**ST.JOSEPH’S UNIVERSITY, BENGALURU -27**

**B.Sc. Open Elective in Biotechnology – II SEMESTER**

**SEMESTER EXAMINATION: APRIL 2023**

**(Examination conducted in May 2023)**

**BTOE2:Sustainable Agriculture and Food Security**

**(For current batch students only)**

**Time: 2 Hours Max Marks: 60**

**This paper contains SIX (60q) printed pages and ONE part**

1. Food insecurity happens when people do not have enough access to food
2. Physically b. Socially c. Economically d. All of the above
3. Current challenges to maintain food security

i. Biofuels iii. Corruption

ii. Overpopulation iv. Lack of education

1. All b.Only i and iii c. Only ii d. Only iv
2. Soil impacts food production. New soil is created by
3. Landslides b. Adding manure to old soil c. Tilling d. None of the above
4. Toxic pollutants can enter the ecosystems through humans.
   1. Air/Water b. Water/soil c. Air/Soil d. Air/Water/Soil
5. Stress factors impacting food security are

i. Loss of crop diversity

ii. Decline of pollinators

iii. Increased vulnerability of monocultures to diseases

1. Only i and iii b. Only i and ii c. Only ii and iii d. i, ii and iii
2. Person who introduced Green Revolution in Mexico is
   1. Norman Borlaug b. Norman Jose c. Norman González d.Norman García
3. Which among the following did the first Green revolution not aim at improving crop production
   1. Increased use of pesticides
   2. Sustainable practices
   3. Use of modern machinery
   4. High yielding variety of seeds
4. allows farmers to produce food with simple farm tools on small land holding.
   1. Intensive farming b. Subsistence farming
   2. Extensive farming d. None of the above
5. Sources that produce emissions impacting climate change come from
   1. Landfills b. Vehicles c. Buildings d. All of the above
6. Maintaining water security is important to

i. Enable hygiene and sanitation for livelihood

ii. Productive economies

iii. Sustainable agriculture

iv. Maintaining seasons

1. All of the above b.Only i and ii c. Only i and iii d. Only iv
2. Reducing food waste can enable

a.Food security b. Socio-economic development

c. Both a and b d. Neither a and b

12. Questions to ask before urbanization in order to maintain food security are

i. Does urbanization result in more land-intensive diets?

ii. Does urbanization impact the global economy which can impact food prices?

iii. Does the rural population suffer from an urban bias in development?

