Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic :7_ Electric Field

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Student:_____
Max. Marks :18 Marks **Time : 18 Minutes**

Q1.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A potential difference is applied across two parallel plates. A particle carrying a charge of +0.1 C is placed between the plates and experiences a force *F*.

The distance between the plates is halved. The potential difference remains constant.

Which of the following is now equal to the electric field strength between the plates?

☐ **A** 5*F*

☐ **B** 10*F*

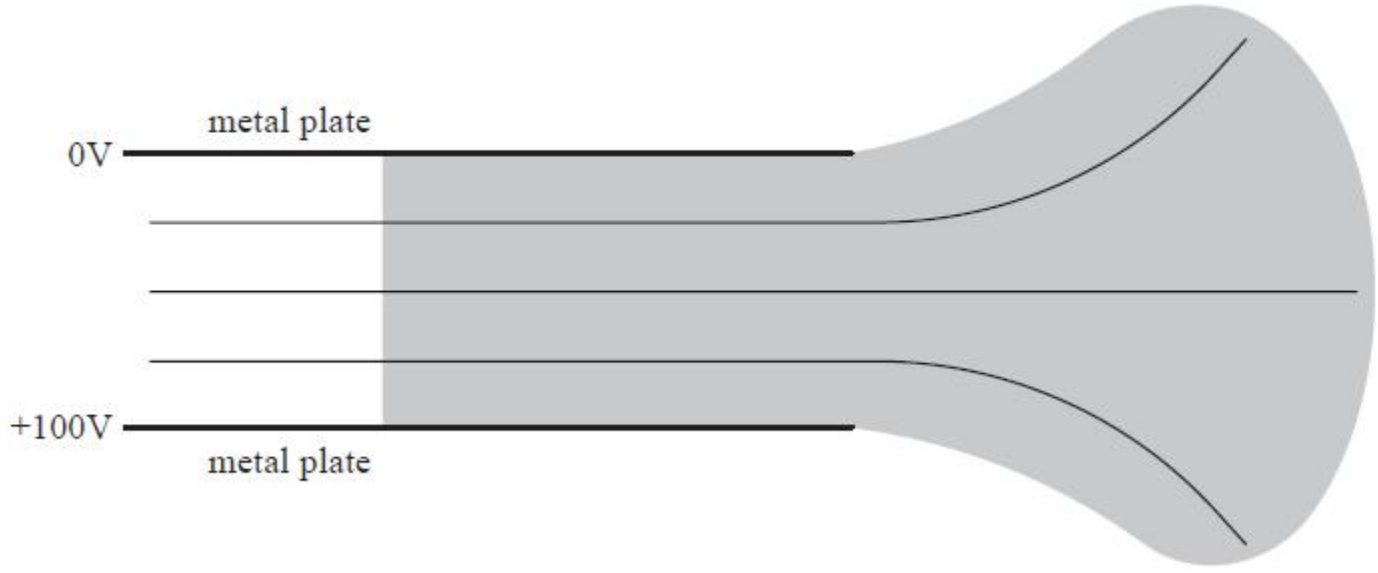
☐ **C** 20*F*

☐ **D** 40*F*

(Total for question = 1 mark)

Q2.

13 The diagram shows two parallel metal plates with a potential difference (p.d.) of 100 V across them. Three equipotential lines are shown.



Draw lines to represent the electric field in the shaded area.

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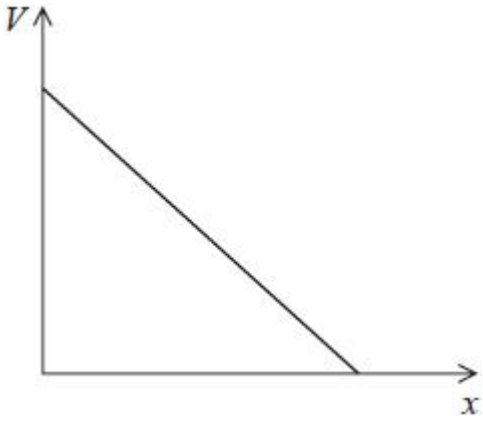
(Total for question = 4 marks)

