(A) 7

(B) 5

(C) 8

(D) 10

(E) 6

74. If $(3x + 2)(5x + 1) = ax^2 + bx + 2$, what is the value of $a - b$?

(A) 28

(B) 20

(C) 15

(D) 9

(E) 2

75. If $x^2 = 0{,}1$, what is the value of x^{-4}?

(A) 0,1

(B) 1

(C) 10

(D) 100

(E) 1000

76. $4n(n+8) = 36$

What is the product of the two solutions to this equation?

(A) -12

(B) -9

(C) 0

(D) 9

(E) 12

77. Which of the following expressions is equivalent to

$$\frac{15x^2-27x-6}{x-2}$$

(A) $5x+1$

(B) $3(5x+1)$

(C) $15x^2-28-4$

(D) $15x-35$

(E) $5x-1$

78. If $y:z = 1:3$ and $z:a = 2:3$ what ratio is equal to $y:a$?

(A) $2:9$

(B) $1:3$

(C) $1:2$

(D) $2:3$

(E) $1:9$

79. $\sqrt{x+1} = 6$

Which of the following is a value of x for the equation above?

(A) 6

(B) 32

(C) 33

(D) 34

(E) 35

80. What is the average of $(2x + 4)$, $(5x - 1)$ and $(-x + 3)$?

(A) $x + 2$

(B) $x - 2$

(C) $2x + 2$

(D) $2x - 2$

(E) $x + 1$

81. Logan bought 36 pieces of bubble gum, which was 40% of the store's stock. How much bubble gum is remaining in the store?

(A) 54

(B) 72

(C) 80

(D) 90

(E) 60

82. For the inequality $2x + y > 15$, when $x = 3$, which of the following cannot be a possible value of y?

(A) 9

(B) 10

(C) 11

(D) 12

(E) 13

83. If $5^{x+4} = 25^{x+3}$, what is the value of x?

(A) -2

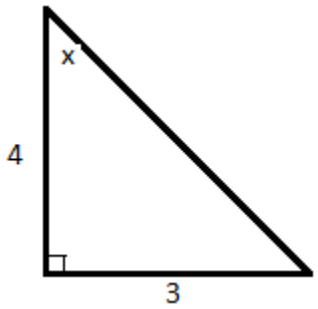
(B) -1

(C) 0

(D) 1

(E) 2

84.



In the figure above, what is the value of $\sin x$?

(A) $\frac{3}{5}$ (B) $\frac{3}{4}$ (C) $\frac{4}{5}$ (D) $\frac{5}{3}$ (E) $\frac{4}{3}$

85. If a sector of a circle with an angle of $60°$ has an area of 24π, what is the radius of this circle?

(A) 8

(B) 4

(C) 12

(D) 16

(E) 20

BIOLOGY

86. The skin, kidneys and lungs are all involved in
A) Digestion
B) Excretion
C) Reproduction
D) Transport
E) Circulatory

87. Which structure contains genes?
A) the cell membrane of an animal cell
B) the cytoplasm of an animal cell
C) the nucleus of a plant cell
D) the vacuole of a plant cell
E) the cell wall of an animal cell

88. Which cell type contains the most chloroplasts?
A) palisade mesophyll
B) phloem
C) stomata
D) spongy mesophyll
E) xylem

89. What is true for a runner, at the end of a marathon race, in a hot climate?
A) evaporation
B) sweating and vasoconstriction
C) sweating and vasodilation
D) vasoconstriction only
E) vasodilation only

90. When a person is frightened, adrenalin is released by the adrenal glands. What are the effects of the adrenalin?

	breathing rate	**heart beat rate**
A)	decreased	decreased
B)	decreased	increased
C)	increased	decreased
D)	increased	increased
E)	no change	no change

91. What crosses the placenta from fetal blood to maternal blood in larger quantities than from maternal blood to fetal blood?
    A) amino acids
    B) vitamins
    C) glucose
    D) oxygen
    E) carbon dioxide

92. What is true of the chromosomes present in the daughter nuclei after meiosis and after mitosis?

	meiosis	**mitosis**
A)	identical	identical
B)	identical	non identical
C)	non identical	identical
D)	non identical	non identical
E)	none of the above	none of the above

93. What is a mutation?
    A) a change in a gene or chromosome
    B) a condition caused by a recessive allele
    C) a process used in genetic engineering
    D) a type of discontinuous variation
    E) none of the above

94. What could be a consequence of deforestation?
    A) more habitats are produced for animals and plants.
    B) more transpiration may increase rainfall.
    C) rainwater runs off the land causing flooding.
    D) soil erosion is less likely
    E) all of the above

95. Small molecules are used as the basic units in the synthesis of large food molecules. Which statement is correct?
   A) amino acids are basic units of carbohydrates.
   B) fatty acids are basic units of glycogen.
   C) glycerol is a basic unit of protein
   D) simple sugar is a basic unit of protein.
   E) glycerol is a basic unit of oils.

