**BECE Past Questions & Answers – 2011 (SCIENCE)**

April2011

INTEGRATEDSCIENCE1

OBJECTIVE TEST  
45 minutes

1. An example of a noble gas is  
A. chlorine  
B. neon  
C. nitrogen  
D. oxygen

2. The structure that stores sperms temporarily in the male reproductive system of humans is  
A. epididymis

B. scrotal sac

C. sperm duct

D. testes

3. Which of the following properties of alcohol as a thermometric liquid is correct?  
A. It is opaque  
B. It does not wet glass  
C. It has a very low freezing point  
D. It has a high freezing point

4. In which of the following vegetation zones of Ghana does millet and sorghum growwell?  
A. Coastal savannah  
B. Forest zone  
C. Guinea savannah  
D. Transition zone

5. Which of the following methods is/are used for preserving fish?  
I. Canning II. Frying III. Smoking

A. I only  
B. I and II only C. II and III only D. I,II and III

6. Which of the following practices in the home can prevent disease infection?

A. Covering one’s food  
B. Drinking unclean water  
C. Keeping one’s surroundings untidy  
D. Sharing towels and sponges

7. An example of a semi metal is  
A. calcium B. lithium C. silicon D. sodium

8. Which kind of energy transformation takes place in an electric motor?  
A. Chemical energy to electrical energy  
B. Chemical energy to mechanical energy  
C. Electrical energy to light energy  
D. Electrical energy to mechanical energy

9. Land race is a breed of  
A. cattle B. goats C. pigs D. sheep

10. In flowering plants, the stamen is made up of  
A. anther and stigma B. anther and filament C. stigma and filament D. stigma and style

11. Which of the following statements about a transistor is correct?  
A. It can be used to amplify current  
B. It is similar to three diodes C. It consists of two leads only D. It has three junctions

12. An atom has 6 protons and 7 neutrons in its nucleus. What is its mass number?  
A. 1  
B. 6  
C. 7  
D. 13

13. A record of daily activities on a farm is termed  
A. labour record  
B. inventory record  
C. farm diary

D. production record

14. Which of the following devices work(s)on the principle of transmission of pressure in fluids?  
I. Water pumps  
II. Syringes  
III. Bicycle brakes

A. I only  
B. I and II only C. II and III only D. I,II and III

15. Which of the following crops is not correctly matched with its group?  
A. Cowpea – cereal crop  
B. Cocoa – beverage crop  
C. Coconut – oil crop  
D. Cocoyam – tuber crop

16. Which of the following substances is a salt?  
A. H2SO4  
B. NaOH C. HCl  
D. CaCl2

17. In which part of the digestive system of a fowl does grinding of feed take place?  
A. Crop  
B. Gizzard  
C. Oesophagus  
D. Provent riculus

18. The parts of a bony fish that are used to control the level at which the fish swims are known as  
A. dorsal and caudal fins  
B. caudal and pectoral fins C. pectoral and pelvic fins D. dorsal and pectoral fins

19. Million’s reagent is used to test for  
A. carbohydrates  
B. fats  
C. proteins  
D. vitamins

20. In an n-p-n transistor, the n-type collector is connected to the positive terminal ofthe battery thus making the  
A. base-collector junction reverse biased

B. base-collector junction forward biased  
C. base-emitter junction reverse biased  
D. base-emitter junction forward biased

21. Which type of vegetation favours both wet and hot environmental conditions?  
A. Strand and mangrove  
B. Coastal savannah C. Guinea savannah D. Tropical forest

22. During drought, some plants dry out because of high  
I. atmospheric temperature  
II. humidity  
III. rate of evaporation

Which of the statements above is/are correct? A. III only  
B. I and II only C. I and III only D. I,II and III

23. Soil erosion on sloppy farm lands is best controlled by  
A. cover cropping  
B. mulching  
C. strip cropping  
D. terracing

24. A viable seed is one that  
A. germinates under suitable conditions  
B. contains oil  
C. develops from fertilized ovary  
D. has a pericarp

25. Which of the following pairs of structures form part of the female reproductive system of humans?  
A. Urethra and uterus B. Cervix and uterus C. Ureter and uterus D. Cervix and ureter

26. Which of the following chemical symbols is that of a metal?  
A. Ca B. Ne C. P D. S

27. All the living and non-living things that surround an organism constitute its  
A. community  
B. ecosystem  
C. environment  
D. habitat

