

PHYSIC MidTerm II PVE

I. Answer the following

1. d. 2. a. 3. d. 4. c. 5. d. 6. a.
7. b 8. c 9. b 10. a 11. c 12. d
13. b 14. d 15. c

II. Fill in the blanks

16. charge 19. electrolytes
17. Energy 20. water
18. zero

III. Answer any five of the following

21. Coulomb - 1m
definition of coulomb - 1m

22. $V = \frac{W}{q}$ or $U = Vq$ 1m
 $U = \frac{1}{4\pi\epsilon_0} \frac{Qq}{r}$ 1m

23. $E = \frac{1}{2} CV^2$ 1m
 $E = 1.5 \times 10^{-2} J$ 1m

24. each definition - 1m

25. $\vec{dB} = \frac{\mu_0}{4\pi} I \frac{(\vec{dl} \times \vec{r})}{r^3}$ 1m

explanation of each term 1m

26. Definition $M = IA$ 1m
 $A = m^2$ 1m

27. Definition 1m

28. unit 1m
Definition 1m

law of conservation of energy 1m

29

IV

29

Answer any five of the following
Diagram 1m

Torque = Force $\times$ $\perp^{\text{rd}}$ distance 1m

final Expression 1m

30. diagram 1m

$$Q = Q_1 + Q_2 \quad \text{and} \quad C = \frac{Q}{V} \quad \dots\dots 1m$$

final Expression 1m

31. each statement 1m

law of conservation of charge 1m

32.

$$E_c = m \frac{v_d}{\tau} \quad \dots\dots 1m$$

$$v_d = \frac{I}{nAe} \quad \& \quad E = \frac{V}{L} \quad \dots\dots 1m$$

$$V = IR \quad \& \quad \dots\dots 1m$$

33.

diagram 1m

A high resistance is connected in series

$$V = I_g R + I_g G \quad \dots\dots 1m$$

with galvanometer 1m

$$R = \frac{V}{I_g} - G \quad \dots\dots 1m$$

34.

Any three properties each 1m

35.

Any three differences each difference --- 1m

36.

Definition 1m

$$\Phi = BA \quad \dots\dots 1m$$

$$e = -\frac{d\Phi}{dt}$$

$$C = BA \sin \theta \quad \dots\dots 1m$$

V

37.

Diagram

$$E = \frac{1}{4\pi\epsilon_0} \frac{q}{r^2}$$

$$E_A = E_B = 2E \cos \theta$$

$$E_A = E_B = \frac{1}{4\pi\epsilon_0} \frac{q}{a^2}$$

$$\cos \theta = \frac{l}{a} \quad \& \quad a = \sqrt{x^2 + l^2}$$

$$E = \frac{1}{4\pi\epsilon_0} \frac{P}{(x^2 + l^2)^{3/2}}$$

38.

Definition

Diagram

$$dW = -F \cdot dx$$

$$W = \int_{\infty}^d \frac{1}{4\pi\epsilon_0} \frac{q}{x^2} dx$$

$$V = \frac{W}{q_0} = \frac{1}{4\pi\epsilon_0} \frac{q}{d}$$

39.

circuit diagram

~~apply KVL to the loop and getting the equations~~

$$-I_1 R_1 - I_g B_1 + I_2 R_4 = 0$$

Apply KVL to the loop 2

$$-I_3 a + I_4 S + I_g B_1 = 0$$

Balancing condition $I_g = 0$

final expression

40.

diagram

$$dB = \frac{\sqrt{4g}}{4\pi}$$

Applying

biot-savart's law

$$dB = \sum dB \sin \theta$$

Simplification

Final answer

41.

a) Definition

b) Diagram

c) Explanation

d) Increases

VI

42.

Formule

$$E_1 = 9 \times 10^4 \text{ N/C}$$

$$E_2 = 9 \times 10^4 \text{ N/C}$$

$$E_R = 9\sqrt{2} \times 10^4 \text{ N/C} \text{ or } 12.73 \times 10^4 \text{ N/C}$$

$$\alpha = 45^\circ$$

43.

Formule

$$V_D \approx 576 \text{ V}$$

$$V_0 = 98 \text{ V}$$

$$W = (V_D - V_0)$$

$$= 1.152 \times 10^6 \text{ J}$$

HL

formule ---- 1m

Equivalent ---- 1m

Yequivalent ---- 1m

current ---- 1m

potential ---- 1m

Any alternate method allowed.

HS:

Formula ----- 1m

$$F_1 = 0.6 \times 10^{-6} \text{ N/m} \quad \text{--- 1m}$$

$$F_2 = 1.2 \times 10^{-6} \text{ N/m} \quad \text{--- 1m}$$

$$F = F_2 - F_1 = 0.6 \times 10^{-6} \text{ N/m} \quad \text{1m}$$

direction / Nature of force resultant force --- 1m