96. Which blood vessel has a high carbon dioxide concentration, a low oxygen concentration and a high blood pressure?
   A) aorta
   B) pulmonary artery
   C) pulmonary vein
   D) vena cava
   E) capillaries

97. Which description of anaerobic respiration in yeast is correct?

	it produces alcohol	it releases more energy than aerobic respiration
A)	identical	identical
B)	identical	non identical
C)	non identical	identical
D)	non identical	non identical
E)	none of the above	none of the above

98. What is an example of excretion in mammals?
   A) the release of hormones from glands
   B) the release of saliva into the mouth
   C) the removal of undigested food through the anus
   D) the removal of urea by the kidneys
   E) all of the above

99. Which name is given to the observable features of an organism?
   A) alleles
   B) genes
   C) genotype
   D) mutant
   E) phenotype

100. A gene for insulin is taken from a human cell and placed in a bacterium. The bacterium can then make human insulin. What is this process called?

A) artificial selection
B) genetic engineering
C) heterozygous inheritance
D) natural selection
E) selective breeding

101. Which substance catalyses the breakdown of fats to fatty acids and glycerol?

A) adrenaline
B) alcohol
C) bile
D) lipase
E) progesterone

102. Which process is not part of the carbon cycle?

A) combustion
B) photosynthesis
C) respiration
D) transpiration
E) all of the above

103. Which environmental condition is not needed for the germination of seeds?

A) carbon dioxide
B) oxygen
C) warmth
D) water
E) H_2O

104. What is a description of transpiration?

A) exchange of gases between the leaf and the atmosphere
B) loss of water vapor from the leaves and stems of a plant
C) movement of water from the roots to the leaves
D) movement of water through the cells of the leaf
E) movement of air through the cells of the leaf

105. Why is yeast used in bread making?

A) to provide alcohol
B) to provide protein
C) to provide oxygen
D) to provide lactic acid
E) to provide carbon dioxide

106. In one type of plant, the allele for red flowers (R) is dominant to the allele for white flowers (r). A plant with red flowers is crossed with a plant with white flowers. Half of the offspring have red flowers and half have white flowers. What are the genotypes of the parent plants?

A) R and r
B) RR and rr
C) Rr and Rr
D) Rr and rr
E) none of the above

107. A red blood cell is placed in a concentrated sugar solution. What happens and why?

A) the cell bursts as sugar molecules diffuse into it.
B) the cell bursts because the concentrated sugar solution enters it.
C) the cell shrinks because sugar molecules leave it.
D) the cell shrinks because water leaves it.
E) the cell dies.

108. When a bright light is shone into the eye, the diameter of the pupil decreases. What is this an example of?

A) accommodation
B) a simple reflex
C) photosynthesis
D) voluntary response
E) respiration

109. A protease is added to a cloudy suspension of protein in a test-tube and kept at 37°C. After eight minutes, the suspension changes from cloudy to transparent. Which product, or products, will now be present in the test-tube?

A) amino acids
B) fatty acids
C) glycerol
D) simple sugars
E) lactic acid

110. In a reflex action, which term describes light, temperature and chemicals?

A) effectors
B) impulses
C) receptors
D) stimuli
E) none of the above

CHEMISTRY

111. The symbols of two atoms may be written as shown.

$^{52}_{23}X$ $^{52}_{24}Y$

Which statement about these atoms is correct?

(A) They are different elements because they have different numbers of neutrons.

(B) They are different elements because they have different numbers of protons.

(C) They are isotopes of the same element because they have the same nucleon number.

(D) They are isotopes of the same element because they have the same proton number.

(E) They are different elements because they have different symbols.

112. A fruit drink coloured orange contains a dissolved mixture of red and yellow colouring agents.

One of these colouring agents is suspected of being illegal.

Which method could be used to show the presence of this illegal colouring agent?

(A) Chromatography

(B) Distillation

(C) Evaporation

(D) Filtration

(E) Crystallisation

113. In which compounds are pairs of electrons shared between atoms?

1 sodium chloride

2 methane

3 lead bromide

(A) 1 only

(B) 2 only

(C) 1 and 3

(D) 1, 2 and 3

(E) None of them

114. Which name is given to mixtures of metals?

(A) Alloys

(B) Compounds

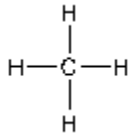
(C) Ores

(D) Salts

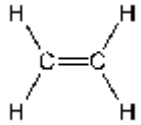
(E) Mixtures

115. Which structure shows a compound that belongs to a different homologous series to propane?

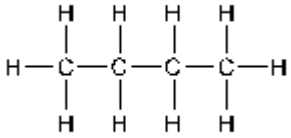
(A)



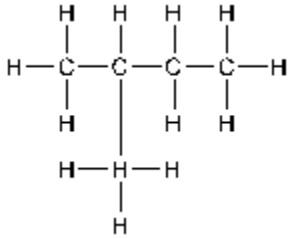
(B)



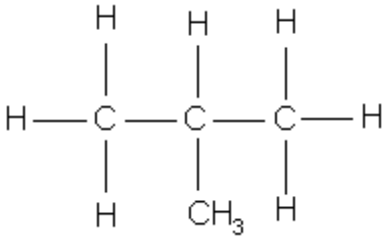
(C)



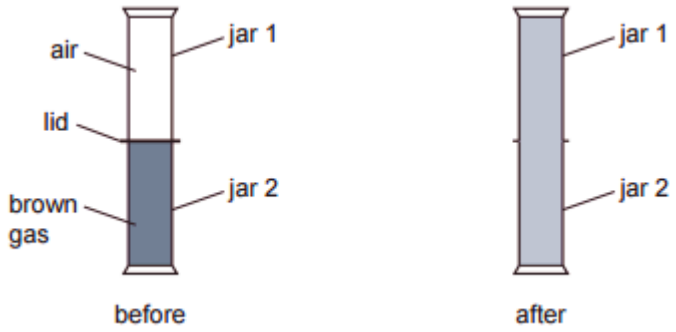
(D)



(E)



116. Two gas jars are set up as shown.



The lid is removed and the gas jars are left to stand. After some time the contents of both gas jars are brown.