28. Which of the following crops should be planted after cassava in crop rotation?  
A. Coco yam B. Cowpea C. Onion  
D. Yam

29. Endo parasites in farm animals can be controlled by  
A. drenching  
B. dipping C. dusting D. spraying

30. Which of the following devices requires the useoftransistors in its operation?  
A. Computer  
B. Electric heater  
C. Microphone  
D. Wall clock

31. Feel Method is used to determine soil  
A. air  
b. colour  
C. structure  
D. texture

32. Which of the following modes of heat transfer is the thermos flask designed to minimize?  
I. Conduction II. Convection III. Radiation

A. I and II only B. I and III only C. II and III only D. I,II and III

33. An atom of an element is represented as .What is the respective number of neutrons and protons in the atom?  
A. 12 and 13  
B. 12 and 25  
C. 13 and 12  
D. 25 and 12

34. The anemometer is an instrument used in determining  
A. amount of rainfall  
B. speed of wind  
C. relative humidity  
D. intensity of light

35. Which of the following subjects is/are considered as applied science?  
I. Biology II. Medicine III. Psychology

A. I only  
B. I and II only C. I and III only D. II and III only

36. Chinchilla is a breed of  
A. goats  
B. pigs  
C. rabbits  
D. sheep

37. Which of the following characters is not acquired through heredity?  
A. Language spoken  
B. Shape of nose

C. Colour of eyes

D. Temperament

38. The food nutrient which ensures good health in farm animals is  
A. carbohydrates  
B. minerals

C. proteins

D. vitamins

39. The use of resistant breeds of farm animals to control pests is a  
A. biological method

B. chemical method

C. cultural method  
D. physical method

40. Which of the following arrangements show the correct order of increasing complexity of structures in living organisms?  
A. cells →organs →tissues →systems

B. cells–>tissues –>organs –>systems

C. cells–>systems –>tissues –>organs

D. cells–>tissues –>systems –>organs

# INTEGRATEDSCIENCE 1

# SOLUTIONS

# OBJECTIVE TEST

1. B. neon

2. A. epididymis

3. C. It has a very low freezing point

4. C. Guinea savannah

5. D. I,II and III

6. A. Covering one’s food

7. C. silicon

8. D. Electrical energy to mechanical energy

9. C. pigs

10. B. anther and filament

11. A. It can be used to amplify current

12. D. 13

13. C. farm diary

14. D. I,II and III

15. A. Cowpea – cereal crop

16. D. CaCl2

17. B.Gizzard

18. C. pectoral and pelvic fins

19. C. proteins

20. A. base-collector junction reverse biased

21. D. Tropical forest

22. C. I and III only

23. D. terracing

24. A. germinates under suitable conditions

25. B. Cervix and uterus

26. A. Ca

27. C. environment

28. B. Cowpea

29. A. drenching

30. A. Computer

31. D. texture

32. D. I,II and III

33. C. 13 and 12

34. B. speed of wind

35. D. II and III only

36. C. rabbits

37. A. Language spoken

38. D.vitamins

39. A.biological method

40. B. cells → tissues → organs→ systems

April 2011

INTEGRATEDSCIENCE2

ESSAY  
1 ¼hours [100marks]

This paper is in two parts,I and II

Answer Question1in Part I and any other four questions in Part II.

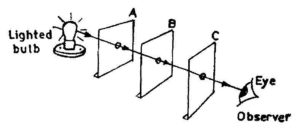
Credit will be given for clarity of expression and orderly presentation of material

PART I  
[40marks]

Answer all of Question1

1.  
(a)  
In an experiment to demonstrate a property of light, three card boards,A,Band C with holes in  
their centres are arranged in a straight line between alighted bulb and an observer as shown in  
the illustration below.

Study the illustration carefully and use it to answer the questions that follow



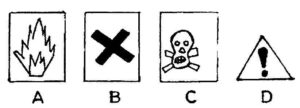
(i) What would the observer see from the position shown?

(ii) What would the observer see when card board B is slightly displaced from the line? (iii) Explain the observation made in (a)(ii) above.  
(iv) What would be observed when the card board B is brought back to its original position? (v) What property of light is being demonstrated in this experiment?  
(vi) Mention

(α) two natural occurrences that could be explained by the property of light demonstrated.  
(β) one device that works on the property of light demonstrated.

