MA02

Hall Ticket Number:

I/IV B.Tech (Supplementary) DEGREE EXAMINATION

May, 2018 **Common to all branches**

Second Semester **Mathematics - II**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) Define a periodic function.
   b) If $f(x)=\begin{cases}0 & -\pi \le x < 0 \\ x & 0 < x \le \pi\end{cases}$, then find the Fourier coefficient b_1.
   c) Check whether the function $f(x)=x-2x^2$ is even or odd function.
   d) Evaluate $\int_1^2\int_1^3 xy^2\ dx\ dy$.
   e) Write complex form of Fourier series.
   f) Write the formula to find area enclosed by the curves in polar coordinates.
   g) State first shifting property of Laplace transforms.
   h) Find $L^{-1}\left\{\frac{s}{(s-1)^2}\right\}$.
   i) Define unit step function.
   j) Write physical interpretation of gradient of a scalar function.
   k) If $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$ then find Curl $\bar{r}$.
   l) State Stoke's theorem.

UNIT I

2. a) Obtain the Fourier series for $f(x)=x-x^2$ in the interval $[-\pi, \pi]$. 6M
   b) Express $f(x)=x$ as a half range Sine series in $0 < x < 2$. 6M

(OR)

3. a) An alternating current after passing through a rectifier has the form $I=\begin{cases} I_0 \sin x; & 0 \le x \le \pi \\ 0; & \pi \le x \le 2\pi \end{cases}$, where I_0 is the maximum current and the period is 2π. Express 'I' as a Fourier series. 6M
   b) Find the Fourier series for $f(x)=x^2$ in the interval $[-\pi, \pi]$. 6M

UNIT II

4. a) Find the Laplace Transform of $f(t)=\frac{\cos at-\cos bt}{t}$. 6M
   b) Apply convolution theorem to find the inverse Laplace transform of $\frac{s}{(s^2+4)^2}$ 6M

(OR)

5. a) Evaluate the value of $\int_0^\infty t^2 e^{3t} \sin t\ dt$ using Laplace Transform. 6M
   b) Using Laplace transform, solve $(D^2+1)x=\cos 2t$, given that $x=0, \frac{dx}{dt}=0$ *at* $t=0$. 6M

UNIT III

6. a) Evaluate $\iint_R xy\ dx\ dy$, where R is the domain bounded by x-axis, ordinate $x = 2a$ and the curve $x^2 = 4ay$. 6M

b) Find the volume of the tetrahedron bounded by the planes $x = 0, y = 0, z = 0$ and $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$. 6M

(OR)

7. a) Evaluate $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z \; dz\, dx\, dy$. 6M

b) Evaluate the integral $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 \, dx \, dy$ by changing the order of integration. 6M

UNIT IV

8. a) Find $\text{Div}\overline{F}$ where $\overline{F} = \text{grad}\,(x^3 + y^3 + z^3 - 3xyz)$. 6M

b) Verify Green's theorem in plane for $\oint_C ((xy + y^2)dx + x^2 dy)$ where 'C' is the region bounded by $y = x$ and $y = x^2$. 6M

(OR)

9. a) Find the angle between the surfaces $xy^2z = 3x + z^2$ and $3x^2 - y^2 + 2z = 1$ at the point (1, -2, 1). 6M

b) Use divergence theorem to evaluate $\int_S \overline{F}.dS$ where $\overline{F} = 4x\,\bar{i} - 2y^2\,\bar{j} + z^2\,\bar{k}$, and 'S' is the surface bounded by the region $x^2 + y^2 = 4$, $z = 0$ and $z = 3$. 6M

CH 123/CY03
14CY203(Y14)

Hall Ticket Number:

I /IV B.Tech (Supplementary) DEGREE EXAMINATION

May, 2018 **Common to all branches**

Second Semester **ENGINEERING CHEMISTRY-II**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) What is meant by an ion selective electrode?
   b) Define the term electrode potential.
   c) Write the cell representation for Calomel electrode.
   d) Define passivity.
   e) What is pilling bed worth rule?
   f) What are paints?
   g) What are the main constituents of LPG?
   h) Mention the formula of phase rule? Write the terms.
   i) Define cracking.
   j) Mention any two applications of UV spectroscopy.
   k) State Beer-Lamberts law.
   l) Write any two applications of IR spectroscopy.

