

- 6 (a) State what is meant by a *field line* (*line of force*) in an electric field.

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.....[1]

- (b) An electric field has two different regions X and Y. The field strength in X is less than that in Y. Describe a difference between the pattern of field lines (lines of force) in X and in Y.

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.....[1]

- (c) A particle P has a mass of 0.15 u and a charge of  $-1e$ , where  $e$  is the elementary charge.

- (i) Particle P and an  $\alpha$ -particle are in the same uniform electric field. Calculate the ratio

$$\frac{\text{magnitude of acceleration of particle P}}{\text{magnitude of acceleration of } \alpha\text{-particle}} .$$

ratio = ..... [3]

- (ii) Particle P is a hadron composed of only two quarks. One of them is a down (d) quark.

By considering charge, determine a possible type (flavour) of the other quark.  
Explain your working.

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.....[3]

[Total: 8]