(b) The diagrams below are illustrations of hazard symbols found in every day life.

Study them carefully and use them to answer the questions that follow:



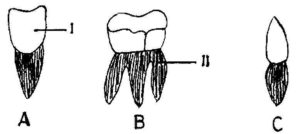
(i) What does each symbol A, B, C and D represent?

(ii) Name one substance each that is associated with each of the symbols A, B and C

(iii) Name one place where the symbol D can be found. (iv) State two advantages of hazard symbols.

(c) The diagrams below are illustrations of the different types of teeth in humans.

Study them carefully and use them to answer the questions that follow:



(i) Identify each type of teeth labeled A, Band C

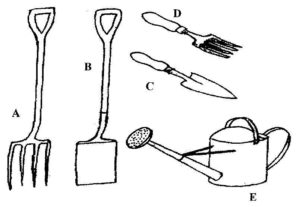
(ii) Describe the shape of each of the teeth labeled A,Band C

(iii) State one function of each of the teeth labeled A,Band C

(iv) Name the parts of the teeth labeled I and II [10 marks]

(d) The diagrams below are illustrations of some farm tools.

Study them carefully and use them to answer the questions that follow:



(i) Identify each of the tools labeled A, B, C, D and E.  
(ii) Mention one use of each of the tools labeled A, B, C, D and E.

PART II  
[60marks]

Answer four questions only from this part

2. (a) (i) (ii) What are ruminants?  
Give two examples of ruminants

(b)  
(i) (ii)  
What is force?  
State two effects of forces on a body

(c)  
(i)  
Mention two ways in which the carbon cycle can be maintained.

(ii) State one environmental effect when the carbon cycle is disrupted

(d)  
(i) Mention the three sub-atomic particles  
(ii) State the relative charge one ch of the three sub-atomic particles mentioned in (d) (i)  
above.  
(iii) Name the particle formed when an atom loses an electron

3. (a) (i) (ii) What is a mixture?  
Explain why some mixtures are thoroughly stirred before they are used.

(b)  
(i) (ii)  
What is reflection of light?  
State two characteristics of the images formed by plane mirrors

(c)  
(i) (ii)  
What is a fertilizer?  
Give one example of an inorganic fertilizer

(d)  
(i) (ii)  
What is indiscriminate sex?  
State two dangers of indiscriminate sex on humans

4. (a) (i) What is a simple machine?

(b) (ii)

(i) Give two examples of a simple machine

What is rusting?  
(ii) State two effects of rusting

(c)  
(i) (ii)  
What are food nutrients?  
Classify the following food items as carbohydrate,fats and oil or protein:

Beans, palm fruits, meat,margarine, bread and maize.

(d)  
(i) (ii)  
State two effects of malnutrition in farm animals. Mention one disease of farm animals caused by virus.

5. (a) (i) What is soil erosion?  
(ii) Name two methods of controlling soil erosion

(b) (i) Explain each of the following terms as used in ecology:  
(α) Adaptation  
(β) Endangered species

(c) (i) (ii) Give one example of hard water  
Explain why it is advisable to drink water which is hard.

(d)  
(i) (ii)  
What is magnetic field?  
State two methods of making magnets

6. (a) (i) Define each of the following terms:  
(α) Solvent  
(β) Solute

(ii) Name one common solvent used in the home.

(b) Explain the following terms as used in animal production:  
(i)Ration (ii) Dehorning

(c)  
(i) What is an element  
(ii) Write down the symbol of each of the following chemical substances:  
(α) Potassium  
(β) Sulphur

(d) Explain each of the following terms: (i) Mixed farming  
(ii) Mixed cropping

INTEGRATEDSCIENCE2

SOLUTIONS

ESSAY

1. (a) (i) Light rays from the lighted bulb

(ii) Sees no light or a portion of card board B

(iii) Since light moves in a straight line, the observer sees the light only when the holes are in a straight line with the light source. Since light rays cannot bend around the card board B when slightly displaced, the observer does not seethe light

(iv) The observer would seethe light rays from the lighted bulb again.

