NEC

Subject Code: R16EE2101

II B.Tech I Semester Regular Examinations, Nov-2017.
ELECTRICAL CIRCUIT ANALYSIS - II
(EEE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Mention any two advantages of three phase system.
   (b) What will be the readings of the two wattmeter's used for measurements of power in a 3-phase circuit at UPF?
   (c) What is transient response?
   (d) Write the relationship between h and Z parameters.
   (e) What are the parameters of a filter?
   (f) Define line and phase angle spectra.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Derive the relations between line and phase quantities of a balanced three phase star connected system. (6M)

   (b) A symmetrical 400 V, 3-phase, supplies a star connected load with $Z_R = 5\ \Omega$, $Z_Y = j5\ \Omega$ and $Z_B = -j5\ \Omega$. Determine the line currents when the phase sequence is RBY. (6M)

3. (a) Explain the loop current method of analyzing unbalanced star connected load with a balanced three phase supply. (4M)
   (b) A 400V, 3 phase, unbalanced, star connected, 3-wire system has $Z_R=(5+j6)\Omega$,$Z_Y=(10+j2)\Omega$, $Z_B=(2+j3)\Omega$. Calculate the line voltages and line currents using Star-delta transformation technique. Assume RYB phase sequence. (8M)

4. (a) Derive the expression for transient current for a series RL circuit excited by step DC voltage (6M)

   (b) A series RLC circuit with R=3Ω, L=1H and C=0.5F is excited by a unit step voltage. Obtain the expression for current using Laplace Transform. Assume that the circuit was initially relaxed. (6M)

5. (a) Derive the relationship between h and Y-parameters. (6M)
   (b) Explain how admittance parameters can be calculated with an example. (6M)

6. (a) Derive the design equations for m-derived high pass filters.   (6M)
   (b) Design constant –K low pass filter having cut off frequency 2 KHz and design
   impedance R_0=600 Ω. Obtain the value of attenuation at 4 KHz.   (6M)

7. (a)Explain trignometric form of Fourier series and explain various constants.   (4M)
   (b)Find the Fourier series for the waveform shown in figure.   (8M)

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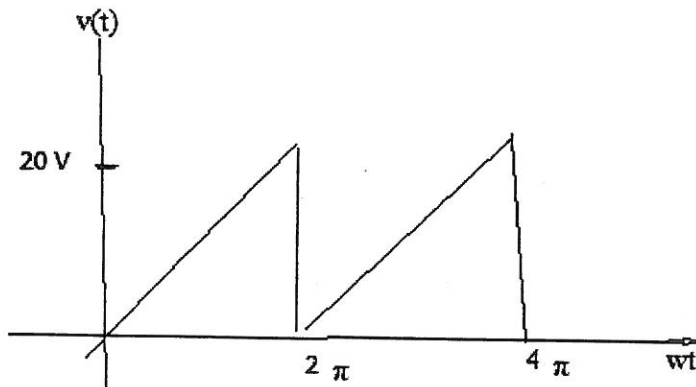
Subject Code: R16EE2102

II B.Tech I Semester Regular Examinations, Nov-2017.
ELECTRONIC DEVICES AND CIRCUITS
(EEE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What are conductors, insulators and semiconductors?
   (b) What are the applications of PN junction diode?
   (c) Define Transition capacitance and Diffusion capacitance.
   (d) Define avalanche and zener breakdown mechanisms and write any two differences.
   (e) What is the need for biasing?
   (f) What are the differences between BJT and JFET?

                                                                 [2+2+2+2+2+2]

PART-B

                                                                 4 X 12 = 48

2. (a) Explain Fermi level in an extrinsic semiconductor with energy diagram.   [8M]
   (b) With a neat sketch explain about Hall Effect.   [4M]

3. (a) Derive the diode current equation.   [8M]
   (b) A silicon diode has reverse saturation current of 2.5 µA at 300°K. Find forward voltage for a forward current of 10mA.   [4M]

4. (a) With a neat sketch explain the working of bridge rectifier.   [6M]
   (b) Explain the construction and working of Photo Diode.   [6M]

5. (a) Explain the input and output characteristics of transistor in common base configuration.   [6M]
   (b) Define α and β and derive the relation between them.   [6M]