Which process causes this to happen?

(A) Condensation

(B) Evaporation

(C) Filtration

(D) Melting

(E) Diffusion

117. Which statement describes positive ions?

(A) Positive ions have more electrons than neutrons.

(B) Positive ions have more protons than neutrons.

(C) Positive ions have more electrons than protons.

(D) Positive ions have more protons than electrons.

(E) Positive ions have no electrons

118. Iron is extracted from iron oxide using carbon monoxide as shown.

İron (II) oxide + carbon monoxide → iron + carbon dioxide

Which statement is correct?

(A) Carbon monoxide is oxidised to carbon dioxide.

(B) Carbon monoxide is reduced to carbon dioxide.

(C) Iron is oxidised to iron oxide.

(D) Iron oxide is oxidised to iron.

(E) Iron oxide is reducing agent.

119. Methyl orange turns red in the solution formed when substance R reacts with water. What is R?

(A) Calcium oxide

(B) Potassium oxide

(C) Sodium oxide

(D) Aluminium oxide

(E) Sulfur dioxide

120. Which metal reacts with steam but not with cold water?

(A) Calcium

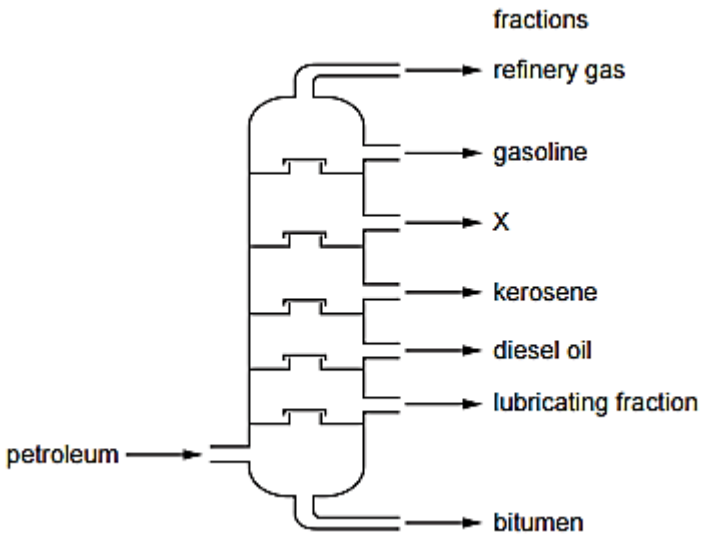
(B) Copper

(C) Sodium

(D) Zinc

(E) Magnesium

121. What is the name of fraction X?



(A) Alcohol

(B) Fuel oil

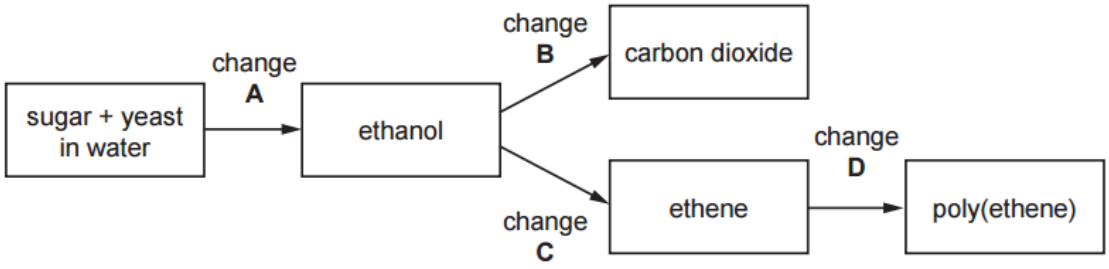
(C) Naphtha

(D) Paraffin

(E) Ethanal

122. Which change on the diagram involves combustion?

Some of the reaction products are not shown on the diagram.



(A) Change A

(B) Change B

(C) Change C

(D) Change D

(E) Both Change B and C

123. What do the nuclei of $^{1}_{1}H$ hydrogen atoms contain?

(A) Electrons and neutrons

(B) Electrons and protons

(C) Neutrons only

(D) Protons only

(E) Electrons, protons and neutron

124. How many atoms of hydrogen are there in a molecule of ethanol, C_2H_5OH?

(A) 1

(B) 2

(C) 5

(D) 6

(E) 12

125. Iron forms an oxide with the formula Fe_2O_3.

What is the relative formula mass of this compound?

(A) 72

(B) 76

(C) 100

(D) 136

(E) 160

126. The rate of a reaction depends on temperature, concentration, particle size and catalysts.

Which statement is not correct?