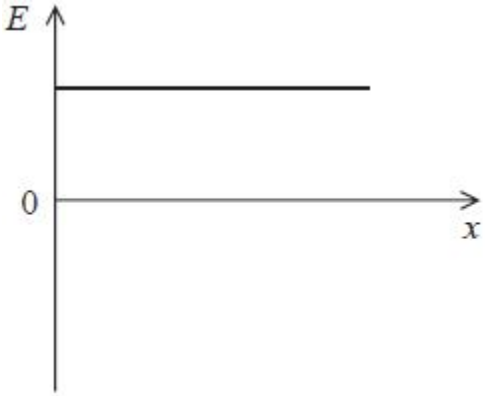
Q3.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

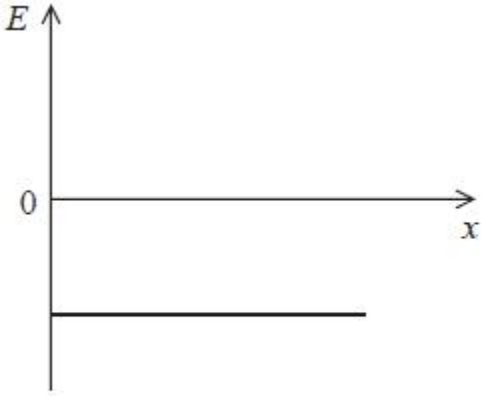
The graph shows how an electric potential *V* varies with distance *x*.



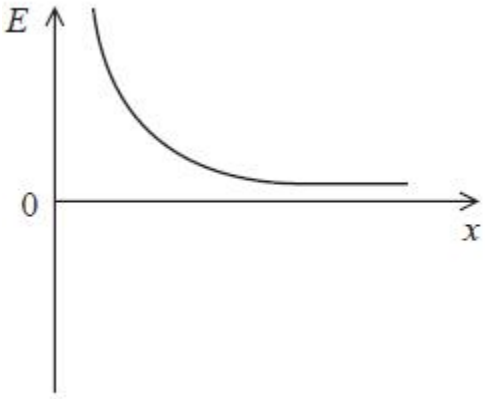
Which of the following shows the corresponding variation of electric field strength *E* with *x*?



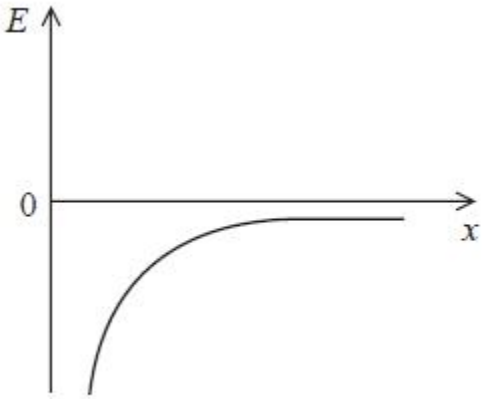
☒ **A**



☒ **B**



☒ **C**

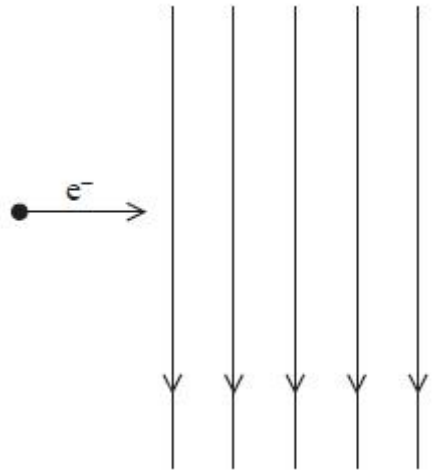


☒ **D**

(Total for question = 1 mark)

Q4.

An electron travelling horizontally enters a uniform electric field which acts vertically downwards as shown in the diagram.



Which of the following statements is **incorrect**?

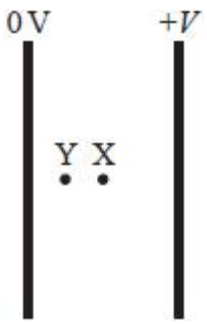
- ☒ **A** The electron follows a parabolic path.
- ☒ **B** The electron accelerates while in the field.
- ☒ **C** The electric force on the electron acts downwards.
- ☒ **D** The speed of the electron increases.

