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PHYSICS TEST - CHAPTER 10: ELECTROSTATICS

Name:		Roll No.		Section:

Total Time: 2:30 Hour **Total Marks: 150**
Time Allowed: 150 Minutes

PAPER OBJECTIVE
SECTION-A (MARKS 150)

NOTE: Section-A is compulsory. All parts of this section are to be answered on these pages and handed over to the center superintendent. Deleting / overwriting is not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark.

Questions	A	B	C	D	A B C D
1. Like charges	repel each other	attract each other	neutralize	have no force	●○○○
2. Unlike charges	merge	attract each other	have no force	repel each other	○●○○
3. SI unit of charge is	coulomb	ampere	volt	farad	●○○○
4. Charge on one electron is	6.0×10^{23} C	9.1×10^{-31} C	1.6×10^{-27} C	1.6×10^{-19} C	○○○●
5. Charge is quantized means it exists as	integer multiples of e	continuous values	any fraction of e	zero only	●○○○
6. Conservation of charge means total charge of an isolated system	becomes zero	increases	decreases	remains constant	○○○●
7. A body becomes positively charged by	gaining electrons	losing neutrons	losing electrons	gaining protons	○○●○
8. A body becomes negatively charged by	losing protons	losing electrons	gaining electrons	gaining neutrons	○○●○
9. A glass rod rubbed with silk becomes positive because it	gains protons	loses neutrons	gains electrons	loses electrons	○○○●
10. Charge of 1 μC equals	10^{6} C	10^{-3} C	10^{-6} C	10^{-9} C	○○●○
11. Charge of 1 nC equals	10^{9} C	10^{-9} C	10^{-6} C	10^{-12} C	○●○○
12. Number of electrons in 1 C of charge is about	9×10^{9}	6.25×10^{18}	6.02×10^{23}	1.6×10^{19}	○●○○
13. Coulomb's law states force between two point charges is	$\propto r/q_1q_2$	$\propto q_1q_2r^2$	$\propto q_1q_2/r^2$	$\propto q_1/q_2r$	○○●○
14. Coulomb's law in magnitude is F =	kq_1q_2/r	kq_1q_2r	kq_1q_2/r^2	$kq_1q_2r^2$	○○●○

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Questions	A	B	C	D	A B C D
15. Value of k in vacuum is about	6.67×10^{-11}	9×10^{9} N m² C⁻²	9×10^{-9} N m² C⁻²	8.85×10^{-12}	○●○○
16. k equals	$\varepsilon_0/4\pi$	$4\pi/\varepsilon_0$	$1/(4\pi\varepsilon_0)$	$4\pi\varepsilon_0$	○○●○
17. Value of ε_0 is	6.67×10^{-11}	8.85×10^{-12} C² N⁻¹ m⁻²	1.6×10^{-19}	9×10^{9}	○●○○
18. If distance between two charges doubles, force becomes	half	one quarter	double	four times	○●○○
19. If distance between two charges halves, force becomes	half	one quarter	double	four times	○○○●
20. If both charges are doubled, force becomes	four times	half	double	same	●○○○
21. If one charge is tripled, force becomes	three times	one third	nine times	same	●○○○
22. Force between two 1 μC charges 1 m apart is	9×10^{-9} N	9 N	9×10^{3} N	9×10^{-3} N	○○○●
23. Force between 2 μC and 3 μC at 1 m apart is	5.4 N	6×10^{-3} N	5.4×10^{-6} N	5.4×10^{-2} N	○○○●
24. Two charges 1 μC each experience 0.9 N. Their separation is	0.1 m	10 m	0.01 m	1 m	●○○○
25. Coulomb force acts along the	perpendicular to the line	tangent to a circle	vertical only	line joining the charges	○○○●
26. Coulomb's law is valid for	neutral bodies	masses	moving charges only	point charges at rest	○○○●
27. Coulomb force is	always attractive	attractive or repulsive	always zero	always repulsive	○●○○
28. Placing a dielectric between charges makes the force	infinite	decrease	increase	zero	○●○○
29. An electric field is a region where a charge experiences	only heat	no force	only light	a force	○○○●
30. Electric field strength is defined as	work per charge	force per unit positive charge	charge per unit force	force × charge	○●○○
31. SI unit of electric field is	N C	J C	N C⁻¹	C N⁻¹	○○●○