6. (a) Draw the transistor biasing circuit using fixed bias arrangement and explain its principle with suitable analysis.   [6M]
   (b) In a silicon transistor with fixed bias, V_{CC} =9V, R_C=3 kΩ, R_B =8 kΩ, β=50, V_{BE}=0.7V. Find the operating point and stability factor.   [6M]

7. (a) Explain the construction and operation of depletion mode MOSFET.   [6M]
   (b) Explain working of two transistor model of an SCR and Draw the SCR characteristics.   [6M]

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Subject Code: R16EE2103

II B.Tech I Semester Regular Examinations, Nov-2017.
ELECTRO MAGNETIC FIELDS
(EEE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Define Potential difference.
   (b) Define an electric di-pole.
   (c) Derive the relation between magnetic field intensity and magnetic flux density.
   (d) Write down the vector magnetic potential.
   (e) Explain about Lorentz force equation.
   (f) Distinguish the terms static fields and time varying fields.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Derive an expression for electric field intensity due to an infinite line charge.
   (b) Two pint charges -4µC and 5µC are located at (2, -1, 3) and (0, 4, -2) respectively. Find the potential at (1, 0, 1) assuming zero potential at infinity.

3. (a) What is meant by boundary conditions and Derive the condition for Dielectric-Dielectric boundary conditions.
   (b) The point charges -1nC, 4nC and 3nC are located at (0, 0, 0), (0, 0, 1) and (1, 0, 0) respectively. Find the energy in the system.

4. (a) State and explain Bio-Savart's Law
   (b) A single turn circular coil of 50 m in diameter caries a current of 28×104 amperes. Determine the magnetic field intensity H at a point on the axis of coil and 100 m from the coil. The μ_r of free space is unity.

5. (a) Derive the expression for self-inductance of a solenoid and toroid.
   (b) Derive an expression for energy density in a magnetic field.

6. (a) What is a magnetic dipole? How does a magnetic dipole differ from an electric Dipole? Explain about magnetic dipole moment.
   (b) Obtain the expression for torque on a current loop placed in a magnetic field.

7. (a) Find the displacement current density within a parallel plate capacitor having a dielectric with ε_r =10, area of plates A = 0.01 m², distance of separation, d= 0.05 mm, applied voltage is V=200 Sin 200 t.
   (b) State and prove the pointing theorem

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Subject Code: R16EE2104

II B.Tech I Semester Regular Examinations, Nov-2017.
FLUID MECHANICS AND PRIME MOVERS
(EEE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. a) Calculate the specific weight of one litre of a liquid which weighs 7 N.
    b) Define stream line and streak line.
    c) Define continuity equation and Bernoulli's equation.
    d) What are the practical applications of Bernoulli's equation?
    e) What is the work done per second on a moving curved plate when jet strikes at the centre of the plate?
    f) Give examples for an axial flow turbine.

                                                        [2+2+2+2+2+2]

PART-B

                                                        4 X 12 = 48

2. a) Define the terms: density, specific volume, specific weight, specific gravity, compressible and incompressible fluids.   [6M]
    b) What are the pressure measurements briefly explain Piezometer.   [6M]
3. a) What is the difference between the steady flow and un steady flow. [4M]
    b) Derive Bernoulli's equation for the flow of an incompressible fluid from consideration of momentum.   [8M]
4. a) Explain the principle of venturimeter with a neat sketch.   [6M]
    b) A venturimeter has its axis vertically the inlet and the throat diameter being 150mm and 75mm respectively. The throat is 225 mm from inlet and venturimeter constant is 0.96, petrol of specific gravity 0.78 flows up through the meter at a rate of 0.029 m³/s. Find the pressure difference between inlet and throat?   [6M]
5. a) Give complete classification of a centrifugal pumps.   [6M]
    b) Derive an expression for the force exerted by a jet on a moving flat plate held perpendicular to the jet.   [6M]
6. A Pelton wheel is to be designed to the following specifications:

    Power 12000 kW, Head 380 m , speed 750 rpm , overall efficiency 85% Jet diameter not to exceed 1/10 times the wheel diameter. Determine i) The wheel diameter ii) the number of jets required iii) The diameter of the jet.   [12M]
7. a) What are the main elements of a hydro electric power plan. Explain briefly with a neat sketch.

