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G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.



UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.SC., PHYSICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
III	PART – III	CORE	U21PH305	ELECTRICITY

Date & Session: 23.04.2025/FN

Time: 3 hours

Maximum: 75 Marks

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer <u>ALL</u> Questions.
CO1	K1	1.	The electric flux emanating from an electric charge of (+q) coulomb is ____. a) q/ϵ_0 b) $q/\epsilon_0\epsilon_r$ c) q d) $q\epsilon_0$
CO1	K2	2.	The S.I unit of electric field is _____. a) Vm^{-1} b) NC^{-1} c) N/C d) Vm
CO2	K1	3.	The capacitance of a parallel plate capacitor does not depend upon ____. a) the distance between the plates b) area of the plates c) medium of the plates d) metal of the plates
CO2	K2	4.	The potential at a point near an isolated positive charge is _____. a) negative b) positive c) zero d) either a or b
CO3	K1	5.	The unit of thermoelectric power is _____. a) J/Kelvin b) volt/Kelvin c) J/A d) watt
CO3	K2	6.	The Thomson coefficient is zero for _____. a) gold b) copper c) silver d) lead
CO4	K1	7.	The relation between the potential difference (V) and current (I) was discovered by _____. a) Volt b) Ampere c) Ohm d) Newton
CO4	K2	8.	Current density is _____. a) current per unit length b) current across unit area c) current per unit volume d) current per resistance
CO5	K1	9.	The power factor of a series resonant circuit at resonance is _____. a) 0 b) 1 c) 0.3 d) 0.6
CO5	K2	10.	In a parallel resonant circuit, the current at resonance is _____. a) minimum b) maximum c) zero d) infinity
Course Outcome	Bloom's K-level	Q. No.	SECTION – B (5 X 5 = 25 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)
CO1	K3	11a.	Explain Coulomb's law.
			(OR)
CO1	K3	11b.	Define the following terms (i) Electric field (ii) Electric dipole.

CO2	K3	12a.	Derive an expression for potential at a point due to a point charge. (OR)
CO2	K3	12b.	Discuss and obtain the expression for combined capacitance of capacitors connected in (i) series (ii) parallel.
CO3	K4	13a.	Explain Seebeck effect. (OR)
CO3	K4	13b.	Elaborate Faraday's law of electrolysis.
CO4	K4	14a.	Find an expression for the growth of charge in a capacitor through a resistance. (OR)
CO4	K4	14b.	Explain with full theory the method of measuring a high resistance by the leakage method.
CO5	K5	15a.	Draw an a.c circuit containing capacitance and resistance in series. Derive an expression for the impedance and current in the circuit. (OR)
CO5	K5	15b.	What is the power factor of the coil containing an alternating voltage of 10volts at 100Hz is applied to a choke of inductance 5 henry and resistance 200 ohms.

Course Outcome	Bloom's K-level	Q. No.	<p align="center">SECTION – C (5 X 8 = 40 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)</p>
CO1	K3	16a.	State and Prove Gauss law. Also give its differential form. (OR)
CO1	K3	16b.	Use gauss's law calculate the electric field strength of a spherically symmetric charge distribution at any distance r from (i) inside (ii) on the surface (iii) outside the spherical charge distribution.
CO2	K4	17a.	What is an electric dipole? Deduce an expression for potential at any point due to a dipole. (OR)
CO2	K4	17b.	Deduce the capacitance of a cylindrical capacitor.
CO3	K4	18a.	Applying the second law of thermodynamics, obtain expression for (i) total thermo e.m.f (ii) π (ii) $\sigma_a - \sigma_b$. (OR)
CO3	K4	18b.	Determine the specific conductivity of an electrolyte using Kohlrausch bridge method.
CO4	K5	19a.	How will you convert Galvanometer into an (i) ammeter (ii) voltmeter (OR)
CO4	K5	19b.	State Kirchhoff's law of distribution of current in an electrical network. Apply these laws to deduce the condition of balance of a Wheatstone's bridge.
CO5	K5	20a.	Investigate the behaviour of a resonant circuit consisting of a capacitor C in series with a coil of inductance L and resistance R. (OR)
CO5	K5	20b.	Deduce an expression for the power in an ac circuit containing resistance, Capacitance and inductance.