(A) Catalysts can be used to increase the rate of reaction.

(B) Higher concentration decreases the rate of reaction.

(C) Higher temperature increases the rate of reaction.

(D) Larger particle size decreases the rate of reaction.

(E) Higher concentration increases the rate of reaction.

127. Caesium chloride and rubidium bromide are halide compounds of Group I elements.

Caesium chloride has the formula ……**1**……, a relative formula mass ……**2**…… that of rubidium bromide and bonds that are ……**3**…… .

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
(A)	CaCl	different from	ionic
(B)	CaCl	the same as	covalent
(C)	CsCl	different from	ionic
(D)	CsCl	the same as	covalent
(E)	$CsCl_2$	different from	ionic

128. Which products are formed at the electrodes when a concentrated solution of sodium chloride is electrolysed?

	Cathode (–)	**Anode (+)**
(A)	Hydrogen	Chlorine
(B)	Hydrogen	Oxygen
(C)	Sodium	Chlorine
(D)	Sodium	Oxygen
(E)	Sodium	Hydroxide

129. Aluminium is the most common metal in the Earth's crust.

Which is not a property of aluminium?

(A) Low density

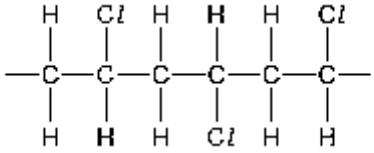
(B) Resistance to corrosion

(C) Good conductor of electricity

(D) Poor conductor of heat

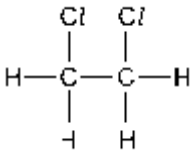
(E) Good conductor of heat

130. The diagram shows three repeat units in the structure of an addition polymer.

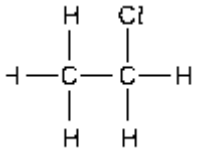


Which alkene monomer is used to make this polymer?

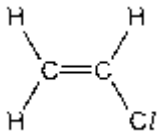
(A)



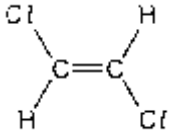
(B)



(C)

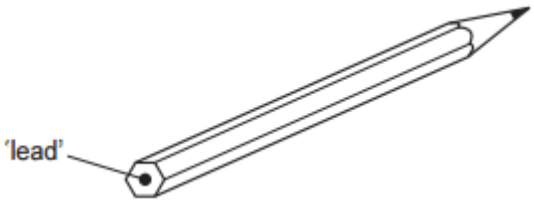


(D)



(E) None of them above

131. The ‘lead’ in a pencil is made of a mixture of graphite and clay.



If the percentage of graphite is increased, the pencil slides across the paper more easily.
Why is this?

(A) Graphite conducts electricity.

(B) Graphite is a form of carbon.

(C) Graphite is a lubricant.

(D) Graphite is a non-metal.

(E) Graphite is black in colour.

132. Which statement about gaseous hydrogen chloride and solid potassium chloride is correct?

(A) Hydrogen chloride is covalent but potassium chloride is ionic.

(B) Hydrogen chloride is ionic but potassium chloride is covalent.

(C) They are both covalent compounds.

(D) They are both ionic compounds.

(E) None of them above.

133. Calculate the number of atoms in one mole of hydrogen peroxide, H_2O_2.

[The Avogadro constant, L = 6.0×10^{23} mol^{-1}]

(A) 1.5×10^{23}

(B) 6.0×10^{23}

(C) 1.2×10^{24}

(D) 2.4×10^{24}

(E) 1.5×10^{24}

134. Element R is in Group 1 of the Periodic Table and element T is in Group 6. R and T are not the symbols for the elements.
The compound of R and T will have the formula

(A) RT

(B) RT_6

(C) RT_2

(D) R_2T_2

(E) R_2T

135. Magnesium nitrate is decomposed by heat in the following reaction.

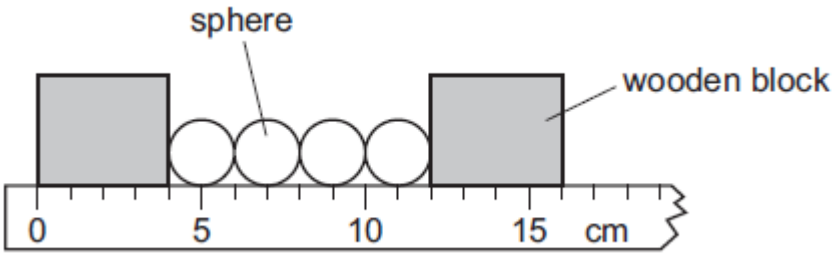
$$2Mg(NO_3)_2\ (s) \rightarrow 2MgO(s) + 4NO_2\ (g) + O_2\ (g)$$

In an experiment, 0.10 mol of magnesium nitrate was heated. What is the maximum volume of gas, measured in dm^3 at room temperature and pressure, which could be obtained?
[Molar volume of a gas = 24 $dm^3\ mol^{-1}$ at room temperature and pressure]

(A) 0.24
(B) 2.4
(C) 4.8
(D) 0.48
(E) 6.0

PHYSICS

136) The diagram shows four identical spheres placed between two wooden blocks on a ruler.