UNIT I

2. a) Derive Nernst's equation for single electrode potential? Write any two applications. 4M
   b) Define the term potentiometric titrations? Discuss about their titrations involving redox reactions. 8M

(OR)

3. a) Explain electro chemical series? Mention the significances with suitable examples. 4M
   b) What is reference electrode? Discuss the construction and measurement of pH by using calomel electrode 8M

UNIT II

4. a) What is meant by corrosion? Explain the mechanism of chemical corrosion? 8M
   b) Write short note on electroplating? 4M

(OR)

5. a) Define electro chemical corrosion? Explain the mechanism of rusting of iron? 6M
   b) Discuss the factors influencing the rate of corrosion? 6M

UNIT III

6. a) What is synthetic petrol? Explain any one methods of preparing synthetic petrol with neat diagram? 8M
   b) Define knocking? How is it related to chemical constitutions? 4M

(OR)

7. a) What is condensed phase rule? Explain Pb-Ag system with neat diagram? 8M
   b) Write briefly about thermal analysis. 4M

UNIT IV

8. a) Explain the principle, and instrumentation and applications of UV spectroscopy. 8M
   b) How sodium is estimated by flame photometry. 4M

(OR)

9. a) Explain the principal involved in AAS. How nickel is estimated by AAS. 8M
   b) Draw the block diagram and applications of colorimeter. 4M

1. Each question carry one mark (1x12=12)

2.a)Derivation of Nernst's equation (3M)

Any Two applications (1M)

b) Definition of potentiometric titrations(2M)

titrations involving redox reactions (6M)

3.a) Explanation of electro chemical series (2M)

significances with suitable examples (2M)

b) reference electrode (2M)
construction and measurement of pH by using calomel electrode (2+4M)

4.a)Definition of corrosion(2M)
Mechanism of chemical corrosion (6M)
b) electroplating (4M)

5. a) Definition of electro chemical corrosion (2M)
Explanation of mechanism of rusting of iron (4M)

b) factors influencing the rate of corrosion –

Nature of Metal 3M

Nature of Environment 3M

6.a) synthetic petrol (2M)
neat diagram (2M)
methods of preparing synthetic petrol (4M)
b) knocking (2M)
Relation with chemical constitutions (2M)
7.a) condensed phase rule (2M)
Pb-Ag system with neat diagram (6M)
b) alloys (1M)
composition and importance of ferrous alloys (1M+2 M)
8.a) principle (2M)
Instrumentation and applications of UV spectroscopy (6M)
b) Estimated of sodium by flame photometry(4M)

9.a) principal involved in AAS (3M)
Estimation of nickel by AAS (5M)
b) block diagram (2M)
Any four applications of colorimeter (2M)

CS124/ IT124

Hall Ticket Number:

I/IV B.Tech (Supplementary) DEGREE EXAMINATION

May, 2018 — **Computer Science & Engineering**

Second Semester — **Digital Logic Design**

Time: Three Hours — **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1 Answer all questions (1X12=12 Marks)

a) How are negative numbers represented?
b) What are the advantages and disadvantages of the 8421 BCD code?
c) What are the three methods of obtaining the 2's complement of a given binary number?
d) Add the hexadecimals numbers (1234) and (9898)?
e) What is Excitation table.
f) Simplify the Boolean function using three variable map F(A,B, C) = ∑(0, 2, 6, 7)
g) Define Combinational circuit?
h) Draw the logic diagram of full adder?
i) Differentiate RAM and ROM.
j) Define PLD.
k) Purpose of counter
l) Define State Reduction.

