Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–1st / 2nd EXAMINATION (SPFU) – WINTER 2015

Subject Code: BSC001 **Date:28/12/2015**

Subject Name: Chemistry

Time: 10:30am to 01:30pm **Total Marks: 70**

Instructions:

1. **Question paper is divided in two sections: objective section and subjective section.**
2. **Attempt both the sections.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

PART-1 OBJECTIVE SECTION

Question No. 1 to 25 carry 1 mark each & 26 to 30 carry 2 marks each.

Q1. Both temporary and permanent hardness of water can be removed by……

A. Boiling
B. Distillation
C. Filtration
D. Decantation

Q2. 1 mg/liter=…… ppm

A. 10
B. 2
C. 1
D. 100

Q3. The soft loose and slimy precipitate formed within the boiler is called

A. Suspension
B. Scale
C. Sludge
D. Sediment

Q4. ……is known as the purest form of iron.

A. Wrought iron
B. Pig Iron
C. Cast iron
D. Chrom iron

Q5. The ability of metal to beaten into sheets is known as

A. malleability
B. tensile strength
C. Conductivity
D. Tenacity

Q6. Pick out the wrong statement.

A. Bronze is an alloy of copper & tin.
B. Brass is an alloy of copper & zinc.
C. The alloy named 'German silver' does not contain any silver.
D. Tempering is the process used to decrease the toughness of iron-based alloy

Q7. Which **one** of the following is not an addition polymer?

A. polythene
B. PVC
C. Nylon
D. Polypropylene

Q8. Which of the following is not true regarding chain growth polymerization?

A. The reaction involves initiation, propagation and termination steps.
B. reaction is very fast
C. Free radical, cationic or anionic intermediates are present
D. Also known as living polymerization.

Q9. Galvanizing is a method of.....

A. coating tin on zinc
B. Coating zinc on iron
C. Coating tin on iron
D. Coating zinc on tin

Q10. Dry corrosion is also known as_____ corrosion.

A. Biological
B. Bacterial
C. Physical
D. Chemical

Q11. Electrochemical corrosion always takes place at_____

A. Cathode
B. Anode
C. In electrolyte solution
D. Any one of the electrode

Q12. Nylon-6,6 can be made in the lab by reacting together the two monomers: hexamethylene diamine and.....

A. Ethyl glycol
B. Adipic acid
C. Succinic acid
D. Caprolactum

Q13. Which of the following component do not contribute towards calorific value?

A. C
B. S
C. N
D. H

Q14. A good fuel should possess.....

A. High ignition temperature
B. High calorific value
C. High moisture content
D. All of these

Q15. Four of the liquid fractions from the fractional distillation of crude oil are diesel oil, petroleum ether, gasoline and kerosene. Which of them is most viscous (least runny)?

A. Petroleum ether
B. Gasoline
C. Diesel oil
D. Kerosene

Q16. Net calorific value is.....Gross calorific value.

A. Higher than
B. Lower than
C. Equal to
D. Double of

Q17. Souring of milk is due to_____

A. Purification
B. Condensation

C. Fermentation D. Boiling

Q18. Which of the following best describe biodegradation?

A. A minor change in an organic molecule.
B. A complete transformation of an organic molecule into mineral form.
C. Fragmentation of complex organic molecule.
D. all of these

Q19. The latin word "ferver" from which fermentation is derived means

A. Boiling
B. Cooling
C. Drying
D. Filtering

Q20. According to atom economy, a synthesis should be designed in such a way that.....

A. numbers of by-products are formed.
B. All reactants are used up in product.
C. harmful gases are produced
E. All of these

Q21. Whihc of the following can be used as alternative green solvents in chemical synthesis?

A. Carbontetrachloride
B. Alcohol
C. Benzene
D. Super critical fluid

Q22. "Bhopal gas tragedy" demonstrate violation of which green chemistry principle?

A. atom economy
B. Energy efficiency
C. Designing of safer products
D. Derivative reaction

Q23. Who discovered x-rays?

A. Bergius
B. Roentgen
C. Ingold
D. Shaun

Q24. TGA stands for:

A. thermo gravimetric analysis
B. thermo gravimetric acceleration
C. thermo gram analysis
D. temperature gravity acceleration

Q25. Wavelength range of x-ray is:

A. 500nm to 800 nm
B. 800 nm to 10 micrometre
C. 10-7 to 10-15 m
D. none of these

Q26. The chemical composition of alum is:

A. $K_2SO_4.Al_2(SO_4)_3.H_2O$
B. $K_2SO_4.Al_2(SO_4)_3.24H_2O$
C. $K_2SO_4.Al_2(SO_4)_3.12\ H_2O$
D. $K_2SO_4.24H_2O$

Q27. Calculate the temporary hardness of water sample in ppm containing following salts:

$Ca(HCO_3)_2$ = 81 mg/L; $Mg(HCO_3)_2$ = 73 mg/L; $CaSO_4$ = 13.6 mg/L; Mg SO_4 = 5 mg/L; $CaCl_2$ = 11.1 mg/L; $MgCl_2$ =9.5 mg/L

A. 100
B. 50
C. 200
D. 250

Q28. Which of the following is example of primary fuel?

A. Crude oil
B. Coke
C. Kerosene
D. Diesel

Q29. Among Mg, Al, Zn and Fe, which will displace all the other metals from their solution?

A. Al B. Zn
C. Fe D. Mg

Q30. x-ray diffraction can only be applied to.....
A. Gases B. Liquids
C. Solids and crystalline minerals D. All of these

PART-II SUBJECTIVE SECTION

Instructions: Attempt any 5 questions out of all.

Each question carry equal marks (7 marks)

Q1. (a) What is corrosion? Discuss the factors affecting corrosion **(3)**
(b) Differentiate between: (i) temporary hardness and permanent hardness (ii) Scale and sludge **(4)**

Q2. (a) Differentiate between thermoplastic and thermosetting polymers. **(4)**
(b) What are the characteristics of a good fuel? **(3)**

Q3. (a) Discuss in brief physical properties of metals. **(3)**
(b) Write a note on optical microscopy. **(4)**

Q4. (a) Write Dulong's formula and calculate HCV(Higher Calorific Value) and LCV(Lower Calorific Value) of a fuel sample whose elemental analysis is as follows: **(3)**
C = 86%; H = 5%; S = 1.5%; N = 2%; O = 3.5%
(b) Give a brief account of principles of green chemistry **(4)**

Q5. (a) Name various moulding constituents of plastics and indicate their uses. **(4)**
(b) Write in brief about disadvantages of using hard water. **(3)**

Q6. Explain lime soda process of softening hard water and write its advantages and disadvantages. **(7)**

Q7. Answer the following: **(7)**
(i) Give statement of "Pilling Bedworth Rule".
(ii) What are coagulants? Give examples.
(iii) Write formula to calculate EMF of a cell?
(iv) Why are tinned containers preferred over galvanized ones for storage of food items?
(v) How are exhausted zeolite regenerated?
(vi) Which gas is evolved during fermentation?
(vii) Which metals combine to form brass and bronze?

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