**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU -27**

**B.Sc (BIOTECHNOLOGY)– III SEMESTER**

**SEMESTER EXAMINATION: OCTOBER 2022**

**(Examination conducted in December 2022)**

**BTOE3: BIOTECHNOLOGY PERSPECTIVES ON SUSTAINABILITY**

**AND CLEAN ENERGY**

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

**This paper contains FIVE printed pages and ONE part**

**Answer the following questions 1 mark X 60 = 60 marks**

1. Attaining Sustainability is responsibilty of
   1. Individual b. Family c. Community d. All of the above
2. Economic sustainability refers to the
   1. Balancing profits with ethics
   2. A circular economy
   3. Job creation and stability
   4. All of the above
3. There are number of goals in SDG
   1. 13 b. 15 c. 17 d. 16
4. Which of the following is not a SDG goal:
   1. Life in air b. Zero hunger

c. Gender equality d. Decent work and economic growth

1. The Paris Agreement works on year cycle.
   1. 6 b. 5 c. 4 d. 7
2. The most important part of social sustainability is
   1. Cleaning roads b. Solving traffic issues

c. Education d. Organizing political rallies

1. Ozone molecules contain oxygen atoms.
   1. 2 b. 4 c. 3 d. 5
2. The first fully synthetic plastic material was
   1. Bakelite b. Polystyrene c. Cellulose d. Gelatin
3. HDPE type of plastic refers to
   1. High-density polyesteramide b. High-density polyethylene

c. High-density polyester d. High-density polyethylamide

1. Which among the following is an example of biodegradable alternatives to plastic
   1. Starch ii. Cellulose iii. Fish scales iv. grass
   2. All of the above b. Only i and ii

c. Only ii and iii d. Only i and iii

1. The name of famous ocean garbage patch is
   1. Great Atlantic garbage patch b. Great Arctic garbage patch

c. Great Indian garbage patch d. Great Pacific garbage patch

1. Aquaponics refers to the recirculating ecosystem of raising together.
   1. Crabs and shrimp b. Toads and fish

c. Plants and fish d. Sharks and crab

1. The 5R policy mainly addresses the pollution caused by
   1. Plastic b. Metal c. Glass d. Paper
2. The last step taken in 5R policy is
   1. Repurpose b. Recycle c. Reuse d. Refuse
3. The most important product of bio-upcycling is
   1. Metal b. Glass c. Bacteria d. None of them
4. Recycled materials can be
   1. Used to make new product
   2. Burnt for energy production
   3. End in landfill after final disposal
   4. All of the above
5. Which statement is incorrect
   1. Circular economy provides jobs
   2. Wind and fossil energy are part of renewable energy
   3. Consumption of renewable energy is increasing in India
   4. United Nations promotes energy sustainability
6. OECD stands for
   1. The Organization for Energy Co-operation and Development
   2. The Organization for Energy Co-operation and Diversity
   3. The Organization for Economic Co-operation and Development
   4. The Organization for Economic Co-operation and Diversity
7. Example of non-renewable energy is
   1. Geothermal b. Nuclear c. Solar d. Bioenergy
8. In circular economy, focus is given to , for promoting sustainability
   1. Design b. Manufacturing c. Development d. All of them
9. Example of past sources used for energy include
   1. Wood b. Fat/Wax c. Animal manure d. All of the above
10. The fuel transported from Pennsylvania during Civil war was
    1. Kerosene b. Petrol c. Diesel d. Biodiesel
11. When did the change in determining if the village was electrified or not come into effect
    1. 1995 b. 1996 c. 1997 d. 1998
12. Extraction of various oil components from crude oil happens through
    1. Distillation b. Evaporation c. Extraction d. Sedimentation
13. The common sinks for energy are
    1. Oceans b. Soil c. Air d. All of the above
14. Disadvantages of biofuel energy is
    1. Cheap price b. Creates job c. Emissions d. None of the above
15. India is a largest producer for
    1. Kerosene b. Petrol c. Diesel d. Coal
16. Problems associated with wind energy harvest
    1. Land use b. Difficult to install c. Sound pollution d. Only a and c
17. Energy from which combination can be harvested from ocean
    1. Wave/Tides/Salts/Temperature b. Salt/Temperature/Tides/Pressure
    2. Wave/Temperature/Pressure/Salt d. Wave/Tides/Salts
18. Biofuels sources are classified into generations
    1. 3 b. 4 c. 5 d. 2
19. Energy efficiency is important to
    1. Protect environment b. Fair economy
    2. Overcome energy associated risks d. All of the above
20. IRENA stands for
    1. The Indian Railway Enhancement Agency (IRENA)
    2. The International Renewable Energy Agency (IRENA)
    3. The International Road and Energy Agency (IRENA)
    4. The International Renewable Energy Association (IRENA)
21. Examples of alternate energy can be
    1. Petrol based cars b. Battery based cars
    2. Coal based trains d. All of the above
22. The efficiency of first silicon based solar cell was
    1. 3% b. 1.5% c. 4% d. 6%
23. Which is not an example of semiconductor device
    1. Resistor b. Metal c. Capacitor d. Diode
24. The n-type semiconductor has more
    1. Holes b. Electrons c. Neutrons d. Muons
25. Perovskite solar cell belong to generation of solar cells
    1. First b. Second c. Third d. Fourth
26. Example of biomaterials used in solar cell
    1. Cellulose b. Carrageenan c. Amino acids d. All of the above