UNIT I

2 a) Simplify the following Boolean expression to a minimum number of literals. 6M
   i) F = (BC' + A'D) (AB' + CD')
   ii) F = WYZ + XY + XZ' + YZ

   b) Convert the following number with indicated bases to decimal 6M
   i) $(1\,0\,1\,1\,1\,1)_2$ ii) $(A\,3\,B)_{16}$ iii) $(2\,3\,6\,7)_8$ iv) $(3\,4\,5\,6)_7$

(OR)

3 a) Express the following function in sum of minterms and product of maxterms. 6M
F (A, B, C, D) = B'D +A'D + BD

   b) Simplify the following Boolean function using four-variable map. 6M
F(w, x, y, z) = ∏(1,2,5,10,12) ∏ d(0,4,8)

UNIT II

4 a) Implement a Boolean function F(x, y, z)=∏(2,4,6) with a Multiplexer. 6M

   b) Give the design of a 4 bit binary adder circuit. 6M

(OR)

5 a) Explain about Tri-state gates in digital systems. 6M

   b) Design a full - subtractor circuit with three inputs x, y, z and outputs D, B. The circuit subtracts X - Y - Z where Z is the input borrow. B is the output borrow and D is the difference draw the circuit using NAND gates. 6M

UNIT III

6 a) Give the design of D-flip-flop and J-K-flip-flop and explain their functionality. 6M

   b) Distinguish between combinational logic and sequential logic. 6M

(OR)

7 a) Design a sequential circuit with two JK flip-flos A,B with one input X and one output Y. 12M
A(t+1) =Ax+Bx
B(t+1)=A'x
Y=Ax'+Bx'

UNIT IV

8 a) Write a brief on EPROM and EEPROM and their characteristics. 6M

   b) What is ripple counter and explain its design. 6M

(OR)

9 a) Design a combinational circuit using PAL having a Boolean function 12M
W(A,B,C,D) = ∏(2,12,13)
X(A,B,C,D) = ∏(7,8,9,10,11,12,13,14,15)
Y(A,B,C,D) = ∏(0,2,3,4,5,6,7,8,10,11,15)
Z(A,B,C,D,) = ∏(1,2,8,12,13)

EC/EI 124

Hall Ticket Number:

I/IV B.Tech /Supplementary DEGREE EXAMINATION

MAY, 2018

Second Semester

ECE/EIE

Circuit Theory

Time: Three Hours

Maximum : 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

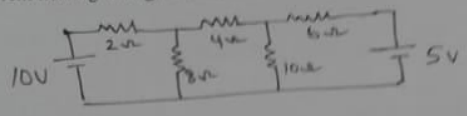
(1X12=12 Marks)

1 Answer all questions

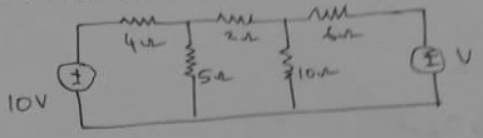
a) State KCL and KVL ?
b) Define energy and power with units?
c) What are the properties of tree in graph theory?
d) State Millman's theorem?
e) Define terms average value and RMS value?
f) What is the difference between active power and reactive power?
g) Define Q-factor?
h) Give any two properties of Laplace Transform?
i) What is the Laplace Transform of the Unit step function and Ramp function?
j) Define bandwidth?
k) What is the difference between transient response and steady state response?
l) What are the applications of P-Spice?

UNIT I

2 a) Find the current flowing through 6 ohms resistor using mesh analysis 6M

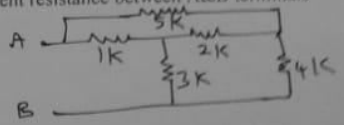


b) Find 'V' if current in 2 ohm resistor is zero using nodal analysis 6M

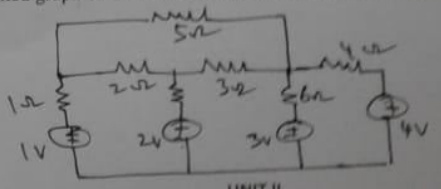


(OR)

3 a) Find the equivalent resistance between A&B terminals 6M



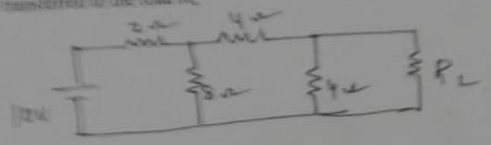
b) Draw the oriented graph of the network and write the cut set matrix 6M



UNIT II

4 a) State and explain Superposition theorem with an example 6M

b) For the circuit shown in fig. find the value of the R_L to get maximum power and also find maximum power transferred to the load R_L 6M



(OR)