iv. Is water conserved

1. Only i and iii b. Only ii and iii c. Only i and ii d. Only i, ii and iii

13. Which one of the following is an Ideation to a late stage funding opportunity for the bio-entrepreneurs in India?

1. BIG b. SITARE c. E-Yuva d. BIPP

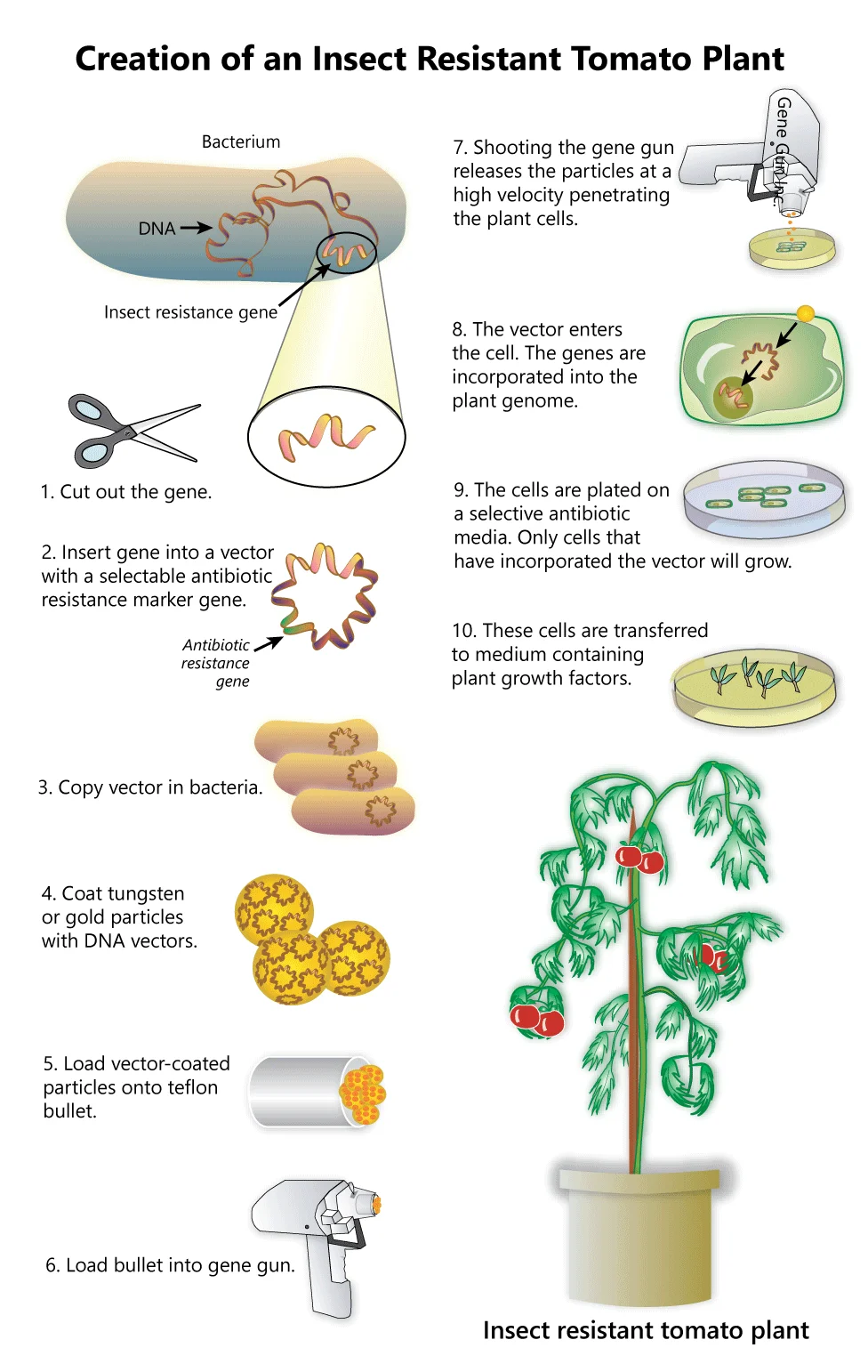
14. Which is the complementary sequence to AATTCC?

1. TTAAGG b. GGCCTT c. CCGGAA d. GGAATT

15. Which among these is a ideation to early stage programme for bioentrepreneur?

1. Biotech finishing school b. SITARE c. BioNEST d. BISEP

16. In the image, which one of the listed answers help to insert a gene to a vector in a practical setup?



1. Antibiotic resistance gene b. Ligases c. Restriction enzymes d. Scissors

17. What is the disadvantage of GM crops that produce a food grade outcome?

a. It is economy driven

b. Adequate testing is not done.

