(DEE 211)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper - I : Mathematics - III

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) a) Define even function and give an example.

b) Define periodic function.

c) Write the form of Fourier series for the function $f(x)$ in the interval $\alpha < x < \alpha + 2\pi$.

d) Find a_0 in the Fourier series of $f(x) = x - x^2$ from $x = -\pi$ to $x = \pi$.

e) Define the integral transform.

f) Define Fourier transform.

g) Write any two properties of Fourier transform.

h) Define interpolation.

i) Define the shift operator E.

j) Show that $E = 1 + \Delta$.

k) State Lagrange's interpolation formula.

l) Write the Bessel's formula.

m) State Trapezoidal rule.

n) State Simpson's $\frac{1}{3}$ rule.

o) Define numerical integration.

UNIT - I

2) a) Find the Fourier series expansion for $f(x)$, if

$f(x) = -\pi, -\pi < x < 0$

$x, 0 < x < \pi$

Deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{\pi^2}{8}$.

b) If $f(x) = |\cos x|$, expand $f(x)$ as a Fourier series in the interval $(-\pi, \pi)$.

OR

c) Expand $f(x) = e^{-x}$ as a Fourier series in the interval $(-l, l)$.

d) Obtain a half range cosine series for

$$f(x) = \begin{cases} kx, & 0 \le x \le \frac{l}{2} \\ k(l-x), & \frac{l}{2} \le x \le l \end{cases}$$

UNIT - II

3) a) Express the function

$$f(x) = \begin{cases} 1, & |x| \le 1 \\ 0, & |x| > 1 \end{cases}$$

as a Fourier integral.

Hence evaluate $\int_0^\infty \frac{\sin\lambda \cos\lambda x}{\lambda} d\lambda$

b) Find by Newton – Raphson method, a root of the equation $3x^3 - 9x^2 + 8 = 0$ correct to 3 decimal places.

OR

c) Find the Fourier cosine and sine transforms of $f(x) = e^{-ax}, a > 0$.

d) Solve the following equations by Gauss-Seidal method:

$10x + y + z = 12; 2x + 10y + z = 13; 2x + 2y + 10z = 14.$

UNIT - III

4) a) Estimate the value of $f(22)$ from the following data:

x :	20	25	30	35	40	45
$f(x)$:	354	332	291	260	231	204

b) Use Stirling's formula to evaluate $f(1.22)$, given

x :	1.0	1.1	1.2	1.3	1.4
$f(x)$:	0.841	0.891	0.932	0.963	0.985

OR

c) Given $y_0 = -12, y_1 = 0, y_3 = 6$ and $y_4 = 12$, find y_2 by using Lagrange's interpolation formula.

d) Given that

x :	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y:	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ at $x = 1.1$.

UNIT - IV

5) a) Use Simpson's $\frac{1}{3}$ rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking seven ordinates.

b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal rule taking $h = \frac{1}{4}$.

OR

c) Using Taylor's series method, obtain the value of y at $x = 0.2$ for the differential equation $\frac{dy}{dx} = 2y + 3e^x, y(0) = 0$.

d) Using Euler's method, find the value of y when $x = 0.6$ of $\frac{dy}{dx} = 1 - 2xy$, given that $y = 0$ when $x = 0$ (take $h = 0.1$)

(DEE 212)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper - II : Network Analysis - I

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) a) What are the characteristics of series sesmance?

b) Based on which law nodal analysis is carried out?

c) Under what conditions maximum power is transferred?

d) What is the phase difference between voltage and current in a pure resistor?

e) What is meant by transient?

f) Draw thevenin equivalent circuit.

g) Under which conditions transient current in an RLC circuit is oscillatory?

h) State the theorem which is applicable to any network?

i) Which type of networks superposition theorem is not applicable?

j) What is the impedance of an ideal parallel resonant circuit?

k) What is the property of an Inductor?

l) Define Initial value theorem.

m) What is the use of Laplace transform analysis?

n) Define power factor.

o) Classify network elements.

UNIT - I

2) a) Explain ideal, practical and dependent sources and their characteristics.

b) Determine current I in the circuit using Mesh analysis shown in fig 1.

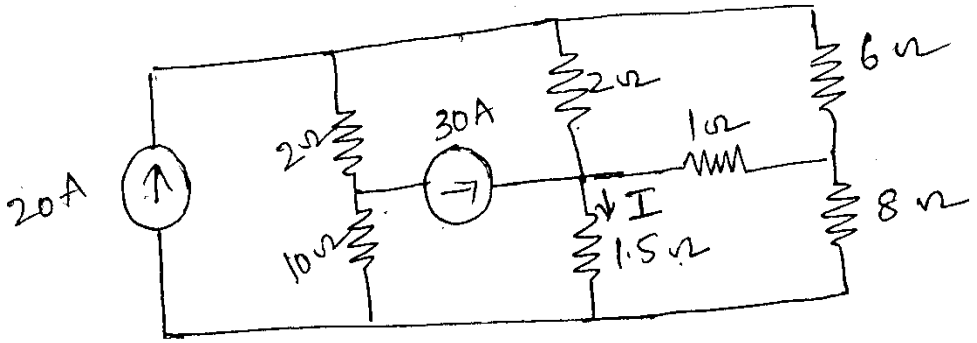

fig-1

OR

3) a) Discuss with examples source transformation technique.

b) Find the voltage 'V' in the circuit shown in fig 2. Which makes the current in the 10Ω resistor zero by using nodal analysis.

