

P. P. SAVANI UNIVERSITY

First Semester of B.Sc. Examination

February-2020

SSFS1030–Applied Chemistry

26.02.20, Wednesday

Time: 12:30 p.m. to 03:00 p.m.

Maximum Marks: 60

Section-A (Total Marks - 30)

- Q.1 Very Short Questions (attempt all questions) (10)**
- 1.1 Objectives (10MCQ Compulsory-0.5 mark each) 05**
- 1.1a Which fuels are used for running automobiles?**
- A Wood
 - B Coal
 - C Diesel
 - D Charcoal
- 1.1b Charcoal burns in air producing-**
- A CO_2
 - B CO
 - C H_2
 - D O_2
- 1.1c Combustion is a reaction in which a Substance reacts with**
- A CO_2
 - B CO
 - C H_2
 - D O_2
- 1.1d Fuel may be-**
- A Solid
 - B Liquid
 - C Gas
 - D All of these
- 1.1e Which one of the following is fuel of our body?**
- A Petrol
 - B Diesel
 - C Food
 - D Water
- 1.1f Combustion is a-**
- A Physical process
 - B Chemical process
 - C Both a and b
 - D None of these
- 1.1g The lowest temperature at which a Substance catches fire is called its-**
- A Boiling point
 - B Melting point
 - C Ignition temperature
 - D Critical temperature
- 1.1h In the presence of water, ignition Temperature of paper is-**
- A Decrease
 - B Increase
 - C Remain constant
 - D None of these
- 1.1i Essential requirements for producing fire are:**
- A Fuel
 - B Air
 - C water
 - D All of these
- 1.1j Rapid combustion is**
- A When gas burns, it produces heat and light
 - B When material suddenly burst into flames

- C When there is evolution of heat
- D None of these

- 1.2 Five Questions (Definitions, True/False, Fill in the Blanks-1 mark each) 05**
- 1.2a Define Flash point.
 - 1.2b What is combustion?
 - 1.2c What is calorific value?
 - 1.2d What is heat of fusion?
 - 1.2e Define energy release rate.
- Q.2 Short Notes (attempt any two- 3 marks each) 06**
- A Write a detailed note on Flame arrestor.
 - B Explain heat transfer in fire by conduction, convection and radiation.
 - C Describe combustion in natural fire.
- Q.3 Explain in detail (attempt any two-7 marks each) 14**
- A Discuss the measurement of heat by using Bomb calorimeter.
 - B Discuss in detail Gaseous flames and their types.
 - C Discuss the triangle of fire, constituent's tetrahedron of fire and life cycles theory of fire

Section-B (Total Marks - 30)

- Q.1 Very Short Questions (attempt all questions) (10)**
- 1.1 Objectives (10 MCQ Compulsory-0.5 mark each) 05**
- 1.1a Why do most chemical reaction rates increase rapidly as the temperature rises?**
- A the fraction of the molecules with kinetic energy greater than the activation energy increases rapidly with temperature
 - B more collisions take place between particles so that the reaction can occur
 - C the average kinetic energy increases as temperature rises
 - D the activation energy decreases as temperature rises
- 1.1b Reaction rates can change with**
- A temperature
 - B the addition of a catalyst
 - C reactant concentrations
 - D all of these
- 1.1c As the temperature of a reaction is increased, the rate of the reaction increases because the**
- A reactant molecules collide with greater energy
 - B reactant molecules collide less frequently
 - C reactant molecules collide less frequently and with greater energy
 - D activation energy is lowered
- 1.1d Which three factors affect the rate of a chemical reaction?**
- A temperature, pressure and humidity
 - B temperature, reactant concentration and catalyst
 - C temperature, reactant concentration and pressure
 - D temperature, product concentration and container volume
- 1.1e Reaction rates generally**
- A are constant throughout a reaction
 - B are smallest at the beginning and increase with time
 - C are greatest at the beginning of a reaction and decrease with time
 - D no such generalisations can be made
- 1.1f For first-order reactions the rate constant, k, has the unit(s)**
- A l mol^{-1}
 - B time^{-1}
 - C $(\text{mol/l})^{-1} \text{time}^{-1}$
 - D time mol l^{-1}
- 1.1g Which of the following statements associated with mechanisms of chemical reactions is incorrect?**
- A intermediates do not appear in the net chemical equation or overall rate law
 - B the first step in a mechanism always determines the rate of the reaction

- C in elementary reactions, coefficients give the order with respect to reactants and products
- D a plausible mechanism must account experimentally determined rate law

1.1h Explosion is the evolution of

- A Heat
- B light
- C Sound
- D All of these

1.1i An explosive that normally detonates is known as:

- A A low explosive
- B A high explosive
- C Primary explosive
- D Secondary explosive

1.1j A secondary explosive is, by definition:

- A a dispersed explosive.
- B A low explosive
- C the main charge of an explosive device that is set off by a small quantity of explosive that is relatively easier to initiate than itself.
- D a deflagrating explosive.

1.2 Five Questions (Definitions, True/False, Fill in the Blanks-1 mark each)

05

- 1.2a Define order of reaction.
- 1.2b What is half-life of a reaction?
- 1.2c Give Arrhenius equation.
- 1.2d Define combustibility limit.
- 1.2 e Define explosion.

Q.2 Short Notes (attempt any two- 3 marks each)

06

- A Describe common ignition sources.
- B Discuss Ignition hazards.
- C Discuss the basics of Chemical Kinetics.

Q.3 Explain in detail (attempt any two-7 marks each)

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- A Derive and explain First order reaction.
- B Discuss in detail Fire retardants and their applications.
- C Describe in detail Ignition hazards and combustibility limits.