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Question Paper Code : 80304

12/11/2016
FN

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Computer Science and Engineering

CS 6701 — CRYPTOGRAPHY AND NETWORK SECURITY

(Common to Seventh Semester Information Technology)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare active and passive attack.
2. Find gcd (1970, 1066) using Euclid's algorithm.
3. Brief the strengths of triple DES.
4. What is an elliptic curve?
5. State any three requirements for authentication.
6. Differentiate MAC and Hash function.
7. List the three classes of intruders.
8. Define Zombie.
9. List the limitations of SMTP/RFC 822.
10. Define Botnets.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain OSI Security Architecture model with neat diagram. (8)
(ii) Describe the various security mechanisms. (8)

Or

- (b) (i) State Chinese Remainder theorem and find X for the given set of congruent equations using CRT.
 $X = 2(\text{mod } 3)$
 $X = 3(\text{mod } 5)$
 $X = 2(\text{mod } 7)$. (8)
(ii) State and prove Fermat's theorem. (8)

12. (a) Explain AES algorithm with all its round functions in detail. (16)

Or

(b) Explain RSA algorithm, perform encryption and decryption to the system with $p = 7$; $q = 11$; $e = 17$; $M = 8$. (16)

13. (a) Describe MD5 algorithm in detail. Compare its performance with SHA-1. (16)

Or

(b) Explain digital signature standard with necessary diagrams in detail. (16)

14. (a) Discuss Client Server Mutual authentication, with example flow diagram. (16)

Or

(b) Explain the technical details of firewall and describe any three types of firewall with neat diagram. (16)

15. (a) Discuss the working of SET with neat diagram. (16)

Or

(b) Explain the operational description of PGP. (16)

Reg. No.

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Question Paper Code : 80223

12/11/18
EN

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Civil Engineering

CE 6703 – WATER RESOURCES AND IRRIGATION ENGINEERING

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the two important standards for irrigation water?
2. Define flood walls.
3. Define consumptive use of surface water.
4. What is multipurpose reservoir?
5. What are canal regulators?
6. Define Duty, Delta and Base period.
7. What is the need for water budget?
8. What is the purpose of canal lining?
9. Why drop irrigation is preferred?
10. Define micro irrigation.

PART B — (5 × 16 = 80 marks)

11. (a) Briefly state the various steps needed for planning an irrigation project. List the various objectives of water resources development in the context of the lesser developed countries.

Or

- (b) What are the various water sources used for irrigation? How is the storage capacity of a large reservoir fed by a dam for a large irrigation project determined?

12. (a) Outline briefly the concept of ground water budgeting and its importance in the determination of the safe yield from a basin.

Or

- (b) What are the quality criteria for irrigation water? Show the relationship between the different parameters. Classify the irrigation water based on various parameters.

13. (a) What is meant by transpiration by plants? Do you consider it an evil as it causes water loss from the soil and plants? What does transpiration coefficient means?

Or

- (b) Suggest a method for estimating the consumptive use of crops over a large area. Classify the consumption use of water by crop based on its estimation during specific periods.

14. (a) What are cross drainage work? What is necessity of such a work in a canal project, and how does this necessity is fulfilled by such water?

Or

- (b) List the different types of canal lining in common use. Draw a neat sketch of a typical cross section of a canal carrying a discharge of $60 \text{ m}^3/\text{sec}$ and lined with brick in cement mortar. Mark the salient features on the sketch.

15. (a) What is tank irrigation? Differentiate between isolated tanks and Group tanks. How can compute the storage capacity of an irrigation tank?

Or

- (b) What is participating irrigation management? Give a case study of the above type of management and explain.

Reg. No. :

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Question Paper Code : 80352

12/11/16
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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Electronics and Communication Engineering

EC 6701 — RF AND MICROWAVE ENGINEERING

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the radio frequency bands available in microwave and radio frequency ranges.
2. Define S-parameters.
3. Define Noise figure.
4. Calculate VSWR of an amplifier, if the amplifier has reflection coefficient 0.2533.
5. Compare PIN and PN diode.
6. What is isolator? And why isolators are called uniline?
7. What is magnetron?
8. What is Tetrodes and Pentodes?
9. What is network analyzer?
10. Classify microwave powers with its range.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is transmission (T) matrix? Obtain and explain the relationship with [S] and vice versa. (8)
(ii) Compute the intrinsic wave impedance, phase velocity and wavelengths of an electromagnetic wave in free space and a printed circuit board (PCB) material whose dielectric constant is 4.6 for the frequency $f = 30$ MHz and 3 GHz. (8)

Or

- (b) (i) Explain and analyze any reciprocal lossless network with derivation. (10)
(ii) Discuss on the application of RF and microwave area. (6)

12. (a) Derive the equation for power gain, available power gain and transducer power gain. (16)

Or

- (b) Investigate the stability regions of a transistor whose S-parameters are recorded as follows :

$$S_{12} = 0.2 \angle -10^\circ ; S_{11} = 0.7 \angle -70^\circ ; S_{21} = 5.5 \angle 85^\circ \text{ and } S_{22} = 0.7 \angle -45^\circ \text{ at } 750 \text{ MHz.} \quad (16)$$

13. (a) Discuss briefly about working principle, operation, characteristics and application of varactor diode. (16)

Or

- (b) What is circulator? With neat diagram, explain the working principle, construction, operation of four-port circulator using magic-tee. Verify the circulator theory with necessary S-parameter equations.