39. Fourth generation biofuels are obtained from

a. Lignocellulosic waste b. Edible sources

c. Algae d. Genetically modified organisms

1. Which of these is not a source of biomass for biofuel?

a. Wood chips b. Paddy straw c. Kitchen waste d. Coal

1. The best strategy to utilize biomass is

a. Direct combustion b. Upgrading and processing

c. Composting d. None of these

1. Which of these is/are thermochemical route/s of biomass conversion?

i. Fermentation ii. Gasification iii. Pyrolysis iv. Hydrothermal liquefaction

1. Only i b. Only i and ii c. All of these d. Only ii, iii, and iv

43. Biofuels are similar to fossil fuels as

a. Their combustion produces energy

b. Both are renewable sources of energy

c. Both are non-renewable sources of energy

d. Both are obtained from fossils

44. ‘To ensure access to affordable, reliable, sustainable and modern energy to all’ is

a. World Health Organisation Goal

b. United Nations Sustainable Development Goal

c. United Nations Industrial Development Organization Goal

d. United Nations Educational, Scientific and Cultural Organization Goal

45. Biomethane is also called as

1. Bioethanol b. Biochar c. Biogas d. Biodiesel

46. Syngas can be used as a source gas for the production of

i. Ammonia ii. Pure hydrogen iii. Methanol iv. SNG

1. Only iv b. Only i, ii c. Only ii, iv d. All of the above

47. The process in which biomass is hydrolyzed or degraded using water at high temperature (280°C - 370°C) and pressures (10 - 25 MPa) is called Hydrothermal Liquefaction. The product is called

1. Bio-oil b. Syngas c. Biogas d. Biomethane

48. Which of these serves mostly in the transport sector as a constituent of mixture with gasoline or as octane increaser

1. Bioethanol b. Biogas c. Bio-oil d. Biochar

49. Starch is a mixture of

1. Amylose and amylopectin b. Cellulose and hemicellulose

c. Lignin and cellulose d. Only amylose

50. The advantage of using lignocellulosic biomass for biofuels is/are

1. It is sustainable b. It is renewable

c. It does not compete with food crops d. All of these

51. Root/tuber crops like cassava, potato, sweet potato are used for bioethanol production because they contain large quantities of

1. Starch b. Fats c. Alcohol d. Proteins

52. A process occurring in the absence of air/ oxygen is called

1. Aerobic b. Anaerobic c. Acoustic d. Amphoric

53. Enzymes and Chemicals are used in

a. Pyrolysis b. Gasification c. Low-temperature deconstruction d. Torrefaction

54. F[lexible fuel vehicles](http://www.afdc.energy.gov/vehicles/flexible_fuel.html), are designed to run on a gasoline-ethanol blend containing

1. Up to 85% ethanol b. Up to 45% ethanol

c. Up to 25% ethanol d. Up to 100% ethanol

55. The goal of pretreatment of lignocellulosic biomass is to

i. Make the cellulose accessible to hydrolysis for conversion to fuels

ii. Make the cellulose accessible to enzymes for conversion to fuels

iii. Improve yields of sugars from the cellulose

iv. Change the physical and chemical structure of the lignocellulosic biomass

a. Only i, iv b. Only i, ii c. Only i, ii, iv d. All of the above

1. Biodiesel is produced using reaction
   1. Transesterification b. Transfiltration

c. Transpurification d. Transconversion

1. Biodiesel is considered as energy
   1. Clean b. Alternate c. Neither a or b d. Both a and b
2. Example of catalyst used in biodiesel production is
   1. NaOH b. CO2 c. H2O d. Oil
3. Reactor used is biodiesel production
   1. PFR b. FBR c. BR d. CSTR
4. Biodiesel is produced from
   1. Seed oil b. Plant fibers c. Both a or b d. Neither a and b