

KADI SARVA VISHWAVIDYALAYA
B.E. SEMESTER 6th (REGULAR) EXAMINATION (APRIL/MAY-2015)

SUBJECT CODE : EC-602

SUBJECT NAME : ANTENNA AND WAVE PROPAGATION

DATE : 29/04/2015

TIME : 10.30 am to 1.30 pm

TOTAL MARKS : 70

Instructions :

1. Answer each section in separate answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly**, the options you attempted along with its respective question number.
5. Use the last page of the main supplementary for rough work.

Section – 1

- Q : 1 (A)** Define following terms related to antenna: 05
(i) Radiation intensity (ii) Effective aperture (iii) Antenna efficiency
(iv) Polarization (v) HPBW
- (B)** Derive the expression of directivity in terms of beam area of an antenna. 05
- (C)** Explain radiation regions of an antenna with diagrams. 05
- OR**
- (C)** Derive Friss Transmission formula for a radio link. 05
- Q : 2 Answer the following questions.**
- (A)** Explain the Principle of Pattern Multiplication for array of point sources. 05
- (B)** Write short note on various feed arrangements and impedance matching methods for antenna designs. 05
- OR**
- (A)** Explain Broadside and End-fire Array, considering linear array of four isotropic sources. 05
- (B)** Explain Radiation Resistance of Loop Antenna. 05
- Q : 3 Answer the following questions.**
- (A)** Explain Radio Communication Link with Transmitting Antenna and Receiving Antenna. 05
- (B)** Explain the geometry of helical antenna. Also enlist modes of radiation of helical antenna. 05
- OR**
- (A)** Explain the case of array of two isotropic point sources with equal amplitude and opposite phase. 05
- (B)** Explain the three element dipole array. Highlight the design issues and discuss the functions of each parasitic element with help of an example at 900 MHz operating frequency. 05

Section – 2

- Q : 4** (A) Explain different types of Reflector Antennas. 05
(B) Give the structure of Troposphere and Ionosphere. 05
(C) Describe the working principle, design and applications of a Microstrip antenna. 05
OR
(C) Explain Experimental Setups for the Measurement of Gain of the Antenna. 05
- Q : 5** **Answer the following questions.**
(A) Explain Non-metallic Dielectric Lens Antenna. 05
(B) Compare far fields of Short Dipole and Small Loop antenna. 05
OR
(A) Explain Impedance of a Slot Antenna. 05
(B) For two element array consisting identical radiators carrying equal currents in phase, obtain positions of maxima and minima of the radiation pattern if the distance of separation $d = \lambda$. 05
- Q : 6** **Answer the following questions.**
(A) Write a short note on Embedded Antennas. 05
(B) Explain the terms: i) Virtual height (ii) Skip distance (iii) Multi-hop propagation 05
OR
(A) Classify various types of horn antennas. Describe their functioning. 05
(B) What do you mean by frequency independent antennas? Draw the log periodic wire antenna and explain its functioning and design concepts. 05

*****All The Best*****

KADI SARVA VISHWAVIDYALAYA
B.E. SEMESTER-VI THEORY EXAMINATION (NOVEMBER-2015)

SUBJECT CODE : EC-602

SUBJECT NAME : ANTENNA AND WAVE PROPAGATION

DATE : 02/11/2015

TIME : 10.30 am to 1.30 pm

TOTAL MARKS : 70

Instructions :

1. Answer each section in separate answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly**, the options you attempted along with its respective question number.
5. Use the last page of the main supplementary for rough work.

Section – 1

- Q : 1 (A)** Define following terms related to antenna: 05
- | | | |
|---------------------------|--------------------|------------|
| (1) Aperture Efficiency | (2) Virtual Height | (3) Fading |
| (4) First Null Beam Width | (5) Polarization | |
- (B)** Explain Beam Area and Directivity. 05
- (C)** Explain Antenna Field Zones. 05

OR

- (C)** Derive the expression for the far field pattern of an array of 2 isotropic point sources with equal amplitude and phase of feed currents. 05

Q : 2 Answer the following questions.

- (A)** Explain Radio Communication Link with Transmitting Antenna and Receiving Antenna. 05
- (B)** Calculate the effective length of a $\lambda/2$ antenna with $R_{rad}=73\Omega$ and Maximum effective aperture $A_{max}=0.13 \lambda^2$. Take $\eta=120\pi$. 05

OR

- (A)** Explain Experimental Setups for the Measurement of Gain of the Antenna. 05
- (B)** Derive Friss Transmission formula for a radio link. 05

Q : 3 Answer the following questions.

- (A)** Explain the Principle of Pattern Multiplication for array of point sources. 05
- (B)** The radiation resistance of an antenna is 72Ω and loss resistance is 8Ω . Calculate antenna efficiency. What is the directive gain if the power gain is 16? 05

OR

- (A)** Write short note on various feed arrangements and impedance matching methods for antenna designs. 05
- (B)** Explain phased array antenna. How is it used as frequency scanning antenna? Justify. 05

Section – 2

- Q : 4 (A) Discuss Dolph-Tchebysheff distribution for linear arrays. 05
(B) Explain briefly (1) Sky Wave (2) Space Wave Propagations. 05
(C) Explain a loop antenna. Derive the expression for its radiation resistance. 05

OR

- (C) Explain the properties of parabola and obtain the expression of the field intensity ratio in the aperture plane of a cylindrical parabolic reflector. 05

Q : 5 Answer the following questions.

- (A) Explain Non-metallic Dielectric Lens Antenna. 05
(B) What do you mean by frequency independent antennas? Draw the log periodic wire antenna and explain its functioning. 05

OR

- (A) Why are the slot dipole antennas known as complimentary antennas? Explain the working, design and applications of slot dipole antennas. 05
(B) For two element array consisting identical radiators carrying equal currents in phase, obtain positions of maxima and minima of the radiation pattern if the distance of separation $d = \lambda$. 05

Q : 6 Answer the following questions.

- (A) Describe Antennas for Terrestrial Mobile communication systems. 05
(B) Describe the working principle, design and applications of a Microstrip antenna. 05

OR

- (A) Explain Yagi-Uda Array-Function and its design. 05
(B) Explain different modes of Propagation with its practical significance. 05

*****All The Best*****