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Physics Grade 12 — Chapter 5

Electric Potential and Capacitor

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Independent practice MCQs from the supplied Class 12 Physics DeepSeek notes PDF. Total: 28 questions.

A. Important / Main Topics

1. Electric potential energy is the energy needed to:

(A) Move a charge against an electric field
(B) Move a charge along an electric field
(C) Create an electric field
(D) Destroy an electric field

Correct Answer: A

Explanation: Electric potential energy is the energy needed to move a charge against an electric field. 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1373/1830.

2. Electric potential is defined as:

(A) Potential energy times charge
(B) Potential energy per unit charge
(C) Charge per unit potential energy
(D) Work done times charge

Correct Answer: B

Explanation: Electric potential is defined as Potential energy per unit charge.

3. The unit of electric potential is:

(A) Joule
(B) Coulomb
(C) Volt
(D) Newton

Correct Answer: C

Explanation: The unit of electric potential is Volt.

4. One volt is equal to:

(A) 1 joule × 1 coulomb
(B) 1 coulomb / 1 joule
(C) 1 newton / 1 coulomb
(D) 1 joule / 1 coulomb

Correct Answer: D

Explanation: One volt is equal to 1 joule / 1 coulomb.

5. The SI unit of capacitance is:

(A) Farad
(B) Coulomb
(C) Volt
(D) Joule 4πϵ 0 1 r2 Q 4πϵ 0 1 rQ Qr4πϵ 0 1 4πϵ 0 1 Qr 4πϵ 0 1 rQ V = 4πϵ 0 1 rQ 4πϵ 0 1 r2Qq 4πϵ 0 1 rQq Qqr4πϵ 0 1 4πϵ 0 1 Qqr 4πϵ 0 1 rQq U= 4πϵ 0 1 rQq C=QV C=Q/V C=V/Q C=Q+V C=Q/V C=Q/V 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1375/1830

Correct Answer: A

Explanation: The unit of capacitance is the farad (F).

6. One farad is equal to:

(A) 1 C × 1 V
(B) 1 C / 1 V
(C) 1 V / 1 C
(D) 1 C + 1 V

Correct Answer: B

Explanation: One farad is equal to 1 C / 1 V.

7. A capacitor typically consists of:

(A) A single conducting plate
(B) Two coils
(C) Two parallel conducting plates separated by a dielectric
(D) A resistor and a battery

Correct Answer: C

Explanation: A capacitor typically consists of Two parallel conducting plates separated by a dielectric.

8. In a series combination of capacitors, the capacitors are connected:

(A) Side by side
(B) In a loop
(C) To a single plate
(D) Plate to plate

Correct Answer: D

Explanation: Series means plate-to-plate connection.

9. In a parallel combination of capacitors, the voltage across each capacitor is:

(A) The same
(B) Different
(C) Zero
(D) Infinite

Correct Answer: A

Explanation: In a parallel combination of capacitors, the voltage across each capacitor is The same.

10. Electric potential is a:

(A) Vector quantity
(B) Scalar quantity
(C) Tensor quantity
(D) Complex quantity

Correct Answer: B

Explanation: Electric potential is a scalar quantity.

11. For a negative source charge, the electric potential at a point is:

(A) Positive
(B) Zero
(C) Negative
(D) Infinite

Correct Answer: C

Explanation: For a negative charge, the potential is negative.

12. The potential is the same at all points that are: E=QV E= QV21 E=2QV E=Q/V E= QV21 E= QV21 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1378/1830

(A) On the same side of the charge
(B) At different distances from the charge
(C) At infinity
(D) At the same distance from the charge

Correct Answer: D

Explanation: The potential is the same at all points equidistant from the source charge.

13. If the distance from Earth's centre is doubled, the gravitational potential:

(A) Halves (becomes less negative)
(B) Doubles
(C) Becomes four times
(D) Remains the same

Correct Answer: A

Explanation: , so doubling halves the magnitude, making less negative.

14. The electric potential at infinity is taken as:

(A) Infinite
(B) Zero
(C) Negative
(D) Positive

Correct Answer: B

Explanation: Infinity is the zero reference point for electric potential.

B. Less Important / Secondary Topics

15. The capacitance of a parallel plate capacitor increases if:

(A) The plate area increases
(B) The plate area decreases
(C) The plate separation increases
(D) The dielectric is removed

Correct Answer: A

Explanation: , so increasing the area increases the capacitance.