                                                        [6M]
    b) Define the following:
       i) Load factor ii) Capacity factor iii) Diversity factor.   [6M]

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Subject Code: R16EE2105

II B.Tech I Semester Regular Examinations, Nov-2017.
COMPLEX VARIABLES AND STATISTICAL METHODS
(EEE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. a) Is $u = sinhx cosy$ harmonic?

   b) Define pole and essential singularity.

   c) Find residue at the pole of the function $f(x) = \dfrac{z}{z-1}$

   d) Define Uniform distribution and Exponential distribution.

   e) Explain point and interval estimations.

   f) Explain Level of significance.

[2+2+2+2+2+2]

PART–B

4 X 12 = 48

2. a) Find the analytic function f(z)= u+iv where $u = cosx \, coshy$

   b) Is the function $f(z) = 2xy + i(x^2 - y^2)$ analytic?.

3. a) Integrate $f(z) = x^2 + ixy$ from $A(1,1) to B(2,8)$ along the curve $x = t, y = t^3$

   b) Obtain the Laurent's series expansion of $f(z) = \dfrac{e^z}{z-2}$ about the point $z = 2$.

4. a) Using residue theorem evaluates the integral $\oint_c \dfrac{2z-1}{z(z+2)(2z+1)} dz$ where C is the circle $|z| = 1$

   b) Show by method of residues, $\displaystyle\int_0^\pi \dfrac{d\theta}{a+b\cos\theta} = \dfrac{\pi}{\sqrt{a^2 - b^2}}, (a > b > 0)$.

5. a) Ten coins are thrown simultaneously. Find the probability of getting at least seven heads

   b) Derive mean of the Poisson distribution.

6. a) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence.

   b) Given that the mean height of students in a class is 158 cms with S.D of 20cms.Find how many students heights lie between 150 cms and 170cms, if there are 100 students in the class.

7. a) A sample of 400 items is taken from population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.

   b) A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there 150 students having mean IQ of 75 with a S.D. of 15 in the second group there are 250 students having mean IQ of 70 with S.D. of 20.

Subject Code: R16EE2106

II B.Tech I Semester Regular Examinations, Nov-2017.
ELECTRICAL MACHINES - I
(EEE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. a) What are functions of compensating windings in DC machines?
   (b) What is need for parallel operation of DC generators?
   (c) What are the drawbacks of a three point starter?
   (d) Define all day efficiency.
   (e) State the conditions for parallel operation of the transformer.
   (f) What is the function of tap changers in the transformers?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

1. a) Explain the process of commutation in a DC machine and describe the methods to improve it. [6M]
   b) What are the different types of DC generators according to the ways in which fields are excited? Show the connection diagram of each type. [6M]

2. a) What is the critical field resistance of a DC Shunt Generator? What is its significance? [6M]
   b) Mention the reasons for compounding DC Generators. Explain the external characteristics of a d DC Compound generator. [6M]

3. a) What is meant by back EMF? Explain the principle of torque production in a DC motor. [6M]
   b) What is Hopkinson's test? Draw a diagram and explain the procedure of this test. [6M]

4. a) Develop the phasor diagram of a single phase transformer under load conditions. Assume lagging power factor load. [6M]
   b) A single phase 100kVA, 2000/200V, 50Hz transformer has an impedance drop of 10% and resistance drop of 5%. Calculate the regulation at full load 0.8 power factor lagging (ii) the value of the power factor at which regulation is zero? [6M]

5. a) Why short circuit test is performed on the HV side of a transformer? Why is the core loss almost negligible in this test? [6M]
   b) Two single phase transformers having the same voltage ratio on no load operate in parallel to supply a load of 100kVA at 0.8 power factor lagging. One transformer is rated at 400kVA and has a per unit equivalent impedance of 0.01+j0.06; the other is rated at 600kVA and has a per unit equivalent impedance of 0.01+j0.05. Determine the load on each transformer in kVA and the operating power factor. [6M]

6. a)) How can the problems of unbalanced voltages and third harmonic currents be overcome in Y-Y connection. [6M]
   b) Explain with the help of connection and phasor diagram, how the Scott connections are used to obtain two-phase supply from 3-phase supply mains. [6M]

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