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Questions	A	B	C	D	A B C D
32. N C^{-1} is equivalent to	V m^{-1}	V m	A m^{-1}	J C	●○○○
33. Electric field is a	dimensionless	vector quantity	scalar quantity	scalar with no direction	○●○○
34. Direction of electric field is the direction of force on a	moving magnet	negative test charge	neutral body	positive test charge	○○○●
35. Force on charge q in field E is	qE	q/E	q + E	E/q	●○○○
36. A 2 μC charge in field 500 N C^{-1} feels	1 × 10^{-3} N	2.5 × 10^{8} N	4 × 10^{-3} N	1 × 10^{3} N	●○○○
37. Field due to a point charge q at distance r is	kq/r	kq^2/r	kq/r^2	kqr^2	○○●○
38. Field of a point charge falls with distance as	r	r^2	1/r	$1/r^2$	○○○●
39. Field at distance r from a charge is E. At 2r it is	4E	E/4	E/2	2E	○●○○
40. Field at 3 m from a 1 μC charge is	1000 N C^{-1}	9000 N C^{-1}	333 N C^{-1}	3000 N C^{-1}	●○○○
41. Field 0.3 m from a 3 nC charge is	90 N C^{-1}	900 N C^{-1}	30 N C^{-1}	300 N C^{-1}	○○○●
42. Field lines of a positive charge point	radially outward	in circles	parallel to each other	radially inward	●○○○
43. Field lines of a negative charge point	upward	in circles	radially outward	radially inward	○○○●
44. Electric field lines start on	magnetic poles	negative charges	positive charges	neutral points	○○●○
45. Electric field lines end on	negative charges	neutral points	magnetic poles	positive charges	●○○○
46. Electric field lines never	cross each other	end on charges	start on charges	show direction	●○○○
47. Closely spaced field lines indicate	strong field	uniform field	zero field	weak field	●○○○
48. Field between oppositely charged parallel plates is	zero	uniform	non-uniform	radial	○●○○

Questions	A	B	C	D	A B C D
49. Field lines between parallel plates are	crossing	parallel and equally spaced	radial	circular	○●○○
50. Field strength between plates with p.d. V and separation d is	V/d	Vd	d/V	V^2/d	●○○○
51. Plates 2 cm apart at 400 V give field	8 V m^{-1}	200 V m^{-1}	800 V m^{-1}	20 000 V m^{-1}	○○○●
52. Plates 5 mm apart with 1000 V give field	200 V m^{-1}	5 V m^{-1}	5×10^3 V m^{-1}	2×10^5 V m^{-1}	○○○●
53. Doubling plate separation at fixed voltage makes field	same	half	double	four times	○●○○
54. Electric field inside a charged conductor is	maximum	uniform non-zero	zero	infinite	○○●○
55. Charge on a conductor resides on its	nowhere	centre	inside	outer surface	○○○●
56. A charged sphere acts for outside points like a	uniform plate	point charge at its centre	dipole	line charge	○●○○
57. Electric potential at a point is work done per unit	mass	time	area	positive charge in bringing it from infinity	○○○●
58. SI unit of potential is	newton	coulomb	volt	farad	○○●○
59. One volt equals	one joule per coulomb	one coulomb per joule	one joule per second	one newton per coulomb	●○○○
60. Potential is a	vector quantity	scalar quantity	direction only	tensor	○●○○
61. Potential due to a point charge q at distance r is	kqr	kq/r^2	kq/r	kq^2/r	○○●○
62. Potential at 0.9 m from a 1 μC charge is	10 000 V	100 V	9000 V	1000 V	●○○○
63. Potential at 3 m from 2 μC charge is	600 V	2000 V	6000 V	18 000 V	○○●○
64. Potential at 2 m from 4 μC charge is	9000 V	36 000 V	72 000 V	18 000 V	○○○●
65. Potential of a point charge falls with distance as	1/r	$1/r^2$	r^2	r	●○○○

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Questions	A	B	C	D	A B C D
66. Potential difference between two points is	power	charge per unit work	work per unit charge between them	force per unit charge	○○●○
67. Work done in moving charge q through potential difference V is	V/q	q/V	q + V	qV	○○○●
68. Moving 2 C through 12 V requires	0.17 J	14 J	6 J	24 J	○○○●
69. Moving 5 μC through 100 V requires	500 J	5×10^{-4} J	5×10^{-8} J	20 J	○●○○
70. Work in moving a charge along an equipotential is	negative	maximum	zero	infinite	○○●○
71. Equipotential surfaces are perpendicular to	charges	field lines	equipotential lines	the ground	○●○○
72. Two points at the same potential have no	mass	force on a conductor	charge	potential difference	○○○●
73. Relation between field and potential is E =	Δr/ΔV	ΔVΔr	ΔV^2	$-\Delta V/\Delta r$	○○○●
74. Electric field points from	equal potentials	nowhere	low to high potential	high to low potential	○○○●
75. One electron volt equals	1.6×10^{-19} J	1.6×10^{-19} V	1.6 J	9.1×10^{-31} J	●○○○
76. Electron volt is a unit of	voltage	energy	charge	field	○●○○
77. An electron accelerated through 100 V gains	100 eV	1 eV	1.6 eV	0 eV	●○○○
78. Electron accelerated through 50 V gains energy	1.6×10^{-19} J	50 J	3.2×10^{-21} J	8×10^{-18} J	○○○●
79. Acceleration of a charge q, mass m in field E is	qE/m	E/qm	qEm	m/qE	●○○○
80. An electron in a uniform field moves	perpendicular only	opposite to the field	at constant velocity	along the field	○●○○
81. A proton in a uniform field accelerates	opposite to the field	along the field	perpendicular to field	never	○●○○
82. Path of a charged particle entering a uniform field perpendicular to it is	helical	straight line	parabolic	circular	○○●○

