EGT2
ENGINEERING TRIPOS PART IIA

Tuesday 26 April 2022 2 to 3.40

Module 3B1

RADIO FREQUENCY ELECTRONICS

NUMERICAL ANSWERS

1 (a) 3.63×10^{-10} W m^{-2} ; 1.39×10^{-6} A m^{-1}
(b) 0.0114 m^2 ; 3.83 mV (p-p)
(c) 7.2º ; 5.4 km
(d) 0.32 mm
(e) (i) 97.3 dB
(ii) 100.9 dB

2 (a) L = 59.7 µH ; C = 265 pF
(b) Coupling capacitor ~ 10 nF ; C = 2.81 pF ; $R_3 = R_d$ = 390 Ω ; R_1 = 22 kΩ ; R_2 = 33 kΩ
(c) (i) Z = 31.5 + j36.7 Ω ; $\underline{S}_{11} = 0.46\angle 93^\circ$
(ii) 10.2 pF ; 36 mm
(iii) C_s = 42.4 pF ; C_p = 8.06 pF

3 (b) R_1 ~ 880 Ω ; R_2 ~ 100 Ω ; R_3 = 3.3 Ω ; R_4 = 75 Ω ; C ~ 10 nF
(c) 852 MHz
(d) l = 97.2 mm ; w = 1.44 mm

4 (a) (i) Chebyshev ; 245 nF ; 16.2 nF
(b) 10 kΩ ; 105 Ω ; 76 nF