Hall Ticket Number :										

R-14

Code: 4G234

II B.Tech. I Semester Supplementary Examinations May 2019

Electromagnetic Fields

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) State and explain vector form of Coulombs law? 4M

   b) Derive the expression for Electric Field intensity and potential at a point P which is situated h meter away from the disc along its axis. The disc is charged uniformly with a charge density of ρ_s C/m^2. 10M

OR

2. a) Derive the expression for energy density in an electrostatic field. 7M

   b) Point charges 1 mC and -2 mC are located at (3,2,-1) and (-1,-1,4),respectively. Calculate the electric force on a 10 nC charge located at (0,3,1) and the electric field intensity at that point. 7M

UNIT–II

3. a) Derive the expression for the energy stored in a parallel plate capacitor 8M

   b) Determine the capacitance of a capacitor consisting of two parallel metal plates of 30 cm X30 cm surface area, separated by 5 mm gap in air. What is the total energy stored by the capacitor if the capacitor if the capacitor is charged with 500 V? What is the energy density? 6M

OR

4. a) Define Dipole and Dipole moment? Derive the expression for potential due to dipole? 7M

   b) Explain Polarization of dielectric materials? 7M

UNIT–III

5. a) Obtain an expression for Magnetic field intensity due to an infinitely long current carrying conductor? 7M

   b) Derive the expression for Vector Magnetic Potential. 7M

OR

6. A uniform solenoid 100 mm in diameter and 400 mm long has 100 turns of wire and a current of I=3A.Find the magnetic field on the axis of the solenoid a) At the center b) At one end c) Half way from the center to one end. 14M

UNIT–IV

7. a) Derive the expression for energy stored in a magnetic field. 7M

   b) Derive the self-inductance of a solenoid 7M

OR

8. a) What is a magnetic dipole? How does it differ from an electric dipole? 7M

   b) Derive the expression for inductance of a solenoid using Amperes circuital law. 7M

UNIT–V

9. a) Distinguish clearly the dynamically induced EMF and statically induced EMF explain with neat diagram. 7M

   b) Find the EMF developed around a circular path with radius r=0.5m in the plane z=0 at t=0 if(i) B=0.1 sin(377t)a_z,(ii) B=0.1sin(377t/r)a_r. 7M

OR

10. Compare and Contrast Electric and Magnetic Fields? 14M

***

Hall Ticket Number :										

R-14

Code: 4G231

II B.Tech. I Semester Supplementary Examinations May 2019

Switching Theory and Logic Design

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Convert the following numbers into decimal:
   i. 100100111000.0111(BCD)
   ii. $(11001101.111)_2$
   iii. $(CF.5)_{16}$
   iv. $(234)_5$ 10M

   b) Explain with examples, how Hamming code is useful for detecting and correcting errors in digital data transmission. 4M

OR

2. a) i.) Perform the **45+(-17)** subtraction using 1's complement and 2's complement method. Find the result in sign-magnitude.
   ii.) What is the radix called in case of Decimal, binary, octal and hexadecimal number system? 7M

   b) Find the Excess-3 code and its 9's complement for the following decimal numbers: i. 56, ii. 812 7M

UNIT–II

3. a) Simplify the following function using K-map and implement it using basic gates only. $f(A,B,C,D) = \sum_m (2,3,5,13,14) + d(8,9,10,11)$ 7M

   b) Simplify the following Boolean function to POS form.
   $f(w,x,y,z) = \sum (0,1,2,5,8,10,13)$ 7M

OR

4. a) Minimize the given expression using K-map and also show the essential prime implicants and selective prime implicants on the K-map.
   $Y(A,B,C,D) = \sum_m (4,5,7,12,14,15) + \sum d(3,8,10)$ 7M

   b) Use the tabular procedure to simplify the given expression
   $f(v,w,x,y,z) = \sum_m (0,4,12,16,19,24,27,28,29,31)$ 7M

UNIT–III

5. a) Implement the following function using an 8:1 MUX
   $F(A,B,C) = \overline{A}B + C\overline{D} + A\overline{C}.$ 7M

   b) Realize two outputs F1 and F2 using 4X2 PROM
   $F_1(A_1, A_0) = \sum_m (0,2)$
   $F_2(A_1, A_0) = \sum_m (0,5,6,7)$ 7M

OR

6. a) Implement the following logic function using an 8X1 MUX
$F(AB,C,D) = \sum_m (1,3,4,11,12,13,14,15)$. 7M

b) Compare the three combinational PLDs. 7M

UNIT–IV

7. a) What are the applications of flip-flops? 2M

b) Design a mod-7 synchronous counter using S-R flip-flops. 12M

OR

8. a) What is twisted ring counter? Write the advantages and disadvantages of ring counter compared to ripple counter 4M

b) Design 3-bit counter which counts in the following sequence
$0 \to 2 \to 5 \to 3 \to 4 \to 0 \to 2 \to .....etc$ 10M

UNIT–V

9. a) What are the capabilities and limitations of finite state machines? 2M

b) Find the equivalence partition and corresponding reduced machine in standard form for the machine given below.

PS	NS,Z	
	X=0	X=1
A	***E,0***	***D,1***
B	***F,0***	***D,0***
C	***E,0***	***B,1***
D	***F,0***	***B,0***
E	***C,0***	***F,1***
F	***B,0***	***C,0***

12M

OR

10. a) Define the “State equivalence and machine equivalence” with reference to sequential machines. 2M

b) What are the conditions for two machines to be equivalent? for the machine given in table, find the equivalence partition and corresponding reduced machine in standard form.