c. High infection resistant

d. Herbicide and insect resistant

18. What is the advantage of genetic engineering over conventional breeding?

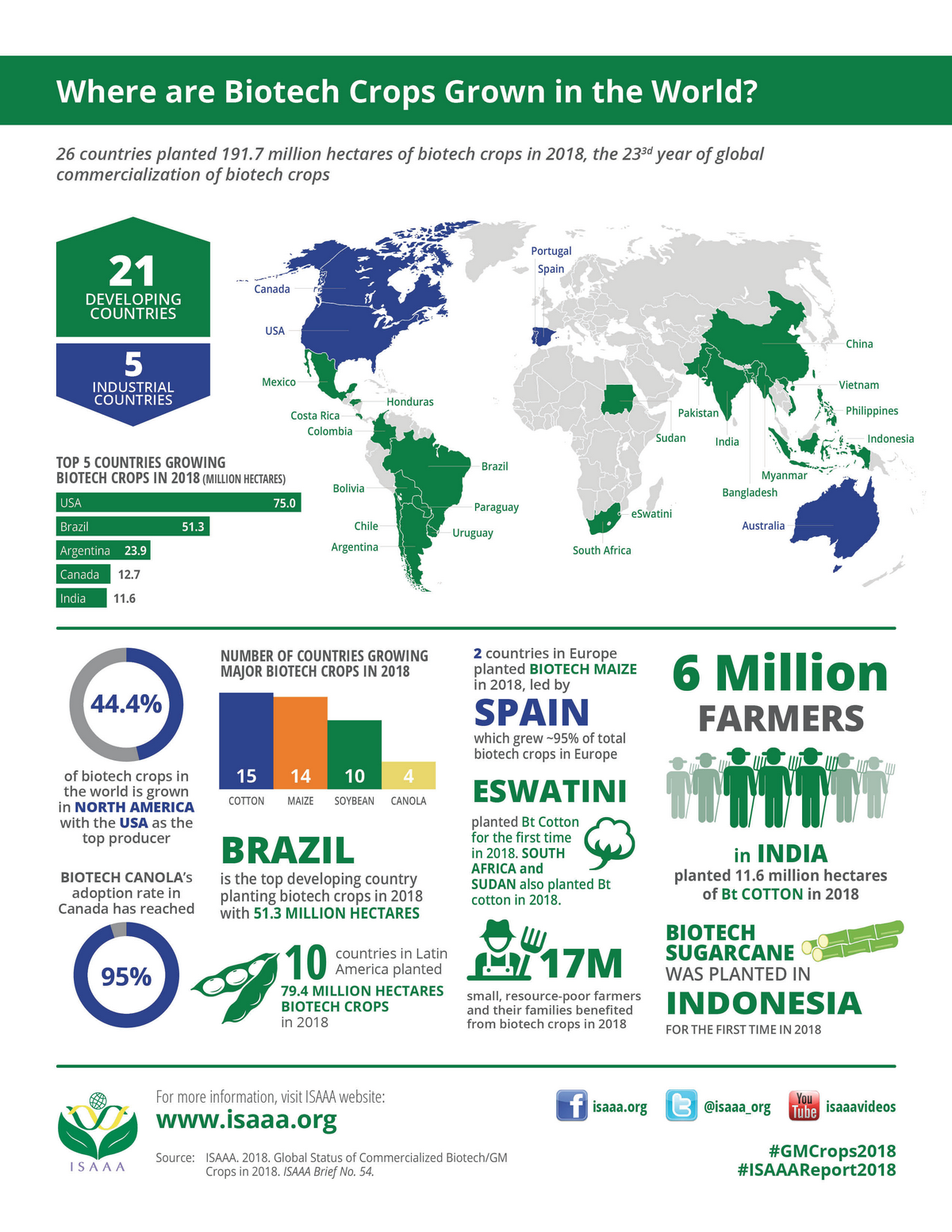
a. Many genes are transferred

b. Longer time taken for experiment

c. Only needed genes are transferred

d. Cannot remodify the plants

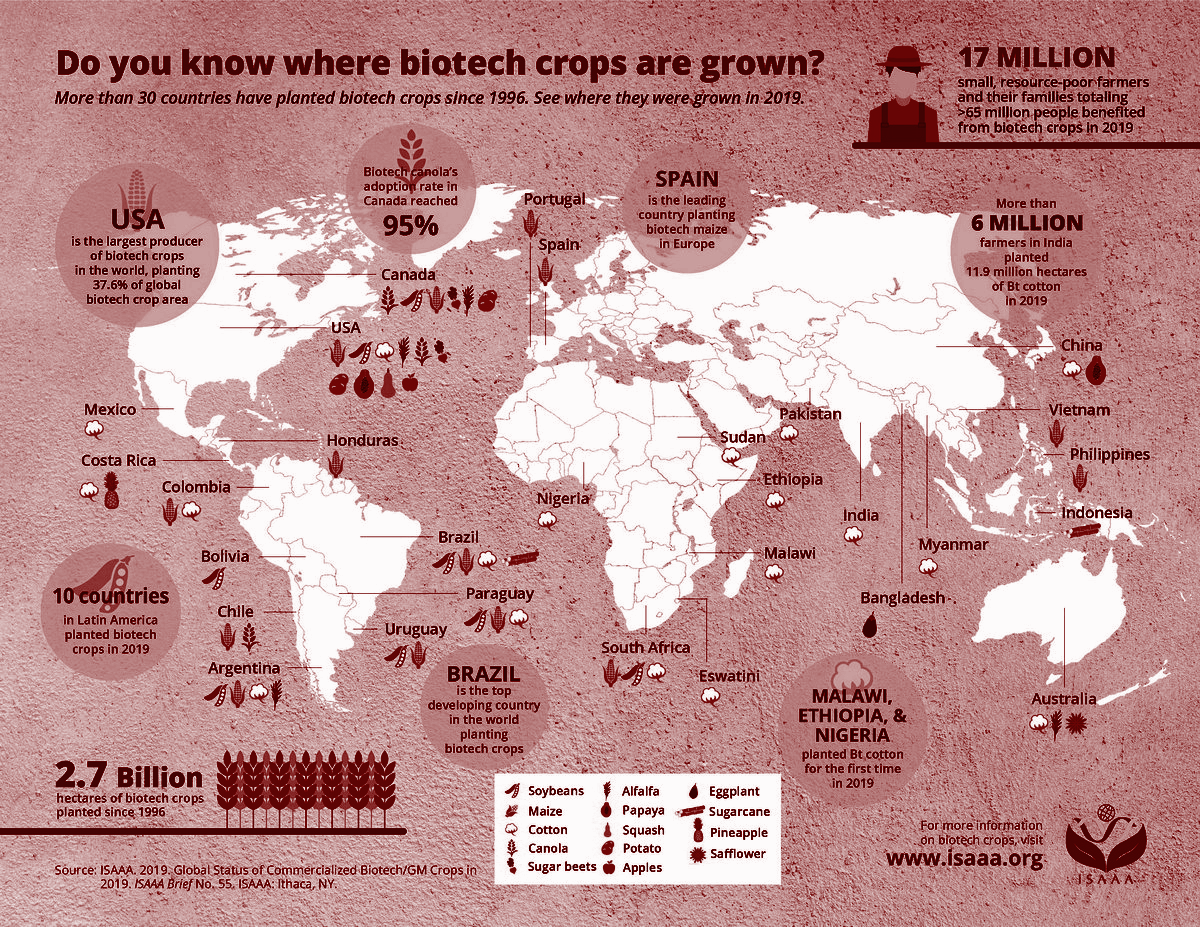
19. In the given image, according to our presentation the shaded countries indicate that these have