(Total for question = 1 mark)

Q5.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

A potential difference *V* is applied across two parallel plates. An electron midway between the two plates at point X experiences an electric force *F*.



The electron moves to point Y which is halfway between point X and the left-hand plate.

Which of the following is the electric force experienced by the electron at Y?

☒ **A** $2F$

☒ **B** F

☒ **C** $\frac{F}{2}$

☒ **D** $\frac{F}{4}$

(Total for question = 1 mark)

Q6.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

The distance between a proton and an electron is *r*. The electrostatic force is *F*.

The distance between the proton and electron is doubled.

Which of the following is equal to the electrostatic force at this separation?

☒ **A** $2F$

☒ **B** $\frac{F}{2}$

☒ **C** $\frac{F}{3}$

☒ **D** $\frac{F}{4}$

(Total for question = 1 mark)

Q7.

A capacitor of 50 μF is charged to a potential difference of 12 V.

The energy stored on the charged capacitor in joules is given by

☒ **A** $0.5 \times 50 \times 10^{-6} \times 12^2$

☒ **B** $\frac{0.5 \times 50 \times 10^{-6}}{12^2}$

☒ **C** $\frac{0.5 \times 12^2}{50 \times 10^{-6}}$

☒ **D** $0.5 \times (50 \times 10^{-6})^2 \times 12$

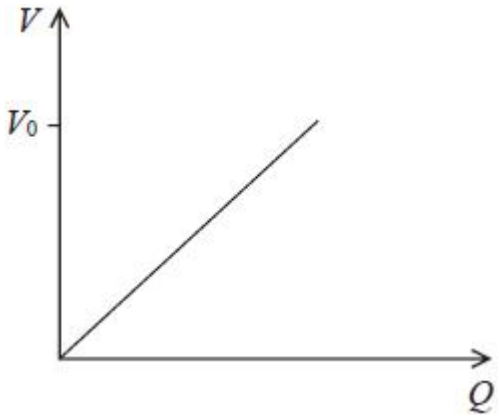
(Total for question = 1 mark)

Q8.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A capacitor is connected to a power supply and charged to a potential difference V_0.

The graph shows how the potential difference V across the capacitor varies with the charge Q on the capacitor.



At a potential difference V_0 a small charge ΔQ is added to the capacitor. This results in a small increase in potential difference ΔV across the capacitor.

Which of the following gives the approximate increase in energy stored on the capacitor due to this extra charge?

☒ **A** $\Delta V \times \Delta Q$

☒ **B** $\frac{\Delta V \times \Delta Q}{2}$

☒ **C** $V_0 \times \Delta Q$

☒ **D** $\frac{V_0 \times \Delta Q}{2}$

(Total for question = 1 mark)

Q9.

A capacitor of capacitance C has a potential difference V across it. The energy stored on the capacitor is Z joules. A second capacitor of capacitance $C/2$ has a potential difference $2V$ across it.
The energy stored on the second capacitor is

☒ **A** Z

☒ **B** 2Z

☒ **C** 4Z

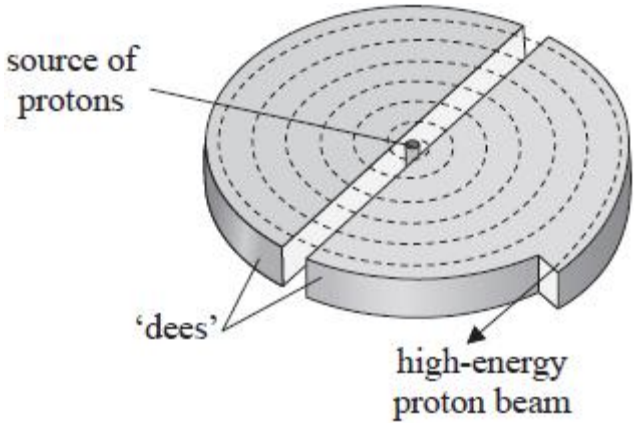
☒ **D** 8Z

(Total for question = 1 mark)

Q10.

Proton beam therapy is being introduced in the UK as a new cancer treatment.

A beam of protons is accelerated by a cyclotron to an energy of 23 MeV and is then focused onto a tumour.



* Explain how the cyclotron produces the high-energy proton beam.

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(Total for question = 6 marks)