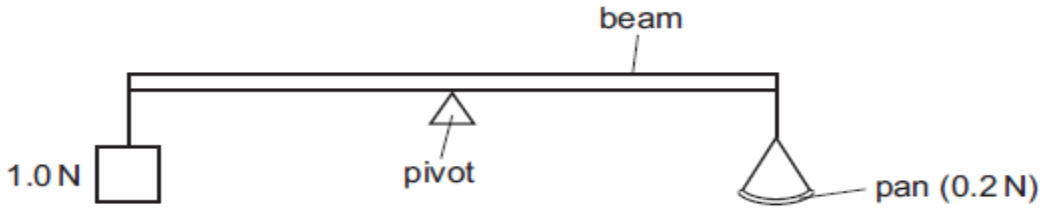
What is the diameter of one sphere?
A) 1.0 cm
B) 2.0 cm
C) 3.0 cm
D) 4.0 cm
E) 5.0 cm

137) What does the area under a speed-time graph represent?
A) Acceleration
B) Average speed
C) Instantaneous speed
D) Deceleration
E) Distance travelled

138) A car travels 100 km. The journey takes two hours. The highest speed of the car is 80 km / h, and the lowest speed is 40 km / h. What is the average speed for the journey?

A) 20 km/h
B) 40 km/h
C) 50 km/h
D) 60 km/h
E) 120 km/h

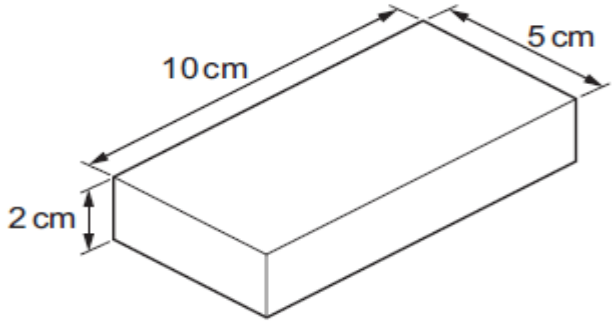
139) The diagram shows a uniform beam being used as a balance. The beam is pivoted at its centre. A 1.0 N weight is attached to one end of the beam. An empty pan weighing 0.2 N is attached to the other end of the beam.



How many 0.1 N weights must be placed on the pan in order to balance the beam?

A) 5
B) 7
C) 8
D) 10
E) 12

140) A metal block has the dimensions shown. Its mass is 1000 g.



What is the density of the metal?

A) $\left(\frac{5\times10}{1000\times2}\right)$ g/cm^3
B) $\left(\frac{2\times5\times10}{1000}\right)$ g/cm^3
C) $\left(\frac{1000\times2}{5\times10}\right)$ g/cm^3
D) $\left(\frac{2}{5\times10\times1000}\right)$ g/cm^3
E) $\left(\frac{1000}{2\times5\times10}\right)$ g/cm^3

141) The diagrams show four identical objects. Each object is acted on by only the three forces shown. Which object accelerates to the right, with the smallest acceleration?

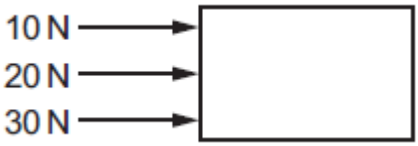
A)

B)

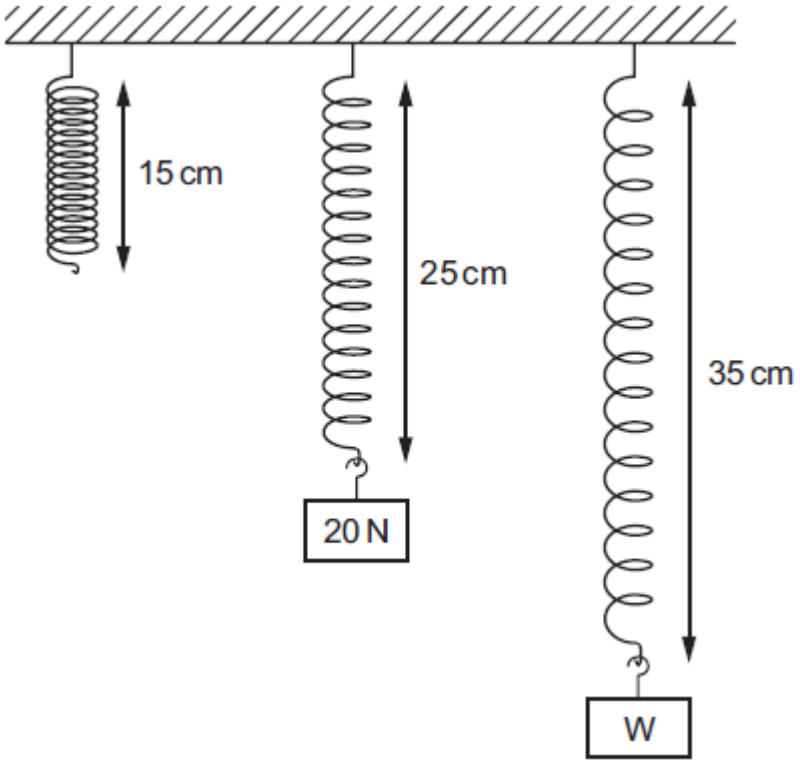
C)

D)

E)



142) Different weights are hung from a spring. The diagram shows the original length of the spring, and the lengths when different weights are added.