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Questions	A	B	C	D	A B C D
83. Electron has larger acceleration than a proton in the same field because it has	larger charge	smaller mass	no charge	larger mass	○●○○
84. Kinetic energy gained by a charge q through V is	V/q	qV^2	qV	q/V	○○●○
85. Speed of a charged particle accelerated through V is	$\sqrt{(qV/2m)}$	$\sqrt{(2qV/m)}$	2qV/m	qV/m	○●○○
86. Electric potential energy of two charges is	kq_1q_2/r	kq_1q_2/r^2	q_1q_2/kr	kq_1q_2r	●○○○
87. Potential energy of two like charges as they come closer	stays same	increases	decreases	becomes zero	○●○○
88. Potential energy of two unlike charges as they separate	decreases	becomes zero	increases	stays same	○○●○
89. Charge on proton is	-1.6×10^{-19} C	$+1.6 \times 10^{-19}$ C	0	$+9.1 \times 10^{-31}$ C	○●○○
90. Charge on neutron is	+e/2	zero	$+1.6 \times 10^{-19}$ C	-1.6×10^{-19} C	○●○○
91. Charging by induction does not require	an earthed conductor	a conductor	contact	a charged body	○○●○
92. Charging by friction transfers	neutrons	nuclei	electrons	protons	○○●○
93. An electroscope detects	magnetic field	current	heat	presence of charge	○○○●
94. A leaf electroscope leaves diverge because they	carry like charges	become hot	carry unlike charges	are neutral	●○○○
95. Earthing a charged body	creates charge	removes its excess charge	reverses its charge	doubles its charge	○●○○
96. Lightning arresters work through	batteries	magnets	sharp pointed spikes	insulators	○○●○
97. Charge on a pointed conductor leaks fast because field is	uniform	zero at the point	strongest at the point	weakest at the point	○○●○
98. Faraday cage shields interior from	sound	magnetism only	external electric fields	gravity	○○●○
99. Static electricity is produced by	magnets	heat only	moving charge only	charge imbalance	○○○●

Questions	A	B	C	D	A B C D
100. Which is a good insulator?	Aluminium	Silver	Copper	Rubber	○○○●
101. Which is a good conductor?	Copper	Plastic	Wood	Wool	●○○○
102. Net charge on a neutral atom is	negative	infinite	positive	zero	○○○●
103. Gravitational force between electrons vs electric force is	much stronger	equal	zero	much weaker	○○○●
104. Coulomb force law resembles Newton's	third law	law of gravitation	law of cooling	second law	○●○○
105. Unlike gravity, electric force can be	zero	only repulsive	only attractive	attractive or repulsive	○○○●
106. Permittivity of free space has unit	V m	J C^{-1}	C^2 N^{-1} m^{-2}	N C^{-1}	○○●○
107. Dimensions of electric field are	$MLT^{-3}A^{-1}$	$MLT^{-1}A^{-1}$	MLT^{-2}	ML^2T^{-2}	●○○○
108. Charge on two spheres is shared equally when they are	far apart	of different sizes	identical and touched	insulated apart	○○●○
109. Two identical spheres with +6 μC and 0 touch. Each then has	+3 μC	+2 μC	+12 μC	+6 μC	●○○○
110. Spheres with +8 μC and −4 μC touch. Each then has	−2 μC	+4 μC	+6 μC	+2 μC	○○○●
111. Force between charges q at distance r is F. Force if charges are 2q and r/2 is	16F	4F	8F	2F	●○○○
112. Field at a point between two equal opposite charges, midway, is	zero	same as one charge	doubled	half	○○●○
113. Field at midpoint between two equal like charges is	zero	infinite	doubled	half	●○○○
114. Total charge of an isolated system containing +5 μC and −5 μC is	zero	10 μC	−10 μC	5 μC	●○○○
115. A positive charge moved against a field gains	kinetic energy only	mass	potential energy	no energy	○○●○
116. A positive charge released in a field moves toward	higher potential	lower potential	infinity only	equal potential	○●○○

