



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade (3rd Cycle)
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT302 – TRANSMISSION LINES AND ANTENNAS

III YEAR/₁ V SEMESTER

UNIT 1 – TRANSMISSION LINE THEORY

TOPIC 7– STANDING WAVES AND STANDING WAVE RATIO ON A LINE



THE LINE AT RADIO FREQUENCIES



The line at frequencies of MHz and above – Assumptions

1. Very considerable skin effect – Internal inductance is zero
2. $\omega L \gg R$, while computing Z
3. $G=0$



LINE OF ZERO DISSIPATION



- For transmission of energy at high frequencies, where the power efficiency is high, assumption of negligible losses or zero dissipation can be used in the analysis of performance of Transmission Lines for easy analysis
- Also known as perfect lines
- $R=0$ & $G=0$



LINE OF ZERO DISSIPATION – LINE PARAMETERS



- $Z = j\omega L, Y = j\omega C$
- $Z_0 = \sqrt{Z/Y} = \sqrt{j\omega L / j\omega C} = \sqrt{L/C} = R_0$
- $\gamma = \sqrt{ZY} = \sqrt{j\omega L \cdot j\omega C} = \sqrt{-\omega^2 LC}$
- $\gamma = \alpha + j\beta = j\omega\sqrt{LC}$
- Therefore $\alpha = 0$ & $\beta = \omega\sqrt{LC}$
- $v = \omega / \beta = \omega / \omega\sqrt{LC} = 1/\sqrt{LC}$



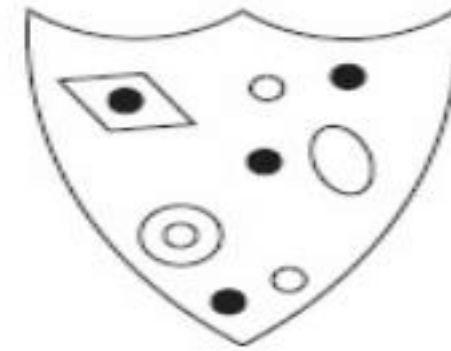
LINE OF ZERO DISSIPATION – LINE PARAMETERS



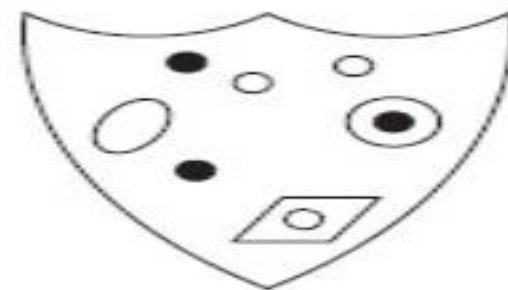
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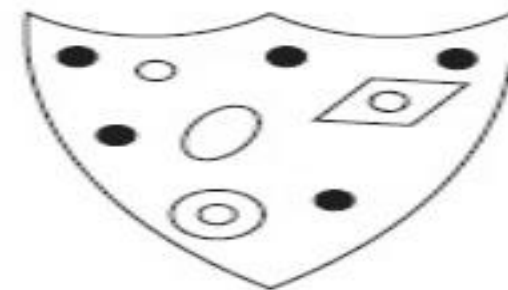
ACTIVITY



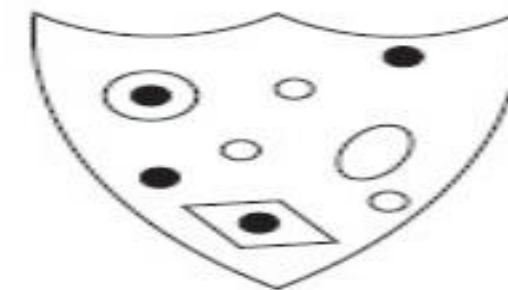
Which below has most in common shield with the shield above?



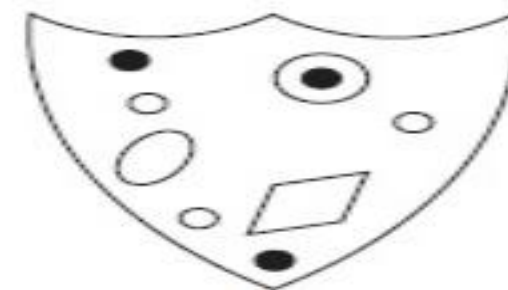
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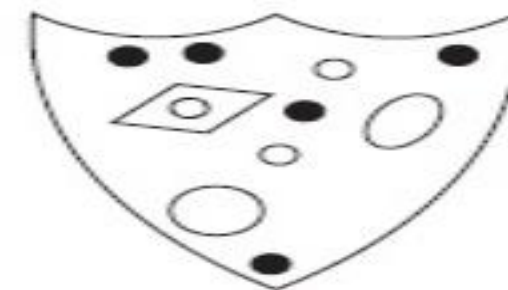
B



C



D



E



ASSESSMENT



3. Given that the reflection coefficient is 0.6. Find the SWR.

a) 2

b) 4

c) 6

d) 8

4. The maxima and minima voltage of the standing wave are 6 and 2 respectively. The standing wave ratio is

a) 2

b) 3

c) 1/2

d) 4



REFERENCES

- J.D.Ryder “Networks, Lines and Fields”, PHI, New Delhi, 2003
- Raju, “Electromagnetic Field Theory and Transmission Lines”, Pearson Education, 2005

THANK YOU