(v) The property that light travels in a straight line or rectilinear propagation of light

(vi) (α)

Eclipse of the sun (solar eclipse) Eclipse of the moon (lunar eclipse) Day and night  
Shadow [anytwo]

(β) camera, microscope, telescope, binoculars, periscope, torch, [anyone]

(b) (i) A – highly inflammable or flammable  
B – Irritant or can cause harm  
C – Poisonous or toxic or deadly  
D – Dangerahead

(ii)  
A  
– liquefied petroleumgas(LPG), petrol, kerosene,spirit, ethanol [anyone]

B  
– Concentrated Hydrochloric acid [Conc. HCl], concentrated sulphuric  
acid [conc. H2SO4], concentrated magnesiumhydroxide [Mg(OH)2], concentrated sodium hydroxide [NaOH] [anyone]

C – Dichlorodiphenyltrichloroethane (DDT)[C14H9Cl5],Potassium cyanide  
[KCN],Sodiumcyanide[NaCN], mercury [anyone]

(iii) On roads,at construction sites, very high voltage plants/devices, [anyone]

(iv) – They help prevent accidents by making people take precautions.  
– They serve as warnings to prevent injuries or death.

(c) (i) A B C – incisor  
– premolar / molar  
– canine

(ii)  
A B C  
– chisel shaped  
– almost flat surface with small projections / cusps /ridges  
– pointed

(iii)  
A B C  
– Biting or cutting  
– chewing or grinding or mashing  
– tearing

(iv)  
I II  
– enamel / crown  
– root

(d)  
(i)  
A B C D E  
– Gardenfork  
– Spade  
– hand trowel  
– hand fork  
– wateringcan

(ii)  
A  
– Breaking up soil or making soil loose or ploughing soil or turning over soil

B  
– Collecting soil or mixing substance such as animal feed or digging groundormakingsurfaceofgroundlevel

C  
– earthing up crops or transplanting seedlings or spreading fertilizer or  
manuring or mounding certain crops

D  
– Breaking up soil or making soil loose or ploughing soil or turning over soil

E  
– Wateringsoil /crops

2. (a) (i) Ruminants arecud-chewinghoofed mammals with multiple-chambered stomach.

(ii) Examples: camel,goat, sheep,giraffe, cow

(b) (i) A forceisapush or pullexerted on abody.  
Or:

(ii) A physical influence that tends to change the position or shape of an object with mass

Effects of forces ona body:  
• Can cause a moving body to cometo rest (stop moving)  
• Can cause a body at rest to move  
• Can cause a moving body to accelerate  
• Can cause a moving body to decelerate  
• Can change the direction of a moving body  
• Can changethe shapeofabody [anytwo]

(c) (i) Ways of maintaining the carbon cycle:  
• Afforestation (planting new trees to replace the ones that have been destroyed or cut down)  
• Photosynthesis  
• Respiration  
• Reducing the amount of carbon dioxide emissions from industries  
• Avoiding excessive bushburning  
• Reducing the amount of fumes from vehicles [anytwo]

(ii) Environmental effects  
• Global warming as a result of the depletion of the ozone layer  
• Increase in volume of sea water due to melting of ice bergs  
• Green house effect [anyone]

(d) (i) Protons, neutrons and electrons

(ii) PARTICLE RELATIVE CHARGE  
Proton positive(+1)  
Neutron no charge or neutral (0)  
Electron negative(– 1)

(iii)  
cation

3. (a) (i) A mixture is  
A physical combination of two or more substances  
Or:  
A substance consisting of two or more substances that have been combined physically

(ii)  
Why some mixtures are thoroughly stirred before they are used:

To attain a uniform mixture or to make it homogenous, since the original mixture may  
not be uniform or there may be some suspended particles of the solute

(b)

(i)

Reflection of light is  
The bouncing back or redirection of light when it strikes a surface

(ii)  
Characteristics of images formed by plane mirrors:  
♣ Same size as object  
♣ Same distance from mirror as object  
♣ Virtual  
♣ Erect /upright  
♣ Laterally inverted [any two]

(c)  
(i)  
A fertilizer is:

Any substance usually added to or spread onto soil to increase its ability to support plant  
growth  
Or: A substance added to soil to increase its nutrient content or fertility

(ii)

Examples of in organic fertilizer:

NPK or ammonium sulphate or urea or potassium chloride (or muriate of potash)

(d)

(i)

Indiscriminate sex  
Having sexual inter course with multiple (two or more) partners and usually without  
protection (use of condom)