a. banned GM crops b. grown GM crops

c. no policy yet for GM crops d. only imported GM crops till date

20. In the given image, as per our presentation,what does it indicate?



1. Bt brinjal grows in all these places b. BT cotton grows in all these places

c. BT Rice grows in all these places d. BT Cauliflower is tested in all these places

21. Bt cotton and Bt brinjal is a \_\_\_\_\_\_\_

1. cloned plant b. transgenic plant c. hybrid plant d. mutated plant

22. Insect resistance transgenic cotton has been developed by inserting a piece of DNA from \_\_\_\_\_\_

a. an insect b. wild relative of cotton c. a virus d. a bacterium

23.Toxic content of *B. thuringiensis* is \_\_\_\_\_\_\_ in nature.

1. Protein b. Steroid c. amino acid d. alkaloid
2. Food loss can happen at

i. Harvesting stage ii. Storage stage iii. Processing stage iv. Consumption stage

1. All except i b. All except iv c. only i, ii, iii d. All of the above
2. Food loss has an impact on

i. Environment ii. Economy iii. Food security iv. Development

1. Only iii b. Only ii and iii c. Only i, ii, iii d. All of the above
2. The rate of fruit softening during ripening is the main factor that determines the shelf life of fruits and vegetables because

i. Softening aggravates the physical damage during handling

ii. Softening increases the susceptibility to post-harvest pathogens

iii. Softening aggravates the physical damage during transportation

iv. Softening will eventually lead to rotting

1. All of the above b.Only i and ii c. Only ii d. Only iv
2. Most of the fruit and vegetable crops engineered so far to improve shelf life have used which genetic engineering technique
3. selection b. breeding c. RNAi d. crossing
4. Which of the following are signs of cut flower senescence that lead to loss of cut flowers?
5. Petal drop b. Discoloration c. Wilting d. All of the above
6. Methionine content in Canola and lupin legume; lysine content in maize and rice, was increased using genetic engineering to improve protein quality. Methionine and lysine are
7. Proteins b. Amino acids c. Sugars d. Fatty acids
8. The amount and composition of \_\_\_\_\_\_\_\_\_\_ determines the end use of grain flour. Flour rich in this component is primarily used for bread and pasta making.
9. Gluten b. Carbohydrate c. Oil d. Fats
10. Production of flavor compounds like vanillin and capsaicin in engineered microorganisms is limited because
11. Limited availability of microbes b. Toxicity of the compound to the microbes

c. Microbes cannot be grown in labs d. Microbes can’t be genetically engineered

1. Compared to conventional cell based vaccine production, edible vaccines have several advantages. Which of the following is false?
2. Edible vaccines do not require cold-chain transport
3. Edible vaccines are not contaminated with toxins and animal pathogens
4. Any vegetable or fruit can be used for edible vaccines
5. Edible vaccines can be stored easily
6. The use of biology to solve problems and make useful products by the integration of basic science and engineering science, technology is
7. Biotechnology b. Biology c. Chemistry d. Social work
8. A plantibodies cocktail of three anti-Ebola virus monoclonal antibodies developed by Mapp Biopharmaceutical is
9. Covishield b. ZMapp c. Sputnik d. Covaxine
10. \_\_\_\_\_\_\_\_\_ can be produced using techniques like plant cell and tissue culture, in vitro whole plant culture, vacuum infiltration, aquatic plants and algal culture.
11. Edible vaccines b. Plantibodies c. Antibodies d. CHO cells
12. Tobacco plants are preferred for the production of plantibodies as they have several advantages. Which of the following is not true?