The extension of the spring is directly proportional to the weight hung from it. What is the weight of W?

A) 25 N
B) 30 N
C) 35 N
D) 40 N
E) 45 N

143) Which source of energy involves the splitting of heavy atoms?

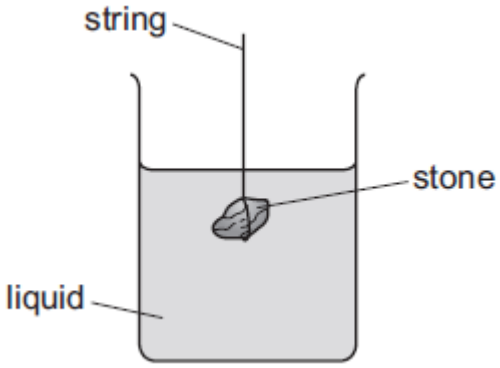
A) Chemical Energy
B) Hydroelectric Energy
C) Geothermal Energy
D) Nuclear Energy
E) Wind Energy

144)A cyclist travels down a hill from rest at point X, without pedalling. The cyclist applies his brakes and the cycle stops at point Y.

Which energy changes have taken place between X and Y?

A) gravitational potential → kinetic → thermal (heat)
B) gravitational potential → thermal (heat) → kinetic
C) thermal (heat) → kinetic → gravitational potential
D) kinetic → gravitational potential → thermal (heat)
E) kinetic → thermal (heat) → gravitational potential

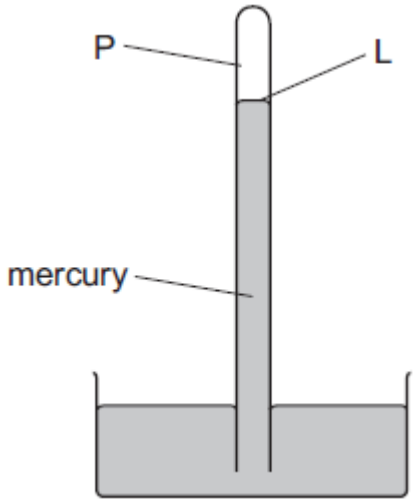
145) The diagram shows a stone suspended under the surface of a liquid from a string. The stone experiences a pressure caused by the liquid.



What would increase the pressure on the stone?

A) decreasing the surface area of the stone
B) increasing the mass of the stone
C) lowering the stone deeper into the liquid
D) using a liquid with a lower density
E) using more strings

146) The diagram shows a simple mercury barometer, used to measure atmospheric pressure.



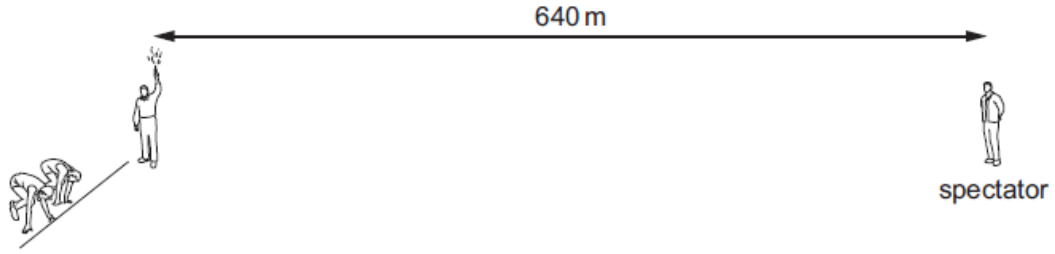
Atmospheric pressure decreases. Which row states what happens to the pressure at point P and what happens to the level L?

	Pressure at P	**Level L**
A)	Decreases	Falls
B)	Decreases	Rises
C)	Stays the same	Falls
D)	Stays the same	Rises
E)	Doesn't change	Rises

147)Puddles of rain water remain after a storm. The water in the puddles gradually evaporates. How does the evaporation affect the temperature of the water remaining in the puddle, and how does it affect the average speed of the remaining water molecules in the puddle?

	Temperature of water in puddle	**Average speed of water molecules in puddle**
A)	Decreases	Decreases
B)	Decreases	Doesn't change
C)	Decreases	Increases
D)	Increases	Decreases
E)	Increases	Increases

148) A man holding a starting pistol stands 640 m away from a spectator.



The spectator hears the sound of the starting pistol 2.0 s after seeing the flash from the pistol. Using this information, what is the speed of sound in air?

A) 160 m/s
B) 320 m/s
C) 640 m/s
D) 840 m/s
E) 1280 m/s

149) Which group contains only non-ferrous metals?

