[illegible] 1999 [illegible]

[illegible] I [illegible]

[illegible]

1. (2)	2. (2)	3. (3)	4. (1)	5. (3)
6. (4)	7. (1)	8. (3)	9. (5)	10. (3)
11. (4)	12. (4)	13. (5)	14. (2)	15. (2)
16. (5)	17. (4)	18. (all)	19. (2)	20. (3)
21. (4)	22. (5)	23. (1)	24. (5)	25. (1)
26. (2)	27. (1)	28. (4)	29. (1)	30. (3)
31. (4)	32. (1)	33. (all)	34. (2)	35. (3)
36. (1)	37. (1)	38. (2)	39. (3)	40. (2)
41. (2)	42. (5)	43. (2)	44. (2)	45. (3)
46. (5)	47. (4)	48. (3)	49. (5)	50. (1)
51. (1)	52. (5)	53. (1)	54. (3)	55. (3)
56. (5)	57. (4)	58. (2)	59. (4)	60. (5)

[illegible] 1999 [illegible]

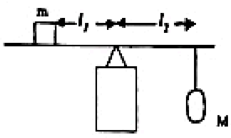
[illegible] II A [illegible]

[illegible]

A [illegible]

01 [illegible]

a)



01

b) [illegible] 01

c) i) 40 g [illegible] 01

ii) $ml_1 = Ml_2$ 01

d) i) [illegible] 01

ii) [illegible] m [illegible] 01

e) [illegible]

$Ml_2 = \left(M - M\frac{\rho_w}{\rho}\right)l_3$ 01

[illegible] c (ii) [illegible]

$\rho = \frac{\rho_w}{1 - \frac{l_3}{l_2}}$

[illegible]

f) [illegible] V [illegible] V' [illegible]

$V + V' = (100^0 \times 10^{...}$ [illegible]

$V = (100^0 \times 10^{...}$ [illegible] $2.5 \times 10^{...}$

$\therefore V' = 100 \times 10^{-3}[(1/2 \times 10^5) - (1/2.5 \times 10^5)]$

$= 10^{-5}\ m^3\ (10\ cm^3)$

01

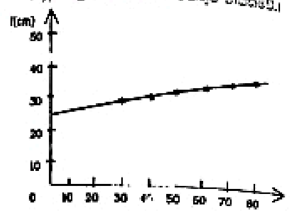
02 [illegible]

a) 30 cm, [illegible]

b) [illegible] 01

c) i) [illegible] 01

[illegible]



[illegible]

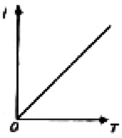
ii) 27 cm (26 - 28 cm) 01

iii) 0.1 cm °C^{-1} (0.0[illegible] - [illegible] °C^{-1}) [illegible] 01

iv) $27/\theta_0$ = 0.1 [illegible]

t_0 = 270 °C ∴ [illegible] = -270°C 01

e)



01

f) [illegible] 01

03 [illegible]

a) [illegible] $(P_1 - P_2)$ [illegible] 01

b) i) Sin i = x / R 01

ii) $n_g = \frac{\sin i}{\sin r}$

$= n_g = x / y$ 01

[illegible] 01

[illegible] 01

1 [illegible] X [illegible] 01

[illegible] 01

[illegible] 01

[illegible] $P_1 P_2$ [illegible] 01

ii) n_g = 1.5[illegible]

f) [illegible] 01

01 [illegible]

a) [illegible] 01

b) [illegible] $\frac{10^{-3}}{10}$ A 01

R_1 [illegible] R_2 [illegible]

4990 Ω 01

c) i) [illegible] 01

ii) [illegible] 01

iii) [illegible] R_1) [illegible] 01

[illegible] R_1 [illegible] 01

iv) $I = E_0 / R_1$ 01

d) K = 1 × 10/600 01

e) [illegible] 01

f) i) [illegible]

ii) [illegible]

iii) [illegible]

iv) [illegible]

v) [illegible]

[illegible] 01

B [illegible]

01 [illegible] 01

i) XY [illegible] 01

ii) [illegible] 01

iii) [illegible] 01

iv) [illegible] X [illegible] Y [illegible] Z [illegible] 01

v) a) [illegible]

$I_1\omega_1 = I_2\omega_2$

[illegible]