5 a) Find the average and RMS value of the wave form shown in fig 6M

b) The impedances $Z_1 = 10+j10\ \Omega$, $Z_2 = -j6\Omega$, $Z_3 = 8\ \Omega$ are connected in series to unknown voltage 'V'. Find 'I' and 'V' if the voltage drop across Z_3 is $21.08\angle 18.43$v. 6M

UNIT III

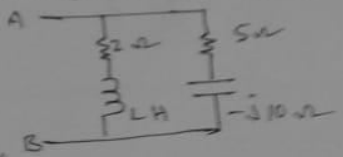
6 a) Distinguish between series and parallel resonance circuits 6M

b) The impedance of the circuit is $Z = 6-j8\ \Omega$ and applied voltage is $V=50\angle 45$. Find the power triangle. 6M

(OR)

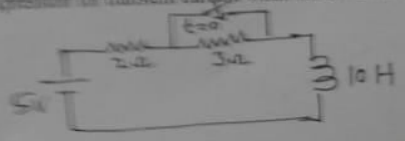
7 a) An R-L-C circuit has R=1 Ω, L=100mH and C=10pF, if a voltage 100v is applied across Series combination. Find (i) Resonant frequency (ii) Q-factor (iii) Half power points 6M

b) Find the value of 'L' for which the circuit shown in fig. is resonant at a frequency of a w=5000 rad/sec 6M



UNIT IV

8 a) Find the expression for transient current when the switch is closed at t=0 6M



b) Find the Laplace Transform of the given functions 6M

$f_1(t) = \frac{2-2e^{-2t}}{t}$ and $f_2(t) = e^{at}\sin(bt)$

(OR)

9 a) State and prove initial and final value theorems 6M

b) Explain DC analysis and control statements in P-Spice 6M

9-5-2018 @ 8:30 AM

EC/EI 124

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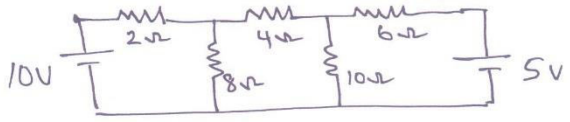

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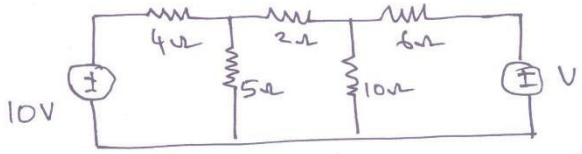

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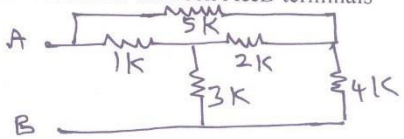

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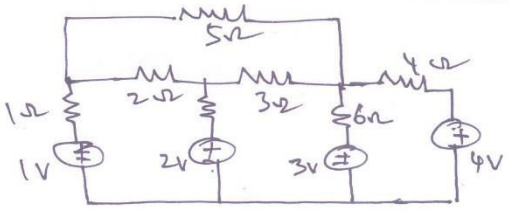

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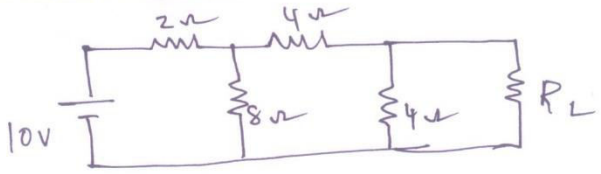

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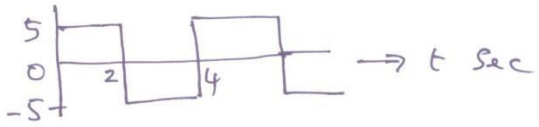

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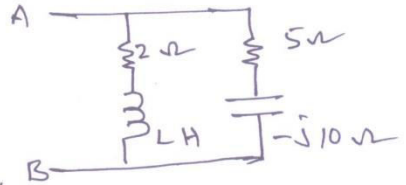

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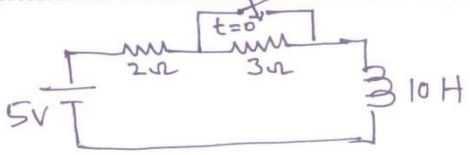

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