# Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

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| **Year and Program: B.Sc. III 2020-21** | **School of Science** | **Department: Chemistry** |
| **Course Code: CHS 302** | **Course Title: Physical Chemistry** | **Semester : I (odd)** |
| **Day and Date: Thursday, 27.05.2021** | **End Semester Examination** | **Time:2 Hrs. Max Marks:50** |

**Instructions**: 1) All Questions are compulsory.
2) Draw neat and systematic diagrams wherever necessary.

| | | Marks | Bloom's Level | CO |
|---|---|---|---|---|
| **Q.1** | **Answer the following questions** | | | |
| a) | What is quantum efficiency of a photochemical reaction? Show that quantum efficiency of photochemical decomposition of HI is two and state and explain Einstein law of photochemistry. | 8 | L1 | CO1 |
| b) | Explain in brief (i) Opposing reactions (ii) parallel reactions iii) consecutive reactions and (iv) chain reactionsand their differential rate equations. | 8 | L2 | CO2 |
| | OR | | | |
| c) | i) State and explain Einstein law of photochemistry. (4 marks) | 8 | L2 | CO1 |
| | ii) The gas-phase reaction between methane (CH4) and diatomic sulphur (S2) isgiven by the equationCH4 (g) + 2S2 (g) ⟶ CS2 (g) + 2H2S (g)At 550°C the rate constant for this reaction is 1.1 *l* $mol^{-1}$ sec and at 625°C the rate constant is6.4 *1* $mol^{-1}$ sec. Calculate Ea for this reaction. (4 marks) | | L2 | CO2 |
| **Q.2** | **Answerthe following questions** | | | |
| a) | Derive an expression for EMF of an electrolyte concentration cell with transference. Which is reversible to anion. | 8 | L3 | CO3 |
| b) | Derive an expression for EMF of an electrolyte concentration cell with transference. Which is reversible to cation. | 8 | L3 | CO3 |
| | OR | | | |
| c) | What are concentration cells? Give an account of a) electrode concentration cell and b) electrolyte concentration cell without transference with one example of each. | 8 | L3 | CO3 |

**Q.3 Answer the followingquestions**

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|---|---|---|---|---|
| a) | What is mean by radioactivity? Describe in brief types of nuclear reactions. | 9 | L2 | CO4 |
| b) | Discuss in brief types of radioactive decay. | 9 | L2 | CO4 |
| | OR | | | |
| c) | Describe nuclear fusion and fission process with radioactive decay reaction. | 9 | L2 | CO4 |

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