A) aluminium, brass, iron
B) brass, copper, lead
C) copper, iron, steel
D) copper, lead, steel
E) aluminium, steel, brass

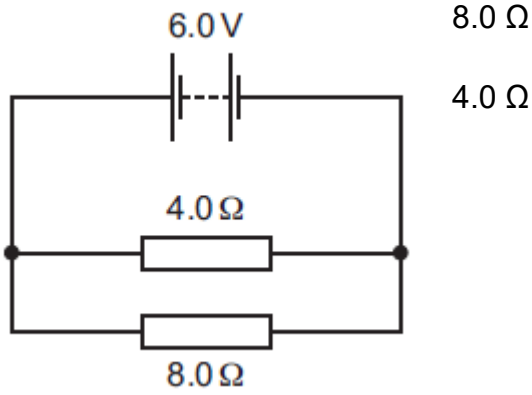
150)A student has wires of different lengths and different diameters. The wires are all made of the same metal.

The student measures the resistance of one wire. Which wire has a greater resistance than the wire he has measured?

A) a shorter wire with a larger diameter
B) a shorter wire with the same diameter
C) a wire of the same length with a larger diameter
D) a wire of the same length with a smaller diameter
E) none of the above

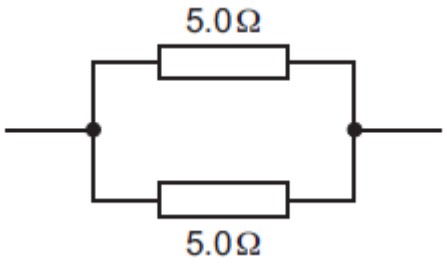
151)The circuit diagram shows a 4.0 Ω resistor and an resistor connected to a 6.0 V battery.

What is the potential difference (p.d.) across the resistor?



A) 0.5 V
B) 1 V
C) 2 V
D) 4 V
E) 6 V

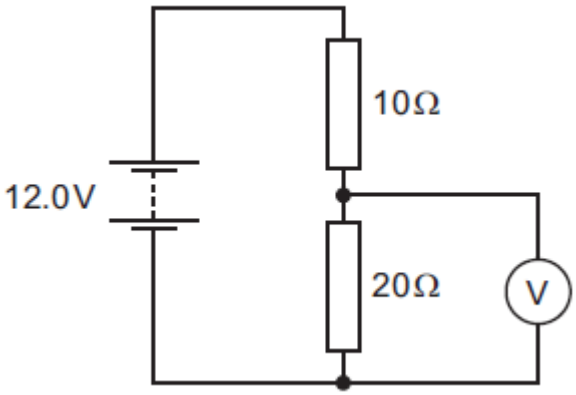
152) Two 5.0 Ω resistors are connected as shown in the diagram.



What is the total resistance of this combination?

A) less than 5.0 Ω
B) 5.0 Ω
C) more than 5.0 Ω but less than 10.0 Ω
D) 10.0 Ω
E) more than 10.0 Ω

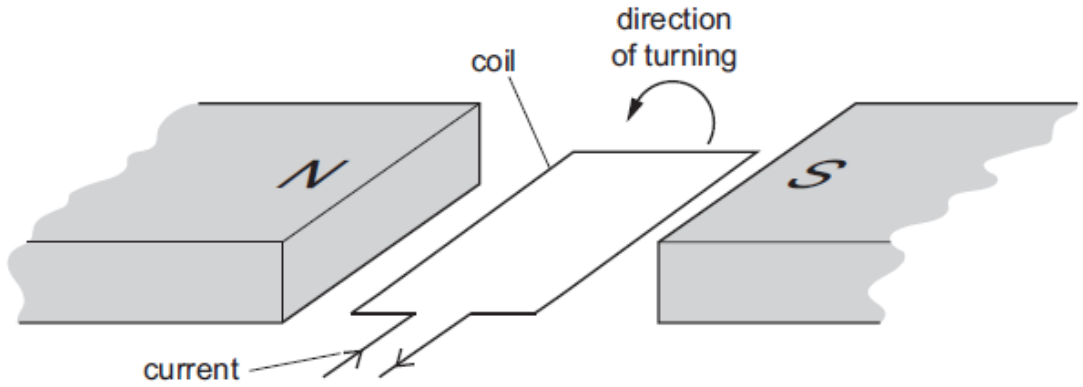
153) The diagram shows a 10 Ω resistor and a 20 Ω resistor connected in a potential divider circuit.



What is the reading on the voltmeter?

A) 2 V
B) 4 V
C) 6 V
D) 8 V
E) 12 V

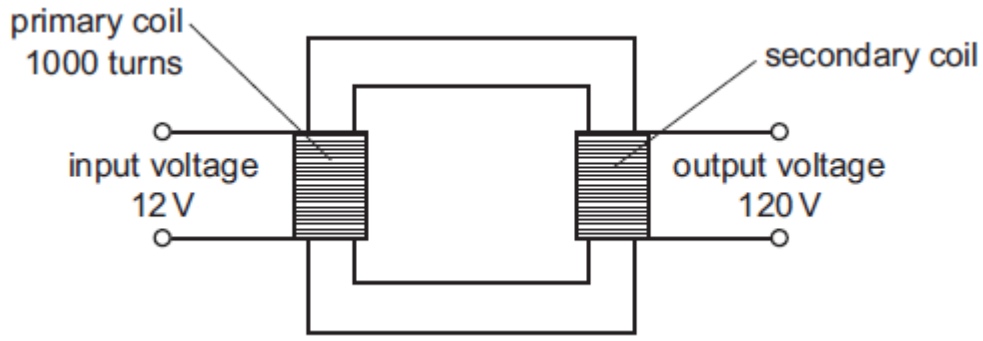
154) The diagram shows a flat, rectangular coil placed between the poles of a magnet. There is a current in the coil that makes it turn in the direction shown in the diagram.



