Roll No: 1756

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Second SEM

B.TECH(GROUP A)

END SEMESTER EXAMINATION

May 2017

CO-102 PROGRAMMING FUNDAMENTALS

Time: 3 Hours

Max. Marks : 80

Note : Answer any five
Assume suitable missing data, if any.

Q1. (a) Explain flow chart, its advantages and disadvantages. Write algorithm for finding the sum of 10 natural numbers. 8

(b) Write a program to read a data file and convert all lower case characters into upper case and then write the same into some other data file. 8

Q2. (a) Explain fundamental data types of C language in detail. How size and sign modifiers effect data types. 7

(b) Create an array of structure **"emp"** in C to store the ID, NAME, AGE, Salary of 200 employees of DTU. Write a program to accept and display the details of employees in proper tabular form using printf and scanf statement. 9

Q3.(a) Differentiate between function prototype, definition and call. Write a program to find factorial using all three . 8

(b) WAP to search a number in an sorted array. Explain the algorithm. 8

Q4.(a) Write a program to print the n elements of a Fibonacci series. 6

(b) Differentiate between header file and library file . 4

(c) 6

Consider

int i, *ptr, a[5];

Which of the following is correct/wrong. Justify your answer

(i) ptr = &a	(ii) a= ptr	(iii) a = &i	(iv) *ptr = a[1]
(v) &i = ptr	(vi) a = *ptr	(vii) ptr = a	(viii) prt = &a[2]
(ix) ptr = 102	(x) ptr = &i	(xi) a++	(xii) ptr++

Q5.(a) Write a program to input 10 numbers and find the sum using dynamic memory allocation 8

(b) Explain the following 8

(i) Recursion (ii) Assignment operators

Q6.(a) Write a program to find the sum of the following series: 8

$1^2 + 3^2 + 5^2 + 7^2 + ...N^2$ where N is an odd number entered by the user.

(b) Explain nested if-else and switch statements. How switch can replace nested if statement and what are its advantages. What is break statement and its roll in switch statement? Give suitable example. 8

Q7. Write Short notes on any two 14

(a) Features of OOP

(b) call by reference

(c) Precedence and associatively of operators

Roll No. 1956

SECOND SEMESTER **B.TECH. (ENE)**

END-SEM EXAMINATION **MAY– 2017**

EN-102 INTRODUCTION TO ENVIRONMENTAL SCIENCE

Time: 03 Hours *Max. Marks: 50*

Note: Attempt any five questions
Assume suitable missing data if any

1. a) Describe the composition and temperature profile of different layers of atmosphere. 5
   b) Discuss the environmental issues associated with over-utilisation of forest resources. 5

2. a) Discuss the status of mineral resources of India. 5
   b) What is the ten percent law? Explain. 5

3. a) What is global warming? What are the environmental consequences of global warming? Explain. 5
   b) Define 'biodiversity'. Discuss the threats to biodiversity. 5

4. a) What is acid rain? How is it formed? Describe the harmful effects of acid rain. 5
   b) Discuss the cycling of nitrogen in environment. 5

5. a) Discuss the control methods for soil erosion. 5
   b) Explain the current practice of solid waste management. 5

6. a) Differentiate between conventional and non-conventional sources of energy. 5
   b) What are the environmental issues associated with pesticides? Explain. 5

7. Write short notes on 10
   a) Ecological Pyramids
   b) Algal Bloom
   c) Ecological Succession
   d) Biomagnification

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SECOND SEMESTER **B.Tech. (Group-A)**

END SEMESTER EXAMINATION **(MAY-2017)**

EE-102 BASIC ELECTRICAL ENGINEERING

Time: 3:00 Hours *Max. Marks: 40*

Note: Q. No. 1 is compulsory. Attempt five questions in all.
All questions carry equal marks. Assume suitable missing data, if any.
Special material required : Graph Paper

Q 1. Indicate whether the following statements are True or False. [1x8]

i. A capacitor of 0.1μF charged to 120 V is connected across an uncharged 0.1μF capacitor. Then the voltage across each capacitor will be 120 V.

ii. If an ordinate represents voltage and abscissa represents the current, the characteristics of an ideal current source would be represented by a vertical line.

iii. The unit of reluctance is A/m.

iv. The low power factor of the circuit means that it draws more reactive power.

v. In a balanced three phase star connected load, the three phase currents in amperes are $10\angle -30^0$, $10\angle -150^0$, $10\angle 90^0$. Then the three line currents in amperes would be $17.32\angle -30^0$, $17.32\angle -150^0$, $17.32\angle 90^0$.

vi. A MI instrument can measure both ac and dc.

vii. Distribution transformers should have core losses more than copper losses.

viii. The admittance of a parallel circuit is $0.12\angle -30^0$S. The circuit is capacitive.