16 × 2 = 4 × ω 01

ω = 8 rad s^{-1} 01

b) [illegible] = 12 J[illegible] 01

[illegible]

(1/2 × 4 × 8^2) - (1/2 × 16 × 2^2)

96 J 01

[illegible] 01

vi) [illegible] 60 × 10 = 600 N 01

τ = Iα

600 × 1 = 16 α 01

α = 37.5 rad s^{-2} 01

vii) [illegible] 01

viii) [illegible]

[illegible] 01

ix) [illegible] 01

02 [illegible]

i)

01 01

ii) V [illegible] e [illegible]

[illegible] 16.6 + e = λ/4 01

[illegible] 50.7 + e = 3λ/4 01

[illegible]

[illegible] V = fλ

$16.6 + e = \frac{V}{512 \times 4}$ ....(1)

$50.7 + e = \frac{3V}{512 \times 4}$ ....(2)

$(2) - (1) \Rightarrow 34.1 = \frac{2V}{512 \times 4}$

∴ V = 349.2 ms^{-1} [illegible] 349 ms^{-1}

V [illegible] e = 0.45 cm [illegible] 0.44 cm 01

iii) $V \propto \sqrt{T}$

V' = 273 k [illegible] T [illegible]

$V_1 / V_2 = \sqrt{T_1 / T_2}$

$V_t/349.2 = \sqrt{273/300}$ 01

$V' = 333.1\ ms^{-1}$ 01

දැන් $V = \sqrt{\frac{\gamma P}{\rho}}$

$\gamma = \frac{V^2 \rho}{P} = \frac{(333.1)^2 \times 1.2}{1 \times 10^5}$ 01

$\gamma = 1.33$ 01

iv) [illegible] 01

[illegible] 01

[illegible]

$\therefore C_p > C_v$

0? ප්‍රශ්නය

$C = k\varepsilon_0 A/d$ 01

ε_0 - නිදහස් අවකාශයේ පාරවේද්‍යතාව.

A - තහඩුවල වර්ගඵලය.

d - තහඩු අතර දුර. 01

පාරවිද්‍යුත් ද්‍රව්‍යය [illegible] (C_1)

$C_1 = \frac{4 \times 9 \times 10^{-12} \times 0.2 \times 0.2 \times \frac{3}{4}}{3 \times 10^{-3}}$ F 01

$= 3.6 \times 10^{-10}$ F 01

පාරවිද්‍යුත් ද්‍රව්‍යය [illegible] C_2

$C_2 = 9 \times 10^{-12} \times 0.2 \times 0.2 \times 1/4$ [illegible]

$= 0.3 \times 10^{-10}$ F 01

සමක ධාරිතාව $= C_1 + C_2$ 01

$= 3.9 \times 10^{-10}$ F 01

ii) [illegible] ΔC. 01

$\Delta C = \frac{4 \times 9 \times 10^{-12} \times 0.2 \times 1 \times 10^{-2}}{3 \times 10^{-3}} - \frac{9 \times 10^{-12} \times 0.2 \times 1 \times 10^{-2}}{3 \times 10^{-3}}$

$= 1.8 \times 10^{-12}$ F 01

[illegible] ΔE.

$\Delta E = (1/2)(\Delta C) V^2$

$= (1/2) \times 1.8 \times 10^{-12} \times (10^3)^2$ 01

$= 9 \times 10^{-7}$ J 01

iii) [illegible] F නම්, 01

[illegible] $= F \times 1 \times 10^{-3}$ 01

$F \times 1 \times 10^{-3} = 9 \times 10^{-7}$

$F = 9 \times 10^{-4}$ N

iii) [illegible]

$= 2 \times 9 \times 10^{-7}$ 01

$= 1.8 \times 10^{-6}$ J

[illegible] 01

[illegible] $qV = (\Delta C) V^2$

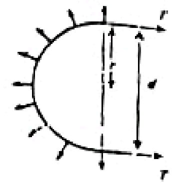
[illegible] $(1/2)(\Delta C) V^2$

∴ [illegible]

$(\Delta C) V^2 = (1/2)(\Delta C) V^2 + F\Delta X$

06 ප්‍රශ්නය

i)



[illegible] T,

$T = 2\gamma r$

γ - [illegible]