(ii)  
Dangers of indiscriminate sex  
♣ Contracting sexually transmitted diseases (STDs),such as AIDS, syphilis, etc  
♣ Teenage pregnancy(where teenagers are involved)  
♣ Abortion, which is usually quit and dangerous to the mother  
♣ Loss of social respect /reputation  
♣ Loss of self-esteem [any two]

4. (a) (i) A simple machine

A mechanical device that makes work easier and/ or faster

(ii)  
Examples of simple machines  
Bottle opener, wheel barrow, nut cracker, inclined plane, spanner, crowbar, etc

(b)  
(i)  
Rusting is  
the corrosion (wearing away) of the surface of iron or steel due to the formation of iron  
oxide  
or: the formation of a red dish brown coating of iron oxide on the surface of iron or steel that forms when the metal is exposed to air and moisture

(ii)

Effects of rusting:  
• Shortage of life span of item  
• Loss of beauty of item  
• Reduction in effectiveness of implement  
• Collapse of buildings [any two]

(c)  
(i)  
Food nutrients

Chemical substances, found in food, that the body needs in order to function properly

(ii)

CARBOHYDRATE FATS AND OILS PROTEIN  
Bread palm fruits beans  
Maize margarine meat

(d)  
(i)  
Effects of malnutrition in farm animals  
♣ Deficiency diseases  
♣ Stunted growth  
♣ Low energy and activity(lack of vitality)  
♣ Slow recovery from illnesses  
♣ Death  
♣ Lower reproduction [any two]

(ii)  
Disease caused by virus  
♣ Rabies  
♣ Bird flu

♣ Newcastle  
♣ Rinder pest [anyone]

5. (a) (i) Soil erosion:  
The washing away of the top soil by agents of erosion  
Or: The removal of soil material by natural processes,principally running water, glaciers, waves, and wind

(ii) Methods of controlling soil erosion:  
• Planting of cover crops  
• Planting of grasses  
• Planting of wind brakes (trees)  
• Ploughing across slopes  
• Terracing  
• Strip cropping [any two]

(b) (i) (α) Adaptation:  
The development of physical and behavioral characteristics that allow organisms  
to survive and reproduce in their habitats

(β) Endangered species  
Species threatened by extinction:  
Or: Species whose numbers are so few, or are declining so quickly, that the animal, plant, or other organism may soon become extinct

(c)

(i)

Example of hard water  
Deep well water  
Bore hole water

(ii)  
It is advisable to drink hard water because  
it contains dissolved mineral salts, such as calcium and magnesium salts, which are  
necessary to maintain good health and proper functioning of the body.

NB: (Minerals are essential for the healthy growth of teeth and bones. They also help in  
cellular activities, such as enzyme action, muscle contraction, nerve reaction, and blood  
clotting)

(d)  
(i)  
Magnetic field:  
A region of space surrounding a magnet or current-carrying circuit in which the resulting  
magnetic force can be detected

(ii)  
Methods of making magnets

♣ Electrical method  
♣ Single stroking  
♣ Double stroking  
♣ Induction  
♣ Hammering [any two]

6. (a) (i)

(α) Solvent:  
A substance that dissolves things:  
Or: A substance in which other substances are dissolved, usually a liquid

(β) Solute  
A substance that is dissolved in another substance

(ii) Common solvent used in home  
Water,Turpentine, liquid soap, alcohol, kerosene [anyone]

(b)  
(i)  
Ration:  
A fixed and limited amount of feed,given to an animal or group of animals at specific  
times / intervals.  
This is done to ensure that the animal has the right amounts of essential food nutrients for  
healthy growth and development.

(ii)  
Dehorning:  
Removing or preventing the growth of the horns of an animal by surgery or cauterization.  
This is done primarily to prevent animals from using them to injure other animals or  
destroy property

(c)  
(i)  
Element:  
A substance that is made up of the same kind of atoms  
Or:  
Any substance that cannot be broken down into a simpler one by a chemical reaction

(ii)  
(α) Potassium – K  
(β) Sulphur – S

(d)  
(i)  
Mixed farming:  
The cultivation of crops and the rearing of livestock on the same farm at the same time  
Or: farming that combines growing crops and rearing livestock on the same farm at  
the same time

(ii)  
Mixed cropping  
The cultivation of different kinds of crops on the same piece of land at the same time