i. They grow fast

ii. Can produce large amounts of antibodies

iii. It is a non-food and non-feed crop

iv. They are leafy crops and multiple harvests can be obtained

1. All of the above b. Only iv c. Only iii d. None of the above
2. Which of the following is the right expansion of PMF?
3. Plant Microbe Farming b. Plant Molecule Factory

c. Plant Molecular Farming d. Plant Micro-Molecule Farming

1. Root cultures can be used for the production of which of the following?

i. Ginseng saponins ii. Curcumin iii. shikonin iv. beta carotenes

1. All of the above b. Only i and iii c. only i and ii d. Only ii
2. Excessive use of chemical fertilizer can lead to
3. Nutrient pollution b. Climate change c. Global warming d. Air pollution
4. Pest control aimed at reducing the use of chemical pesticides is called
5. Integrated Pesticide Management b. Integrated Pest Management

c. Internal Pest Management d. Intentional Pesticide Management

1. Dead zones in water bodies is due to
2. Nutrient pollution b. Climate change

c. Use of biocontrol agents d. Ozone depletion

1. Viral pathogens that attack insects are
2. *Rhizobium* bacteria b. Mycorrhiza c. NDV d. Baculovirus
3. Which of the following is used as a biofertilizer?

i. fungi ii. ferns iii. bacteria iv. algae

1. only ii b. only iv c. All of the above d. Only ii and iv
2. Nitrogen fixing bacteria symbiotically associated with legume plant roots is
3. *Rhizobium*  b. Mycorrhiza c. *Azolla* d. Blue Green Algae
4. \_\_\_\_\_\_\_\_\_ contain active ingredients of biological origin that include plant extracts, microorganisms, microbial metabolites, organic molecules, minerals, or other such natural materials that have pesticidal properties.
5. Biopesticides b. Biofertilizers

c. Mycopesticides d. Organic pesticides

1. \_\_\_\_\_\_\_\_\_ is the use of natural enemies of insects to control agricultural pests
2. Pesticides b. Bio-control c. Transformation d. Biofertilizer

47. Which among this is not an advantage coming from a BT crop?

1. More Insect and pest resistance b. more yield

c. More abiotic stress d. viral resistance

48. What is not an attribute of a small scale enterprise manufacture?

a.minimal manpower b. fewer machines

c.small scale service d. annual turn over matching large scale enterprise

49. Naturalness in terms to a Bt crop refers to

1. An ethical debatable value b. A gene c. A vector d. A bacteria

50. Synthetic or chemical pesticides are harmful because

1. They might affect the farmer’s health
2. They might kill pollinators
3. They can cause soil pollution
4. All of the above

51. Farming techniques used in 21st century agriculture are

1. Drones to determine crop health
2. Internet to determine weather conditions
3. Smart irrigation and automation
4. All of the above

52. \_\_\_\_\_\_\_ are products with both nutritional and medicinal properties.

1. Nutraceuticals b. Anti-nutrients c. Allergens d. Antibiotics

53. Intellectual Property laws can protect \_\_\_\_\_\_\_\_\_

a. Trademarks b.Copyright c. Patents d. All the above

54. Aquaponics is the combination of \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_.

1. plants and water
2. aquaculture and water
3. hydroponics and aquaculture
4. hydroponics and plants

55. Which of the following is not true about hydroponics?

1. Requires high investment
2. Technical knowledge required
3. Can be misused to cultivate banned crops
4. Plants through hydroponics cannot be cultivated everywhere

56. Hydroponics is a method of cultivation of plants without the use of \_\_\_\_\_\_\_.

1. Water b. Air c. Soil d. Sunlight

57. Connecting and exchanging agriculture data with other devices and systems over the internet fall under which one of the category listed below

1. IOT in agriculture b. Aquaponics c. Hydroponics d. Entrepreneurship

58. Which device is used for precision agriculture?

1. alcohol breath analysers

b. Radio Frequency Identification Devices

c. BP monitors

d. Stethoscope

59. What is the chief contributor of Greenhouse emissions by economic sector?

1. Industries b. Electricity and heat c. Transportation d. Human body

60. Lipids or plant based oils are used in plant based meat to provide

1. Texture b. Nutrition c. Flavour d. All of the above