14. (a) Explain the working principle and operation of multi-cavity Klystron amplifier and derive the expressions for its output power. (16)

Or

- (b) A travelling wave tube (TWT) operates under the following parameters :

$$\text{Beam Voltage } V_0 = 3 \text{ kV}$$

$$\text{Beam Current } I_0 = 30 \text{ mA}$$

$$\text{Characteristic impedance of helix } = Z_0 = 10 \Omega$$

$$\text{Circuit length } = N = 50 \text{ m}$$

$$\text{Frequency } f = 10 \text{ GHz}$$

Determine :

- (i) Gain parameters C .
- (ii) Output power gain A_p in decibels.
- (iii) All four propagation constants.

(16)

15. (a) Explain the impedance measurement technique using slotted line and reflectometer. (8 + 8)

Or

- (b) Explain the measurement of high VSWR with the help of block diagram. (16)

Reg. No. :

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Question Paper Code : 80385

12/11/16
FN

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Electrical and Electronics Engineering

EE 6701 — HIGH VOLTAGE ENGINEERING

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is back flashover?
2. Define Isokeraunic level or thunderstorm days.
3. What is ionization by collision?
4. Define Gas law.
5. What is a tesla coil?
6. What is Deltatron circuit?
7. What are the advantages of generating voltmeters?
8. List some advantages of Faraday generator.
9. Define 50% flash over voltage.
10. What are the tests need to be conducted on power transformer?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the mechanism of lightning stroke. (10)
(ii) Give the mathematical model for lightning discharges and explain them. (6)

Or

- (b) Explain the different methods employed for lightning protection of overhead lines. (16)

12. (a) From the fundamental principles, derive Townsend's criteria for the breakdown of gaseous dielectric medium. (16)

Or

- (b) Explain the various breakdown theories involved in commercial liquid dielectrics. (16)

13. (a) (i) Mention the necessity of generating high DC voltages. (4)
(ii) Explain with a neat diagram the generation of high DC voltages using Van-de-graff generator. State the factors which limit the voltage developed. (12)

Or

- (b) Explain the working principle of Cockroft-Walton voltage multiplier circuit. Derive an expression for total voltage drop and total ripple voltage of n-stage voltage multiplier circuit and hence deduce the condition for optimum number of stages. (16)

14. (a) (i) Enumerate digital peak voltmeter. (8)
(ii) What is CVT? Explain how CVT can be used for high voltage AC measurement. (8)

Or

- (b) Explain how a sphere gap can be used to measure the peak value of voltages? Also discuss the parameters and factors that influence such voltage measurement? (16)

15. (a) Discuss the various tests carried out in a circuit breaker at HV labs. (16)

Or

- (b) Explain in sequence the various high voltage test being carried out in a power transformer. (16)

Reg. No.

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Question Paper Code : 80133

12/11/16
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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Biomedical Engineering

BM 6503 — BIO MATERIALS AND ARTIFICIAL ORGANS

(Common to Medical Electronics)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give the classification of biomaterials. Give one example for each class.
2. What is a viscoelastic material? Give an example.
3. Write any two advantages of Yttrium stabilized zirconia as an implant material over alumina.
4. What is DCC coating? State its application in medical devices.
5. Silica flour (finely ground SiO_2 density : 265 kg/m^3)

is used as a filler for polymethyl siloxane (silastic rubber). Find the weight percent and volume fraction of SiO_2 required to make a silastic rubber with a density of 125 kg/m^3 .

6. Draw the stress-strain curve of collagen, elastin and tissue.
7. Write the three types of soft tissue implants. Give examples.
8. State the role of vascular grafts. List any two requirements for that.
9. What is an artificial kidney and what are all function?
10. What is the function of an oxygenator? Name any two types.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the following with an example :
- (i) Stress and strain. (4)
 - (ii) Toughness. (4)
 - (iii) Fatigue failure and Wear failure. (4)
 - (iv) Young's Modulus. (4)

Or

- (b) (i) Explain the steps involved in a wound healing process. (10)
- (ii) Write a note on body response to implants. (6)
12. (a) Explain the types, properties and manufacturing of implants using the following.
- (i) Stainless steel. (8)
 - (ii) Co based alloys. (8)

Or

- (b) (i) Explain the types, properties and manufacturing of implants using carbon. (10)
- (ii) Explain the creep and stress relaxation in a viscoelastic material. (6)
13. (a) (i) Discuss the structure and biomaterial applications of the following biopolymers
- (1) Collagen. (5)
 - (2) Elastin. (5)
- (ii) Write a note on dental filling composites and cements. (6)

Or

- (b) Discuss in detail the biomaterials used for ophthalmology. (16)
14. (a) (i) Write a detailed note on the nature, properties and functionality of suture materials. (10)
- (ii) A nylon suture was implanted in the abdominal cavity of a dog. The suture was removed after 10 days and a second piece of the same suture was removed after 20 days, and its average tensile strength was found to be decreased by 40% and 50% respectively. How long it will take the strength to decay 60% of its original value? (6)

Or

- (b) Discuss in detail the functionality of Hip and knee joint replacements. (16)

15. (a) (i) Explain the functioning of artificial kidney (dialyzer membrane). (12)
- (ii) A bioengineer is designing an arterial stent from NiTi alloy and polyester cloth to enlarge an atherosclerotic artery. Calculate the hoop stress in an 8×10^{-3} m diameter artery with a thickness of 1×10^{-3} m due to a blood pressure of 90 mm of Hg. Assume the artery a uniform tube. (4)

Or

- (b) Explain the following with reference to dental implants
- (i) Endosseous implant. (4)
- (ii) Re implantation of natural teeth. (4)
- (iii) Mandibular reconstruction. (4)
- (iv) Testing and evaluation of dental implant. (4)
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