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Questions	A	B	C	D	A B C D
117. Potential at the surface of a charged sphere of radius R is	zero	kq/R^2	kq/R	kqR	○○●○
118. Field just outside a charged conducting surface is	perpendicular to the surface	zero	parallel to the surface	random	●○○○
119. Electric field lines near a conductor surface meet it	at right angles	tangentially	at 30°	at 45°	●○○○
120. Surface of a conductor in electrostatic equilibrium is	equipotential	at zero potential always	at infinite potential	at varying potential	●○○○
121. Field in the gap between charged plates 1 cm apart at 300 V is	3×10^{-4} V m^{-1}	3 V m^{-1}	300 V m^{-1}	3×10^{4} V m^{-1}	○○○●
122. Force on an electron in a field of 1×10^4 N C^{-1} is	1×10^4 N	1.6×10^{-15} N	1.6×10^{-23} N	1.6×10^{15} N	○●○○
123. A uniform field is represented by lines that are	diverging	parallel and equidistant	converging	curved	○●○○
124. Radial field lines represent the field of a	dipole only	point charge	uniform plate	parallel plates	○●○○
125. Dipole field lines go from	negative to positive	positive to positive	closed loops	positive to negative charge	○○○●
126. Work done by electric field on a charge moved along a closed path is	negative	zero	infinite	positive	○●○○
127. Electric potential at infinity is taken as	one volt	one joule	zero	maximum	○○●○
128. In equilibrium, field inside a hollow charged conductor is	radial	infinite	zero	non-zero uniform	○○●○
129. The force on a charge in an electric field is independent of its	charge	sign of charge direction	speed	field strength	○○●○
130. Electric force between proton and electron in hydrogen is	zero	attractive	magnetic	repulsive	○●○○
131. SI unit of permittivity is	C m^{-1}	V m	N m	F m^{-1}	○○○●
132. Potential difference of 1 V does 1 J of work on	1 A	1 N	1 kg	1 C	○○○●
133. Capacity to attract light objects after rubbing shows body is	charged	hot	radioactive	magnetized	●○○○

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Questions	A	B	C	D	A B C D
134. Electric field strength 2×10^5 N C^{-1} acts on 3×10^{-6} C. Force is	0.6 N	6 N	6×10^{10} N	0.06 N	●○○○
135. Charge that experiences 0.5 N in field 250 N C^{-1} is	2×10^{-3} C	0.5 C	125 C	5×10^{-3} C	●○○○
136. Electron moving through p.d. gains kinetic energy equal to	V/e	e^2V	eV	e/V	○○●○
137. Acceleration of electron ($m = 9.1 \times 10^{-31}$ kg) in 1×10^4 N C^{-1} field is about	9.8 m s^{-2}	1.6×10^{15} m s^{-2}	1.8×10^{15} m s^{-2}	9.1×10^{-27} m s^{-2}	○○●○
138. A negatively charged rod brought near a neutral conductor induces on the near side	positive charge	both equally on all sides	no charge	negative charge	●○○○
139. Force between two charges in a medium is smaller than in vacuum by factor	k	relative permittivity	zero	$1/\varepsilon_0$	○●○○
140. Force on a 1 C charge at 1 m from another 1 C charge in vacuum is	9×10^{-9} N	9×10^9 N	6.67×10^{-11} N	1 N	○●○○
141. Field 1 m from a 1 C charge is	1.6×10^{-19} N C^{-1}	9×10^{-9} N C^{-1}	9×10^9 N C^{-1}	1 N C^{-1}	○○●○
142. A charge of +2 μC placed in a 1000 V m^{-1} field moves 0.5 m along the field. Work done is	4×10^{-3} J	1 J	2×10^{-3} J	1×10^{-3} J	○○○●
143. Potential difference between two plates 3 cm apart with field 2×10^3 V m^{-1} is	6 V	60 V	0.06 V	6×10^4 V	○●○○
144. Electric force on a charge is zero at a point where field is	zero	maximum	radial	uniform	●○○○
145. In a uniform field, the force on a charge is	constant	decreasing	increasing	zero	●○○○
146. Potential energy of charge q at potential V is	V/q	qV	qV^2	q/V	○●○○
147. Electron volt equals work done on an electron through	1 joule	1 coulomb	1 volt	1 ampere	○○●○
148. Charged particle in uniform field moves in a parabola like a	wave	pendulum	projectile	satellite	○○●○
149. Positively charged body has	excess of protons	excess of electrons	excess of neutrons	deficiency of electrons	○○○●
150. Field lines never intersect because the field at a point has	no direction	no magnitude	one direction	two directions	○○●○

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