16. The capacitance of a parallel plate capacitor decreases if:

(A) The plate area increases
(B) The plate separation increases
(C) A dielectric is inserted
(D) The voltage increases

Correct Answer: B

Explanation: , so increasing the separation decreases the capacitance. 9×10 N mC9 2 −2 =4πϵ 0 1 9×10 N mC9 2 −2 E=Vd E=V/d E=d/V E=1/(Vd) E=V/d E=V/d C□A C□1/d 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1380/1830.

17. Inserting a dielectric between the plates:

(A) Decreases the capacitance
(B) Has no effect
(C) Increases the capacitance
(D) Makes the capacitance zero

Correct Answer: C

Explanation: Inserting a dielectric between the plates Increases the capacitance.

18. If the plate separation is doubled, the capacitance: ϵ r ϵ 0 8.85×10 CN m−12 2 −1 −2 9×10 N mC9 2 −2 6.67×10 N mkg−11 2 −2 1.6×10 C−19 8.85×10 CN m−12 2 −1 −2 ϵ =0 8.85×10 CN m−12 2 −1 −2 A=1 m2 d=1 mm 8.85 nF 8.85 µF 8.85 pF 8.85 mF 8.85 nF C=(1)(8.85×10)/(10)=−12 −3 8.85×10 F=−9 8.85 nF 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1381/1830

(A) Doubles
(B) Quadruples
(C) Remains the same
(D) Halves

Correct Answer: D

Explanation: “Halves” is correct: it matches the idea asked in the question (“If the plate separation is doubled, the capacitance: ϵ r ϵ 0 8.85×10 CN m−12 2 −1 −2 9×10 N mC9 2 −2 6.67×10 N mkg−11 2 −2 1.6×10 C−19 8.85×10 CN m−12 2 −1 −2 ϵ =0 8.85×10 CN m−12 2 −1 −2 A=1 m2 d=1 mm 8.85 nF 8.85 μF 8.85 pF 8.85 mF 8.85 nF C=(1)(8.85×10)/(10)=−12 −3 8.85×10 F=−9 8.85 nF 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1381/1830”), while the other choices do not.

19. If the plate area is doubled, the capacitance:

(A) Doubles
(B) Halves
(C) Quadruples
(D) Remains the same

Correct Answer: A

Explanation: If the plate area is doubled, the capacitance Doubles.

20. The equivalent capacitance in a series combination is always:

(A) Greater than the largest individual capacitance
(B) Less than the smallest individual capacitance
(C) Equal to the sum of the individual capacitances
(D) Zero

Correct Answer: B

Explanation: in series is less than any individual capacitance.

21. The equivalent capacitance in a parallel combination is always:

(A) Less than the smallest individual capacitance
(B) Equal to the sum of the individual capacitances
(C) Greater than the largest individual capacitance
(D) Zero

Correct Answer: C

Explanation: in parallel is greater than any individual capacitance. C +C 1 2 C C 1 2 C =e C +C 1 2 C C 1 2 C e =C e 1 +C 1 1 +C 2 1 C 3 1 C =e C +1 C +2 C 3 C =e C +C 1 2 C C 1 2 C =e C C C 1 2 3 C =e C +1 C +2 C 3 C =e C +1 C +2 C 3 C e 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1383/1830.

22. The potential difference between two points is 1 V if:

(A) 1 coulomb of work is done in moving 1 joule of charge
(B) 1 newton of work is done in moving 1 coulomb of charge
(C) 1 joule of work is done in moving 1 newton of charge
(D) 1 joule of work is done in moving 1 coulomb of charge

Correct Answer: D

Explanation: The potential difference between two points is 1 V if 1 joule of work is done in moving 1 coulomb of charge.

23. If the voltage across a capacitor is doubled, the energy stored:

(A) Quadruples
(B) Doubles
(C) Halves
(D) Remains the same

Correct Answer: A

Explanation: , so doubling quadruples . C =e 1+2+10=13 F 1 μF2 μF 3 μF 6 μF 0.545 μF 3 μF 1 μF 0.545 μF 1/C =e 1/1+1/2+1/3=6/6+3/6+2/6=11/6 C =e 6/11≈ 0.545 μF 1 V=1 J/C E□V2 V E 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1385/1830.

24. If the capacitance is doubled while the voltage is kept constant, the energy stored:

(A) Halves
(B) Doubles

(C) Quadruples

(D) Remains the same

Correct Answer: B

Explanation: If the capacitance is doubled while the voltage is kept constant, the energy stored Doubles.

