CLASS: IMSc		**SEMESTER : II**
BRANCH: PHYSICS		**SESSION : SP/2023**

**SUBJECT: PH102 ELECTRICITY & MAGNETISM**

TIME: 3 Hours   **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Show that the electric field just outside a conductor has a magnitude σ/ε_0, where σ is the local surface charge density.	[5]	1	2
Q.1(b)	Prove electric field at a point is defined as the gradient of the potential at that point.	[5]	1	5
Q.2(a)	Find the electrostatic energy stored in the space surrounding a uniformly charged, spherical shell of radius R carrying a total charge Q.	[5]	2	1
Q.2(b)	Explain why the introduction of a dielectric medium between the plates of a capacitor changes its capacitance.	[5]	2	2
Q.3(a)	State Ampere' circuital law. Apply the law to find the magnetic field due to a long current carrying solenoid at an internal and external points.	[5]	3	3
Q.3(b)	Find an expression for torque on a current loop placed in a uniform magnetic field.	[5]	3	1
Q.4(a)	Summarize all four Maxwell's equation in integral and differential form.	[5]	4	2
Q.4(b)	Find an expression for the impedance in a parallel LCR circuit.	[5]	4	1
Q.5(a)	Determine the power across the impedance (2+j3) ohm by using Thevenin's theorem.	[5]	5	1
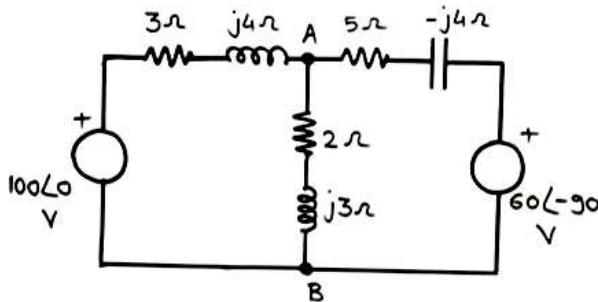
Q.5(b)	Find the Norton's equivalent circuit between the terminals A and B	[5]	5	1