PS	NS,Z	
	X=0	X=1
A	***F,0***	***B,1***
B	***G,0***	***A,1***
C	***B,0***	***C,1***
D	***C,0***	***B,1***
E	***D,0***	***A,1***
F	***E,1***	***F,1***
G	***E,1***	***G,1***

12M

***

Hall Ticket Number :										

R-14

Code: 4G233

II B.Tech. I Semester Supplementary Examinations May 2019

Electrical Circuits – I

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Discuss the concept of source transformation technique. 7M

   b) Find the equivalent resistance between the terminals Y and Z in Fig.1. 7M

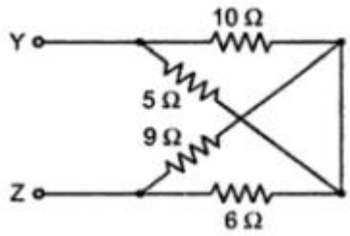

Fig.1

OR

2. a) Explain the following terms with reference to network topology with an example. 8M
   i. Twig
   ii. Link
   iii. Oriented graph
   iv. Incident matrix

   b) Write the properties of tie-set matrix and cut-set matrix 6M

UNIT–II

3. a) Show that resonant frequency ω_n of RLC series circuit is geometric mean of lower and upper half-frequencies ω_1 and ω_2 7M

   b) With respect to series resonant circuit, prove that bandwidth is inversely proportional to the Q-factor at resonance. 7M

OR

4. a) Define the following: 8M
   i) Amplitude of an alternating quantity
   ii) Instantaneous value of an alternating quantity
   iii) Frequency
   iv) Phase

   b) Discuss about Power triangle and power factor in ac circuits. 6M

UNIT–III

5. a) State and prove the superposition theorem with the help of an example. 7M

   b) Find R_{AB} in Fig.2, for maximum power transfer. Also calculate maximum power.

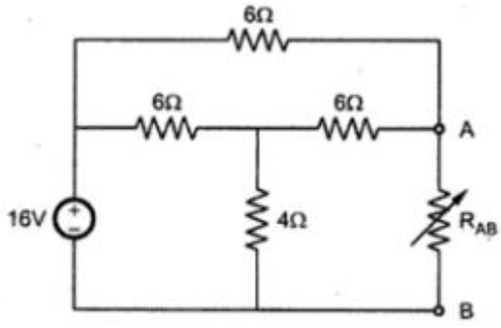

Fig.2 7M

OR

6. Find the Thevenin equivalent circuit for the circuit shown below Fig.3. 14M

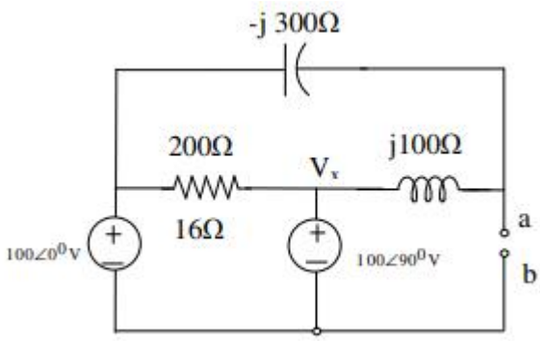

Fig.3

UNIT–IV

7. Find the Y-parameters for the two port network shown in fig.4 14M

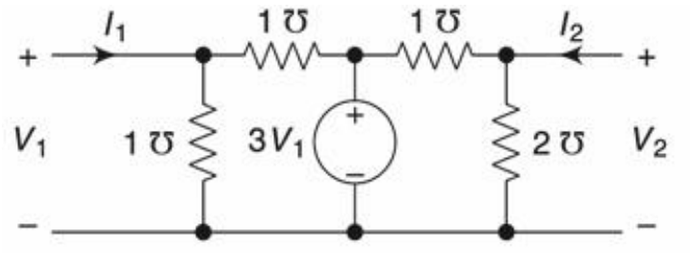

Fig.4

OR

8. a) Obtain the *z* -parameters for the network in Fig.5 8M

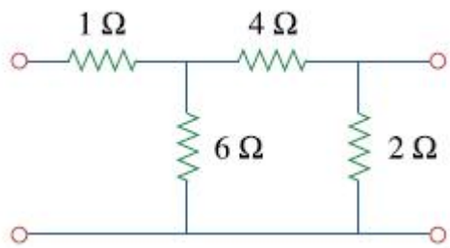

Fig.5

b) Determine the h-parameters with the following data: 6M

(i) With the output terminals short circuited, V_1=25V, I_1=1A, I_2=2A

(ii) With the input terminals open circuited, V_1=10V, V_2=50V, I_2=2A

UNIT–V

9. a) Derive the relation between self inductance, mutual inductance and coefficient of coupling. 7M

b) A magnetic circuit consists of an iron ring of mean circumference 80 cm with cross-sectional area of 12 cm2 throughout. A current of 2A in the magnetising coil of 200 turns produce a total flux of 1.2 mwb in the iron. Calculate: i) the flux density in the iron ii) the absolute and relative permeability of iron. iii) the reluctance of the circuit. 7M

OR

10. a) Explain the importance of dot convention in coupled circuits. 6M

b) Define: (i) Flux (ii) m.m.f (iii) Reluctance (iv) Magnetic field intensity. 8M

***