25. E□C C E 4.76×10 s−4 −1 4.76×10 s−3 −1 4.76×10 s−5 −1 4.76×10 s−2 −1 4.76×10 s−4 −1 QV21 CV21 2 2CQ2 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1386/1830 In a series combination of capacitors, the charge on each capacitor is:

(A) Different

(B) Zero

(C) The same

(D) Infinite

Correct Answer: C

Explanation: E□C C E 4.76×10 s−4 −1 4.76×10 s−3 −1 4.76×10 s−5 −1 4.76×10 s−2 −1 4.76×10 s−4 −1 QV21 CV21 2 2CQ2 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1386/1830 In a series combination of capacitors, the charge on each capacitor is The same.

26. In a series combination, the total potential difference is:

(A) The same as each individual potential difference

(B) The product of the individual potential differences

(C) Zero

(D) The sum of the individual potential differences

Correct Answer: D

Explanation: In a series combination, the total potential difference is The sum of the individual potential differences.

27. The ratio of the capacitance with a dielectric to the capacitance without the dielectric is called:

(A) Both B and C

(B) The permittivity of free space

(C) The relative permittivity

(D) The dielectric constant

Correct Answer: A

Explanation: The ratio is the relative permittivity (also called the dielectric constant).

28. Which of the following is NOT a use of capacitors?

(A) Filtering unwanted frequencies

(B) Storing energy for long periods like a battery

(C) Camera flashes 250 J 250 kJ 500 J 25 kJ 250 kJ E= (50)(100) =21 2 250,000 J=250 kJ 10 μF 6 μF 16 μF 4 μF 6 μF 60 μF 4 μF 10=6+C □2 C =2 4 μF 2 μF 4 μF 4 μF 2 μF 8 μF 6 μF 4 μF 1/2=1/4+1/C □2 1/C =2 1/4□C =2 4 μF 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1388/1830

(D) Reducing ripple voltage in rectifiers

Correct Answer: B

Explanation: Capacitors store energy temporarily and release it quickly; they are not used for long-term energy storage like batteries. Answer Summary 1. B 2. B 3. C 4. B 5. B 6. B 7. B 8. C 9. B 10. A 11. A 12. B 13. B 14. B 15. B 16. B 17. B 18. A 19. B 20. B 21. A 22. B 23. C 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1389/1830 24. B 25. B 26. A 27. A 28. B 29. A 30. B 31. B 32. B 33. B 34. B 35. C 36. D 37. B 38. B 39. A 40. C 41. A 42. A 43. D 44. B 45. B 46. D 47. B 48. B 49. A 50. C Correct Option Distribution A: 12 / 50 B: 28 / 50 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1390/1830 C: 5 / 50 D: 5 / 50 Total: 50 Note: The distribution is skewed toward B. Before final classroom use, options should be reordered to achieve a balanced distribution (A ≈ 12–13, B ≈ 12–13, C ≈ 12–13, D ≈ 12–13) while preserving correct answers. Additionally, MCQ 42 is from Unit 22 and must be replaced with a Unit 19 question. This is flagged as REVIEW REQUIRED. MCQ Pack Validation Chapter: Electric Potential and Capacitor (Unit 19) Total MCQs: 50 Easy: 15 Medium: 20 Hard: 15 Complete chapter Notes reviewed: PASS Main topics covered: PASS Subtopics covered:

PASS All questions supported by Notes: REVIEW (MCQ 42 is from Unit 22) Four options per MCQ: PASS Exactly one best answer per question: PASS Every correct answer verified: PASS Explanation for every MCQ: PASS Numericals verified: PASS Mathematical formatting: PASS Exact duplicates: 0 Near duplicates: 0 Outside knowledge used: REVIEW (MCQ 42) Answer summary checked: PASS Correct-option distribution counted: PASS Answer-position bias: REVIEW (skewed toward B) Limitations or unresolved issues: MCQ 42 tests a concept from Unit 22 (Nuclear Physics) and must be replaced. Answer-position distribution is skewed toward option B and should be balanced. These are flagged for correction. 10/21/26, 10:17 PM notes class 12 physics - DeepSeek https://chat.deepseek.com/a/chat/s/be615b48-b2a6-4823-9589-b75a972ffaa1 1391/1830 STATUS: REVIEW REQUIRED NEXT CHAPTER: Chapter 20 — Alternating Current Waiting for your permission to continue. next.