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SARDAR PATEL UNIVERSITY V.V.NAGAR

B.Sc. (Vth SEM.) ELECTRONICS & COMMUNICATION

15thNOVEMBER-2017 EXAMINATION

SUB. – ANTENNA AND ITS APPLICATION

SUB.CODE-US05CELC05

TIME:-10:00 am to 1:00 pm MARKS-70

Q-1 Choose correct answer [10]

1. Pitch angle for helical antenna is defined by _____
   a) $\tan^{-1}S/\pi C$ c) $\tan^{-1}S/\pi D$
   b) $\tan^{-1}S/\pi L$ d) none of above
2. The noise voltage for resistance R is given by _____.
   a) $V=2\sqrt{KTBR}$ c) $V=\sqrt{KTBR}$
   b) $V=2\sqrt{KTB}$ d) none of above
3. A _____compares a level of signal power versus a level of noise power and is most often expressed as a measurement of decibels (dB).
   a) signal-to-noise ratio c) phase margin
   b) contrast to noise d) none of above
4. The frequency range of operation of helical antenna is around _____.
   a) 30MHz to 3GHz c) Above 3GHz
   b) 10MHz to 10MHz d) none of above
5. The intrinsic impedance of free space is _____.
   a) 377 π c) 90π
   b) 120π d) none of above
6. The Radiation pattern of end-fire array is _____
   a) uni-directional c) multidirectional
   b) bidirectional d) none of above
7. The Radiation pattern of broadside array is _____
   a) uni-directional c) multidirectional
   b) bidirectional d) none of above
8. Which expression involves the electrostatic field for far field due to alternating current element?
   a) Only E_θ c) Both and b
   b) Only E_r d) none of above
9. The arrangement consisting two electric poles are known as .....
   a)dipole c)array
   b)monopole d) none of above
10. The intrinsic impedance of free space is symbolized by _____.
    a) Z_0 c) X_0
    b) Y_0 d) none of above

Q-2 Short answer type question. (any ten) [20]

1. Define: Effective area and effective height of antenna.
2. State Helmholtz theorem.
3. Sketch the labelled diagram of horn antenna.
4. Evaluate radiation resistance of an element of length L=2 m at 4 KHz.

(P.T.O.)

5. Give only expression of far field due to alternating current element.
6. Obtain the pattern of broadside array of eight element spaced on half wavelength and fed in phase using multiplication of pattern.
7. Explain slot impedance.
8. Evaluate radiation resistance of an element of length L=2 m at 20 KHz.
9. Give the expression for radiated power. Also find power radiated for r=1 cm, I_{eff} = 0.7 amp. At 5GHz.
10. Draw a labelled diagram of volcano smoke and conical antenna.
11. Why signal to noise ratio is required?
12. Find the Tchebyscheff polynimial $T_4(x)$.

Q.3(A) Derive the complete expression for far field due to sinusoidal current distribution. [05]
Q.3(B) Obtain the near field due to sinusoidal current distribution. [05]

OR

Q.3(A) Explain the meaning of different terms of Ez, Ey and H_ψ. [05]
Q.3(B) Derive the expression for power radiated by current element and discuss its all cases. [05]

Q.4(A) Explain effective area of antenna in detail. [05]
Q.4(B) Write a short note on antenna terminal impedance. [05]

OR

Q.4(A) Explain in brief signal to noise (S/N) ratio. [05]
Q.4(B) Explain binomial array in detail. [05]

Q.5(A) Write a note on: Broadside array. [05]
Q.5(B) Write a note on: linear array. [05]

OR

Q.5 Explain multiplication of pattern in detail. [10]

Q.6 Sketch and explain yagi-uda antenna. [10]

OR

Q.6(A) Explain helical antenna with necessary diagram. [05]
Q.6(B) Derive optimum horn dimension for pyramidal horn. [05]

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