



Final exam

Year: 1st year

Course Code: PH 106

Course Title: Electricity and Magnetism

Examination date: 24 /6/2023

Examination Time: 2 hour

Number of Pages: 4 page

Answer the following Questions: (Each question 1.5 mark)

1	The proportionality constant in coulomb's law has unit of			
	a. Farad/meter	~~b. meter/Farad~~	c. Newton	d. both a and c
2	The electric field of a charge			
	a. Increases with distance	b. Decreases with cube of distance	c. Decreases with distance	~~d. Decreases with square of distance~~
3	Let B be the midpoint of AC. Two point charges Q are placed at A and C. What should be the value of charge placed at B so that the system remains at equilibrium?			
	a. $-Q/2$	~~b. $-Q/4$~~	c. $+Q/2$	d. $+Q/4$
4	The force of attraction between two unlike point charges is F, magnitude of force if distance between the point charges gets tripled will be.....			
	a. $3F$	b. $(1/3)F$	~~c. $(1/9)F$~~	d. $9F$
5	If two same charges are $3 \times 10^{-7} \text{ C}$ and acted upon by a force of 0.5 N. Determine the distance between them, if both the charges are in vacuum.			
	a. 0.02 m	~~b. 0.04 m~~	c. 0.03 m	d. 0.05 m
6	Electric potential is			
	a. Vector quantity	b. Tensor quantity	~~c. Scalar quantity~~	d. None of them
7	The conventional direction of electric field is			
	~~a. Positive to negative~~	b. Negative to positive	c. No specific direction	d. None of them
8	The insulation between the two plates of a capacitor is called			
	a. Conductor	b. Semiconductor	~~c. Dielectric~~	d. Superconductor
9	The capacitance is a circuit component that oppose the change in circuit			
	~~a. Voltage~~	b. Current	c. Impedance	d. None of the above
10	What will be the nature of equipotential surfaces due to a point charge, situated at infinity?			

	a. Spherical	~~b. Plane surface~~	c. Elliptical	d. Cylindrical
11	Two opposite point charges, each of magnitude q are separated by a distance $2d$. What is the electric potential at a point P mid-way between them?			
	a. $q/2$	b. q	~~c. zero~~	d. q/d
12	If the potential difference across the two plates of a parallel plate capacitor is double, then the energy stored in it will be			
	a. 2 times	~~b. 4 times~~	c. 8 times	d. Remains constant
13	Electric lines of force are parallel and equally spaced, then the electric field is:			
	~~a. Weak~~	b. Strong	c. Non-Uniform	~~d. Uniform~~
14	Capacitor stores which type of energy?			
	a. kinetic energy	~~b. potential energy~~	c. heat energy	d. vibrational energy
15	If a parallel plate capacitor of plate area $4m^2$ and plate separation $2m$ store the charge of $1.77 \times 10^{-11} C$. What is the voltage across the capacitor?			
	a. 0.5V	~~b. 1V~~	c. 2V	d. 3V
16	A test charge is moved from lower potential point to a higher potential point. The potential energy of test charge will			
	a. remain the same	b. decrease	c. become zero	~~d. increase~~
17	Two equal and opposite charges $Q_1 = 2 C$ and $Q_2 = -2C$ are placed at a distance of 6m from each other. What is the potential at the midpoint between the two charges?			
	~~a. 0 V~~	b. 1 V	c. 2 V	d. 3 V
18	Two electric field lines _____			
	a. Always intersect	~~b. Never intersect~~	c. intersect sometimes	d. All the above
19	NC^{-1} is a unit of			
	a. Force	b. Charge	c. Current	~~d. Electric Intensity~~
20	In Kirchhoff's first law $\sum i = 0$ at the junction is based on the conservation of			
	a. Energy	~~b. Charge~~	c. Momentum	d. Speed
21	The electric field lines are closer where the field is:			
	~~a. Strong~~	b. Weak	~~c. Uniform~~	d. Variable