Q 2(a) When an ideal voltage source is placed as a part of a closed circuit, what are the factors that determine the magnitude of current associated with the voltage source. [4]

(b) Use Δ-Y transformation to determine the currents in the circuit of Fig. 1. [4]

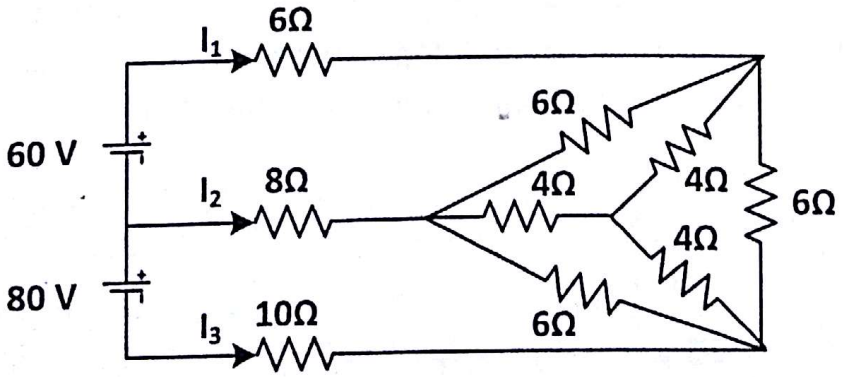

Fig. 1

Q 3(a) State Superposition theorem and illustrate its use to solve a network. [4]

(b) For the circuit shown in Fig. 2, determine the value of R_L that will absorb maximum power and the value of this power ? [4]

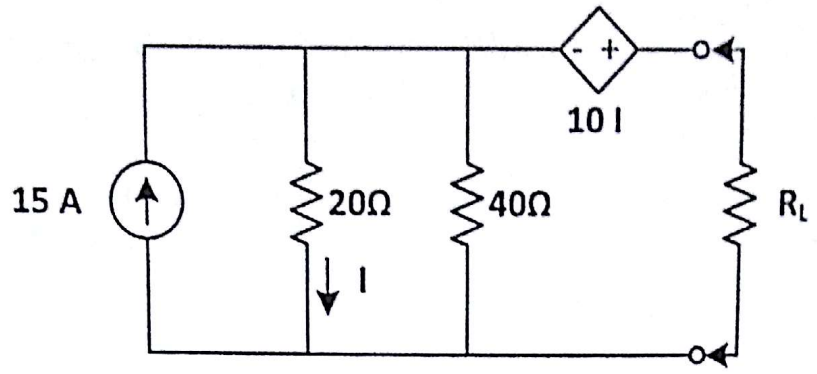

Fig. 2

Q 4(a) What is reactive power? Why is such a term not encountered when dc sources are used in an electric circuit? [4]

(b) For the circuit shown in Fig. 3, determine I_1, I_2 and V of the circuit. Also draw to scale the phasor diagram. Take Voltage as reference. [4]

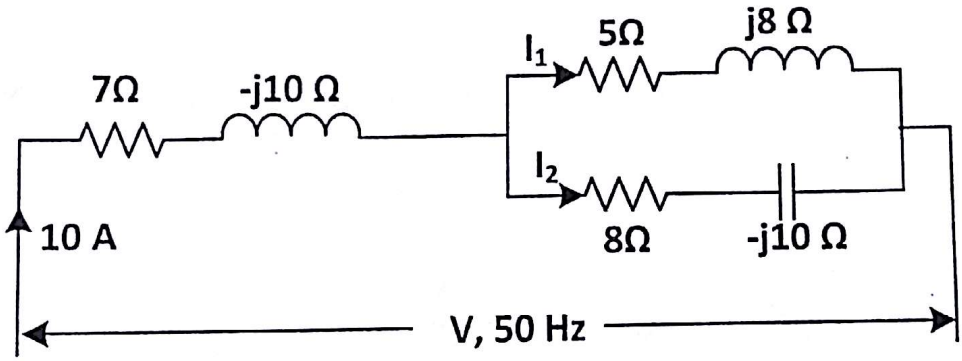

Fig. 3

Q 5(a) In a series RLC circuit explain graphically the variation of R, X_L, X_C and impedance with frequency and depict the point of Resonance. [4]