Which change would make the coil turn in the opposite direction?

A) decreasing the current in the coil
B) increasing the number of turns on the coil
C) decreasing the number of turns on the coil
D) reversing both the direction of the current in the coil and the poles of the magnet
E) reversing only the direction of the current in the coil

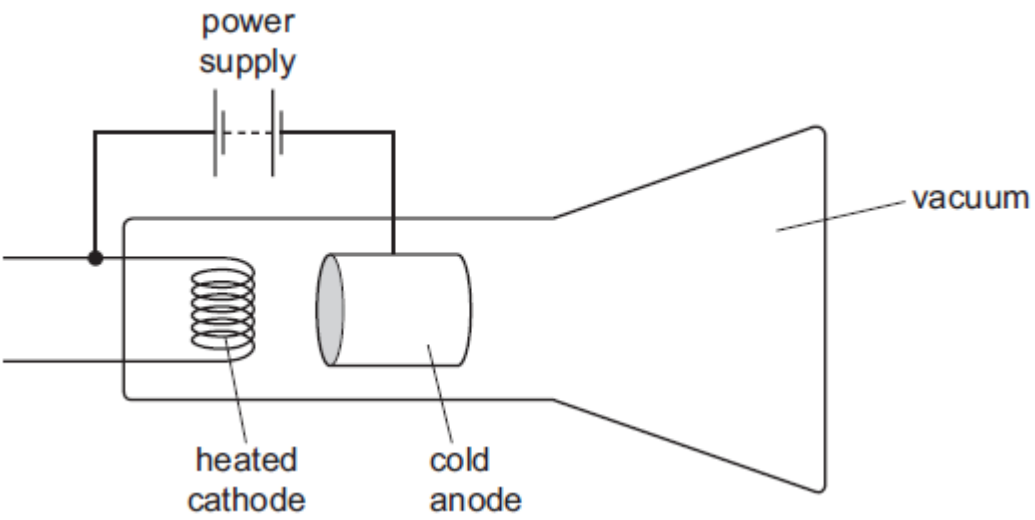
155) A transformer has 1000 turns on its primary coil. An input voltage of 12 V is applied to the primary coil, and an output voltage of 120 V is induced across the secondary coil.



How many turns are on the secondary coil of the transformer?

A) 100
B) 120
C) 480
D) 1000
E) 10000

156) The diagram shows a cathode-ray tube.



The tube is not working properly.
Which change should be made so that the tube works properly to produce a continuous beam of cathode rays?

A) Heat the anode instead of the cathode.
B) Reverse the connections of the power supply.
C) Use an a.c. power supply instead of a d.c. power supply.
D) Use a cold cathode
E) Use air in the tube instead of a vacuum.

157) Which statement about α-radiation is correct?

A) It is a stream of fast-moving electrons.
B) It is a form of electromagnetic radiation.
C) It is more ionising than γ-radiation.
D) It is equivalent to thermal radiation
E) It is more penetrating than β-radiation.

158) A radioactive source produces a count rate on a detector of 1600 counts / s. After 32 hours the count rate has fallen to 100 counts / s. Both count rates have been corrected for background radiation. What is the half-life of the source?

A) 2.0 hours
B) 6.4 hours
C) 8.0 hours
D) 12.0 hours
E) 16.0 hours

159) A nuclide has the symbol $^{22}_{10}Ne$.

What is the proton number of a nucleus of this nuclide?

A) 10
B) 12
C) 22
D) 32
E) 44

160) Diagram 1 shows two thin, uncharged strips of plastic.
Diagram 2 shows the same strips after they have been rubbed with a dry cloth.

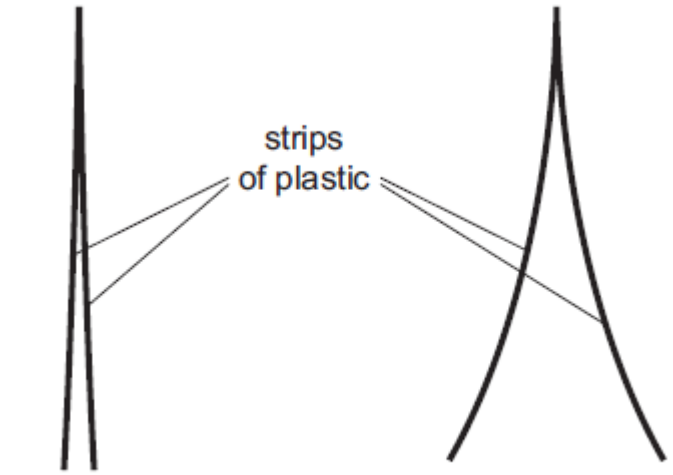


diagram 1 diagram 2

Which row describes the charge on the strips after rubbing, and the force between the strips after rubbing?

	Charge on strips	**Force between strips**
A)	Neutral	None
B)	Opposite	Attraction
C)	Opposite	Repulsion
D)	The same	Attraction
E)	The same	Repulsion