22	A particle (charge = $+40 \mu\text{C}$) is located on the x axis at the point $x = -20 \text{ cm}$, and a second particle (charge = $-50 \mu\text{C}$) is placed on the x axis at $x = +30 \text{ cm}$. What is the magnitude of the total electrostatic force on a third particle (charge = $-4.0 \mu\text{C}$) placed at the origin ($x = 0$)?			
	a. 41 N	~~b. 56 N~~	a. 16 N	c. 35 N
23	_____ is the junction connected with multiple routes carrying currents?			
	~~a. Node~~	b. Centre	c. Anode	(b) Cathode
24	Relation between power, voltage and conductance			
	a. $V = P^2 \cdot G$	b. $V = P^2 / G$	c. $P = V^2 / G$	~~d. $P = V^2 \cdot G$~~
25	By increasing the temperature the conductivity of a conductor			
	a. increases	~~b. decreases~~	~~c. remains constant~~	d. None of them
26	A 30 V battery is connected across a 7.5Ω resistor and a current of 3.5 A flows. The internal resistance of the battery is			
	a. 0.5Ω	~~b. 1.07Ω~~	c. 1.14Ω	d. 2Ω
27	A wire of resistance R is cut into two equal parts, its resistance becomes R/2. What happens to resistivity?			
	a. Double	~~b. Half~~	~~c. Remains same~~	d. One forth
28	The electrical Conductivity (σ) can be calculated as			
	a. $\sigma = R \cdot \frac{A}{L}$	b. $\sigma = R \cdot \frac{L}{A}$	~~c. $\sigma = \frac{1}{R} \cdot \frac{L}{A}$~~	d. $\sigma = \frac{1}{R} \cdot \frac{A}{L}$
29	The magnetic field at distance r from a long wire carrying a current I is 0.4 T. the magnetic field at a distance 2r is ,			
	a. 0.1 T	~~b. 0.2 T~~	c. 0.8 T	d. 2 T
30	Specific resistance of a material depends upon			
	a. Length	b. Area	~~c. Temperature~~	d. Both a & b
31	Identify the condition under which the force acting on a charge moving through a uniform magnetic field is maximum			
	~~a. $\theta = 90^\circ$~~	b. $\theta = 180^\circ$	c. $\theta = 0^\circ$	d. $\theta = 360^\circ$
32	A charged particle with velocity v and charge q passes through a magnetic field B. what will be the force on it due to magnetic field given that the velocity is along the direction of magnetic field			

	a. qvB	b. qv/B	c. qv^2B	d. ~~Zero~~
33	Which of the following is true regarding magnetic lines of force?			
	a. Real	b. ~~Imaginary~~	c. Does not exist	d. Parallel to field
34	Two resistances of 20 ohms each are connected in parallel and this combination is connected with another resistance of 5 ohms in series. The total resistance of the circuit is			
	~~a. 15 Ohms~~	b. 30 Ohms	c. 20 Ohms	d. 50 Ohms
35	Two capacitors of capacitances C_1 and C_2 are connected in series and potential difference V is applied across it. Then the potential difference across C_1 will be			
	a. $V \frac{C_1+C_2}{C_2}$	b. $V \frac{C_1}{C_2}$	c. ~~$V \frac{C_1}{C_1+C_2}$~~ ✓ $V \frac{C_2}{C_1+C_2}$	d. Both of them
36	Two capacitors of 3 pF are connected in series and a potential difference of 5000 V is applied across the combination. They are then disconnected and reconnected in parallel. The potential between the plates is			
	a. 2.25×10^6 V	b. 1.1×10^6 V	c. 2250 V	d. ~~1250 V~~
37	The reciprocal of resistivity is called			
	a. Impedance	b. resistance	c. Conductance	d. ~~conductivity~~
38	If a current of 5A flows through a resistor of 20 ohm then the power developed and the energy dissipated in 1 minute are			
	a. 1500 W, 90000 J	b. 500 W, 90000 J	c. ~~500 W, 30000 J~~	d. 1500 W, 30000 J
39	conductance of a substance is measured in			
	a. $\Omega.m$	b. Ω	c. ~~Ω^{-1}~~	d. $\Omega^{-1}.m^{-1}$
40	A conductor carries a current of 20 mA if the area of cross-section of the conductor is 30 m^2 and the electric field is 10V/m then value of the electrical resistivity in Ωm is			
	a. 10000	b. ~~15000~~	c. 45000	d. 60000

With my best wishes

Dr. Nora. A.Eid