(b) Determine the average and effective value of the waveform shown in Fig. 4. [4]

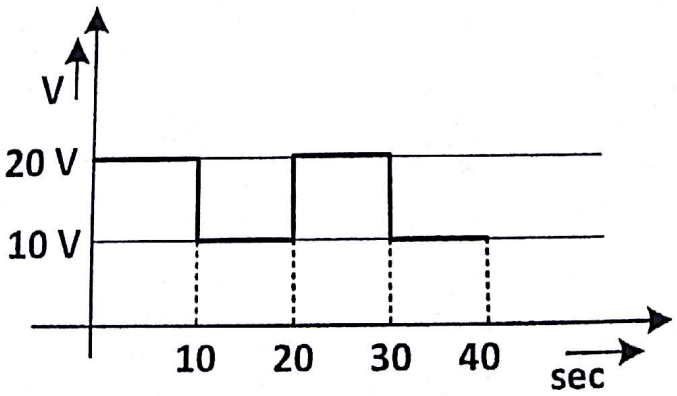

Fig. 4

Q,6 (a) Explain with diagram the measurement of power of a balanced three phase load with the help of one wattmeter. [4]

(b) The input power to a 3-phase motor was measured by using two single phase wattmeters.The readings were 5.2 KW on one wattmeter whereas the other showed a reading of 1.7 KW when the connections of current coil were reversed and the line voltage was 415 V. Determine the total active power, p.f. and line current of the circuit. [4]

Q.7 (a) Explain dot convention. Illustrate its application with the help of an example. [4]

(b) A 10 kVA, 2500 V/250 V, 50 Hz, single phase transformer gives the following test results :

O. C. T. : 250 V, 0.8 A, 50 W.

S. C. T. : 60 V, 3 A, 200 W.

Draw the efficiency curve for load changes from no-load to 1.5 full load in steps of 0.1 at unity p.f. [4]

Q 8 write short notes on any *two* of the following : [4× 2]

(i) Shunt and multipliers
(ii) Dynamometer type wattmeter
(iii) Digital Voltmeter
(iv) Autotransformer
(v) Tellegen's theorem

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II[nd] SEMESTER

B. Tech.

END SEMESTER EXAMINATION May 2017

MA – 102 Mathematics-II

Time: 3 Hours Max. Marks: 50

Note: Attempt all the questions by selecting any two parts from each question.

(1) (a) Define the eigen value and eigen vector and find out it for the matrix

$$\begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}.$$

Verify that the eigen vectors are orthogonal.

(b) Solve the differential equation

$$\frac{d^4y}{dx^4} + 2\frac{d^2y}{dx^2} + y = x^2 \cos x.$$

(c) Solve

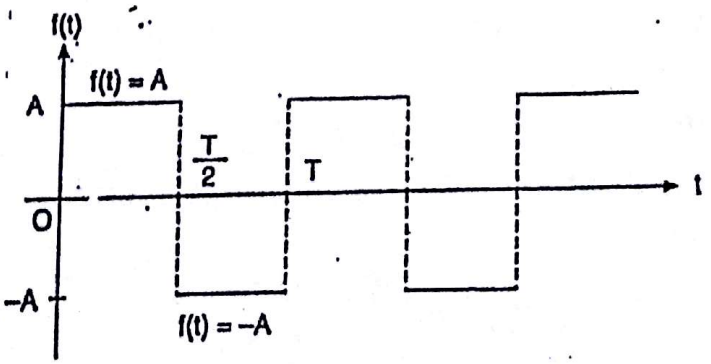
$$x^2\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} + y = \frac{1}{(1-x)^2}$$

(10)

(2) (a) Show that

$$\frac{A}{s}\tanh\frac{sT}{4}$$

is the Laplace transforms of rectangular periodic wave of period T given by



(b) Define the *unit step function* and by Laplace transforms, find the solution of the initial value problem

$$y'' + 9y = 9u(t-3),\ y(0) = y'(0) = 0,$$

where $u(t-3)$ is the unit step functions.