$\frac{F}{A} = y \times \frac{e}{L}$ 02

$y = FL/Ae$

$7 \times 10^6 = \frac{T}{1.25 \times 10^{-9}} \times \frac{0.05}{(\pi r - 0.05)}$

$7 \times 10^6 = \frac{2 \times 2.5 \times 10^{-2} r}{1.25 \times 10^{-9}} \times \frac{0.05}{(\pi r - 0.05)}$

$8.75(\pi r - 0.05) = 2.5 r$

$r(8.75\pi - 2.5) = 8.75 \times 0.05$

$25 r = 8.75 \times 0.05$

$r = 0.0175$ m

[illegible] 3.5 cm 01

ii) [illegible] $2\pi r^2$

[illegible] $\gamma \times 2\pi r^2$ 01

$= 2.5 \times 10^{-2} \times 2 \times \frac{22}{7} \times (0.0175)^2$ 01

$= 4.8 \times 10^{-5}$ J 01

iii) [illegible] = (1/2) Te 01

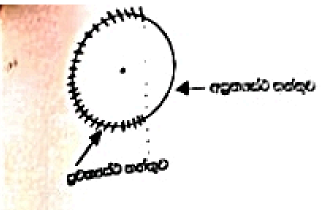
[illegible] $= 2\pi r = 2 \times 22/7 \times 1.75 = 11$ cm

[illegible] = (11 - 10) = 1 cm 01

∴ [illegible]

$= 2 \times 2.5 \times 10^{-2} \times 0.0175 \times 0.01$ 01

$= 4.4 \times 10^{-6}$ J 01



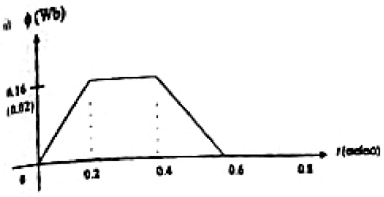
0? ප්‍රශ්නය

i) [illegible] $= B.\pi R^2/4$

$= 0.5 \times 22/7 \times (0.2)^2/4$

$= 0.016$ Wb

ii)



[illegible] 01

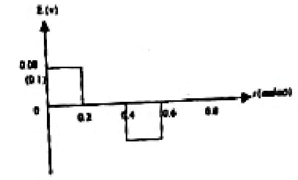
[illegible] 02

iii) [illegible] $= \frac{d\phi}{dt}$

$= 0.016/0.2$ හෝ $0.02/0.2$ 01

$= 0.08$ V හෝ 0.1 V 01

iv)



[illegible] 01

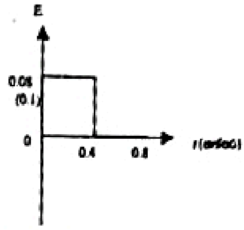
[illegible] 02

([illegible] 1 බැ.)

v) [illegible] = 0.08 V 01

[illegible] = 0 01

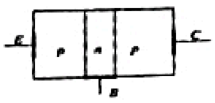
vi) a)



[illegible] 01

[illegible] 01

b)



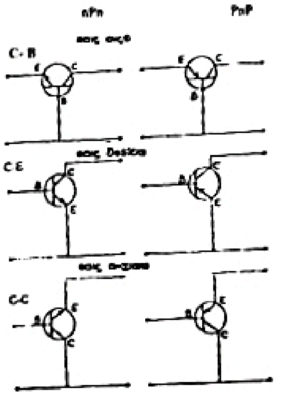
[illegible]

i) [illegible]

ii) [illegible]

iii) [illegible] 01

b)



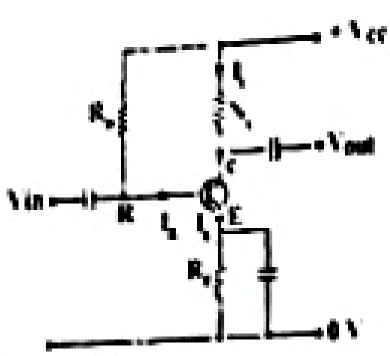
([illegible] 3 ට ලකුණු 01)

([illegible] 2 ට ලකුණු 01)

[illegible] 01

[illegible]

