K21U 0092

Reg. No.:	RENVENC
Name :	to notify (CE) OLL LIERA

VI Semester B.Sc. Degree (CBCSS - Reg./Supple./Improv.) Examination, April 2021 (2014 - 2018 Admissions) CORE COURSE IN CHEMISTRY IN BOOKING A TOTAL

6B15 CHE: Physical Chemistry - III

Time: 3 Hours

Max. Marks: 40

SECTION - A

Answer all questions. Each question carries one mark.

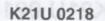
- 1. Define Single electrode potential.
- 2. What is unit of k for a second order reaction ? Offield police and a supplied of the control of the control
- 3. Name a redox indicator.
- 4. What is chemiluminescence? (1×4=4)

SECTION - B seek selved to borden and mislay - 335

Answer any seven questions. Each question carries 2 marks.

- 5. Why is quantum yield of H₂ Cl₂ reaction very high?
- 6. State Growthus Draper Law. What is its significance?
- 7. What are pseudounimolecular reactions? Give examples.
- 8. Differentiate between threshold energy and activation energy.
- 9. Explain Lewis concept of acids and bases.
- 10. Calculate the ionic strength of a 0.01 M Na₂SO₄ solution.
- 11. Give the electrode reaction in a calomel electrode.
- 12. Why is KCI used in salt bridge ? It wollows bus not supe another both of id-

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- 12. Explain briefly the procedure for solving a Fredholm integral equation of second kind with separable integral.
- 13. Solve the homogeneous Fredholm integral equation $\phi(x) = \lambda \int_0^1 e^x e^{\xi} \phi(\xi) d\xi$
- 14. Find the first two iterated kernels of the kernel $K(x, t) = (x t)^2$, a = -1, b = 1.
- 15. Write short note on Abel's equation.
- 16. Find the eigen values and eigen functions of $y(x) = \lambda \int_0^{2\pi} \sin x \cos t y(t) dt$.
- 17. Find L[e^{5t} cos3ht]. .

18. Find
$$L^{-1} \left(\frac{1}{s^2 (s^2 + a^2)} \right)$$
.

- 19. Find the inverse Laplace Transform of the function $\frac{1}{s^2-4s+5}$.
- 20. State and prove first shifting theorem.
- 21. Find L[tcos3t].
- 22. State and prove linearity property of Fourier Transform.
- 23. Find the Fourier transform of f(x) = 1 if |x| < 1 and f(x) = 0 otherwise.
- 24. Find the Fourier cosine transformation of the function $f(x) = \begin{cases} k & \text{if } 0 < x < a \\ 0 & \text{otherwise} \end{cases}$.

SECTION - C

Answer any 6 questions. Each question carries 5 marks:

- 25. Form the Fredholm integral equation corresponding to the boundary value problem y'' = f(x), y(0) = 0, y(1) = 0.
- 26. Find the Green's function of the boundary value problem $\frac{d^4y}{dx^4} + \lambda y = -f(x)$ with y(0) = y'(0) = 0, y(1) = y'(1) = 0.
- 27. If the Kernel K (x, t) is real and symmetric then show that the eigen function corresponding to distinct eigen values of the homogenous Fredholm integral equation y(x) = λ ∫_a^b k(x, t) y(t) dt are orthogonal.



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- 28. Find eigen value and eigen function of $y(x) = \lambda \int_0^1 (\sqrt{x}t \sqrt{t}x)y(t)dt$.
- 29. Solve the initial value problem : $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} 3y = \sin t$ given that y(0) = y'(0) = 0.
- 30. Solve y'' 3y' + 2y = 4t, y(0) = 1, y'(0) = -1.
- 31. Find the inverse Laplace transform of $ln \frac{s+a}{s-a}$.
- 32. Find the Fourier Transform of $f(x) = e^{-ax}$, if x > 0, f(x) = 0, if x < 0, where a > 0.
- 33. State and prove convolution theorem of fourier transform.

Answer any one question. It carries 10 marks.

 $(1 \times 10 = 10)$

- 34. a) Write down the four properties that have to be satisfied by Green's function of a second order differential equation with homogenous boundary conditions.
 - b) Define singular integral equations and give examples for each case.
- 35. a) Evaluate $\int_0^\infty \frac{e^{-t} \sin t}{t} dt$.
 - b) Find the Fourier integral representation of $f(x) = \begin{cases} \sin x & \text{if } 0 < x < \pi \\ 0 & \text{if } x > \pi \end{cases}$