(c) Evaluate

(i) $L\left[t^2 \cos 3t\right]$

(ii) $L^{-1}\left[2(s+1)/\left(s^2+2s+2\right)^2\right]$ (10)

(3) (a) Write the *Bessel's differential equation* and find out its *general solution.*

(b) Solve in series the equation

$$x\frac{d^2y}{dx^2} + \frac{dy}{dx} - y = 0.$$

(c) State and prove the *Rodrigue's formula.* (10)

(4) (a) With the help of *convolution theorem*, find

$$L^{-1}\left[\frac{s}{(s^2+a^2)^2}\right].$$

(b) The following table gives the variations of a periodic current over a period

t (secs)	0	T/6	T/3	T/2	2T/3	5T/6	T
A (amp.)	1.98	1.30	1.05	1.30	-0.88	-0.25	1.98

Show, by numerical analysis, that there is a direct current part of 0.75 amp. in the variable current and obtain the amplitude of the first harmonic.

(c) Find the relation between $J_n(x)$ and $J_{-n}(x)$. (10)

(5) (a) Find the *Fourier cosine series* of the function

$$f(x) = \begin{cases} x^2, & 0 \leqslant x \leqslant 2 \\ 4, & 2 \leqslant x \leqslant 4. \end{cases}$$

(b) Find the Fourier series expansion of the periodic function of period 4

$$f(x) = \begin{cases} 2 + x, & -2 \leqslant x \leqslant 0 \\ 2 - x, & 0 < x \leqslant 2, \end{cases} \quad f(x+4) = f(x).$$

(c) Find the Fourier transform of the function

$$f(t) = e^{-a|t|}, \quad -\infty < t < \infty, \quad a > 0.$$

Also find out inverse transform of it. (10)

Total No. of Pages: 2 *Roll No.....*

SECOND SEMESTER **B.Tech. [All Groups]**

END SEMESTER EXAMINATION *May 2017*

AP-102: PHYSICS-II

Time: 3 Hours *Max. Marks: 40*

Note: Attempt **any** *FIVE* questions. **Q.No.1** is compulsory. Assume suitable missing data, if any.

1. [a] Differentiate between conventional and induced electric fields. (2)
   [b] Write down the integral form of Maxwell's equation. (2)
   [c] Draw the equivalent circuit of an ideal Zener diode in the breakdown region. (2)
   [d] What value of series resistor is required to limit the current through a LED to 20 mA with the forward voltage drop 1.6 V when connected to a 10V supply? (2)

2. [a] Evaluate the expectation value for the kinetic energy of a particle in one dimensional rigid box in the n^{th} quantum state. (4)
   [b] The normalized state of the free particle is given by a wave function

$$\Psi(x,0) = N \exp[-(x^2/2a^2)+iK_0x]$$

   (i) Find the factor of N,
   (ii) In what region of space the particle is most likely to be found. (4)

3. [a] Describe the Maxwell's distribution of the speed for the molecules of gas and deduce the formula for mean, root mean square and most probable speed. (4)
   [b] Discuss the salient feature of Maxwell's Boltzmann, Fermi Dirac and Bose Einstein's statistics. Give the comparative picture of three statistics. (4)

4. [a] Explain the Liquid Drop Model and compare it with Shell model. (4)

[b] Using the information on the atomic masses as given below, show that a nucleus of a uranium can disintegrate with emission of alpha particle according to the relation

$$_{92}U^{238} \rightarrow _{90}Th^{234}$$

Calculate:

(i) The total energy released in the disintegration.

(ii) The K.E. of alpha particle, the nucleus being at rest before disintegration.

Mass of U^{238} = 238.12492 a.m.u, Mass of Th^{234}= 234.11650 a.m.u., mass of He^4 = 4.00387 a.m.u (4)

5. [a] Explain the velocity of Electromagnetic wave (EM) in isotropic dielectric medium is less the velocity EM wave in free space. (4)

[b] Assuming that all the energy form a 1000 W lamp is radiated uniformly; calculate the average values of intensities of electric and magnetic fields of radiations at a distance of 2 meter from the lamp. (4)

6. [a] Derive an expression for collector current for common emitter configuration with circuit diagram and draw its input and output characteristics. (4)

[b] A n-p-n transistor at room temperature has its emitter disconnected. A voltage of 5V is applied between collector and base with collector positive, a current of 0.2 μA flows. When the base is disconnected and the same voltage is applied between collector and emitter, the current is found to be 20 μA. Find α, I_E and I_B, when I_C is 1 mA. (4)

7. [a] What is Poynting vector? How the Poynting theorem derived from the Maxwell's curl equation. Explain Poynting theorem. (4)

[b] At what temperature we can expect a 10% probability that electrons in a metal will have an energy which is 1% above E_f? The Fermi energy of the metal is 5.5 eV, T=? (4)