[illegible] 01



01

$I_E = I_B + I_C$

$I_B = I_C / \beta$

$= 2/100 = 2 \times 10^{-2}$ mA — 01

I_C [illegible] I_B [illegible]

$I_E \approx I_C$ [illegible]

[illegible] $I_E = 2 + 0.002 = 2.02 \times 10^{-3}$ A

$R_E = V_E / I_E$

$= 1.2/2 \times 10^{-3} = 600\Omega$ [illegible] — 01

$V_{CC} = I_C R_C + V_{CE} + V_E$ — 01

$R_C = [V_{CC} - V_{CE} - V_E] / I_C$

$= 12 - 6 - 1.2/2 \times 10^{-3} = 4.8/2 \times 10^{-3}$

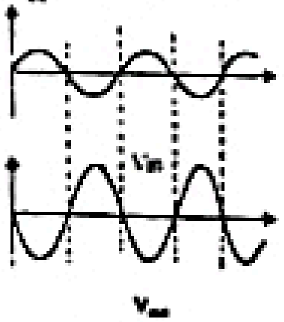
$= 2.4$ kΩ — 01

$V_{CC} = I_B R_B + V_{BE} + V_E$ — 01

$= 510$ kΩ — 01

$V_B = V_E + V_{BE} = 1.2 + 0.6 = 1.8$ V

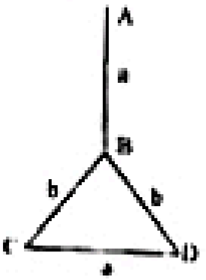
$V_C = V_E + V_{CE} = 1.2 + 6 = 7.2$ V — 01



V_{out}

[illegible] — 01

[illegible]



[illegible] A [illegible] B [illegible] D [illegible] θ_B [illegible] θ_D [illegible] b [illegible] k [illegible] AB [illegible]

$2k(50 - \theta_B) A/L$ — 01

[illegible] BC [illegible]

$k(\theta_B - 10) A/L$ — 01

[illegible] BD $= k(\theta_B - \theta_D) A/L$

[illegible] — 01

[illegible] = [illegible]

$2k(50 - \theta_B) A/L = k(\theta_B - 10) A/L + k(\theta_B - \theta_D) A/L$

$100 - 2\theta_B = 2\theta_B - 10 - \theta_D$ — 01

$4\theta_B - \theta_D = 110 \leftarrow ①$

[illegible] D [illegible] — 01

$k(\theta_B - \theta_D) A/L = 2k(\theta_D - 10) A/L$

([illegible] 01, [illegible] - 01) — 01

$\theta_B - 3\theta_D = -20 \leftarrow ②$

$① \times 3 + ②$ — 01

$11\theta_B = 350$

$\theta_B = 31.8$ °C

[illegible] $\theta_D = 17.3$ °C — 01

[illegible] — 01

$[k(50 - \theta'_B) A/L]$

$= [k(\theta'_B - 10) A/L] + [k(\theta'_B - \theta'_D) A/L]$

$3\theta'_B - \theta'_D = 60 \leftarrow ④$ — 01

$k(\theta'_B - \theta'_D) A/L = k(\theta'_D - 10) A/L$

[illegible] — 01

$\theta'_B - 2\theta'_D = 10 \leftarrow ⑤$

$④ \times 2 - ⑤$ — 01

$5\theta'_B = 130$

$\theta'_B = 26$ °C

$\theta'_D = 18$ °C — 01

01

b) i) B [illegible] C — 01

(2 [illegible])

ii) D

([illegible]) — 01

iii) E — 01

iv) D — 01

v) $K_{max} = hf - \phi$ — 01

(1) [illegible] — 01

[illegible] $= \dfrac{(2 - 1) \times 1.6 \times 10^{-19}}{(7.5 - 5) \times 10^{14}}$ — 01

$= 6.4 \times 10^{-34}$ Js — 01

(2) [illegible] 2.5×10^{14} Hz — 01

(3) $2 \times 1.6 \times 10^{-19} = 6.4 \times 10^{-34} \times 7.5 \times 10^{14} - \phi$ — 01

[illegible] = 1eV (0.9 eV - 1.1eV) — 01

(4) 7.5×10^{14} Hz [illegible] 2 eV — 01

∴ [illegible] 2 V — 01

[illegible] — 01