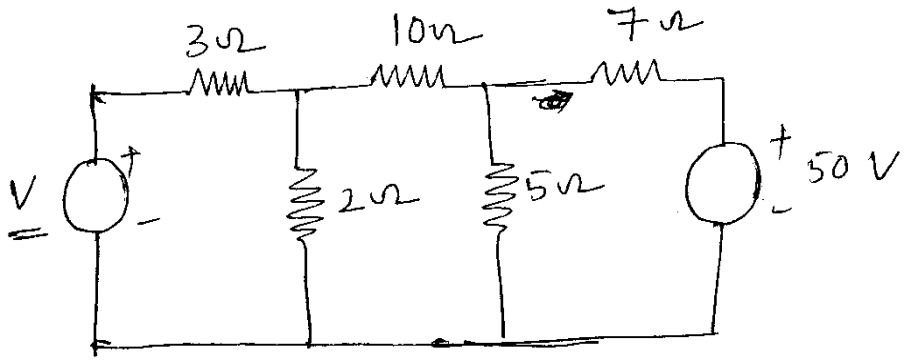

fig 2

UNIT - II

4) a) State and explain compensation theorem.

b) Determine the maximum power delivered to the load in the circuit shown in fig 3.

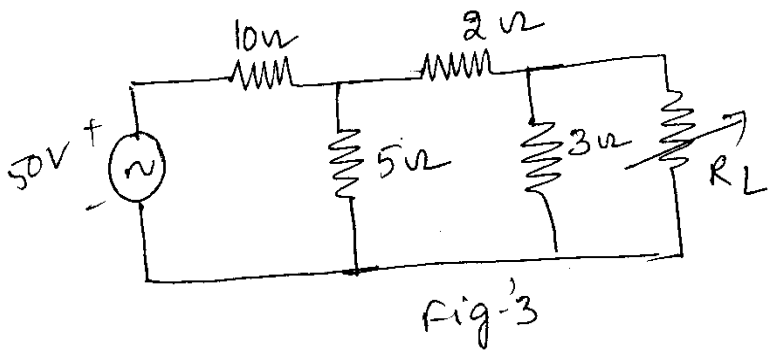

Fig-3

OR

5) a) Explain phase and phase difference in sinusoidal waveforms related to pure resistor and pure Inductor.

b) Find the form factor of the half wave rectified sinewave shown in fig 4.

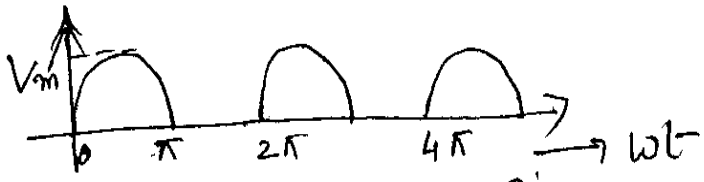

Fig 4

UNIT - III

6) a) Explain the concept of instantaneous power and average power.

b) In the parallel circuit shown in fig 5, the applied voltage is v = 100 sin 5000 tV. Find the currents in each branch and also the total current in the circuit.

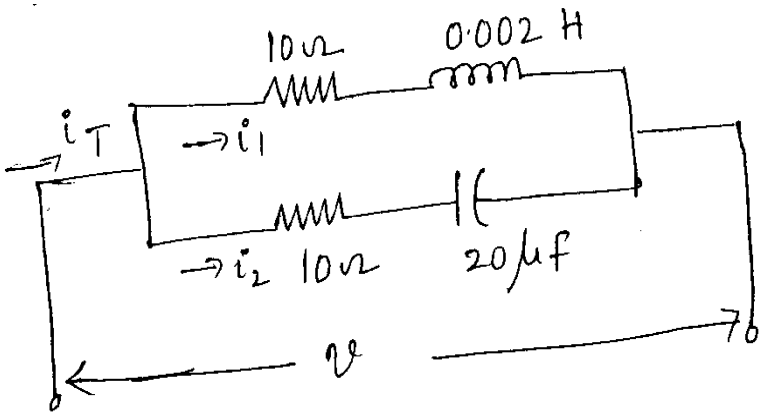

Fig 5

OR

7) a) State and prove maximum power transfer theorem related to ac circuits.

b) Determine the quality factor of a coil for the series RLC circuit consisting of R = 10Ω, L = 0.1 H and C = 10μF.

UNIT - IV

8) a) Derive the expression for current for an R-L transient circuit with sinusoidal response.

b) Determine the current 'i' if the circuit is driven by a voltage source as shown in fig 6. The initial value of the voltage across the capacitor and the initial current through the inductor are both zero. Use Laplace transforms.

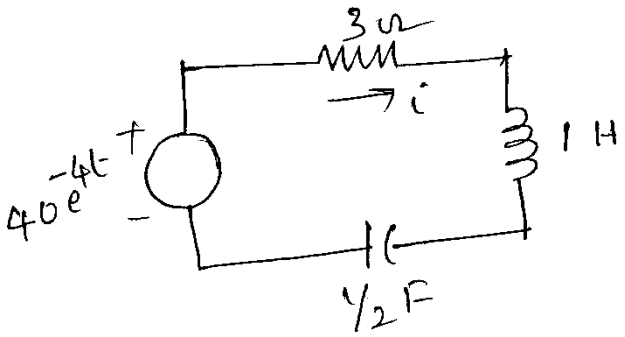

Fig 6

OR

9) a) Derive the expression for current of an R-L-C DC circuit.

b) A series RC circuit consists of resistor of 10Ω and capacitor of 0.1F as shown in Fig.7. A constant voltage of 20V is applied to the circuit at t = 0. Determine the voltage across capacitor and resistor.

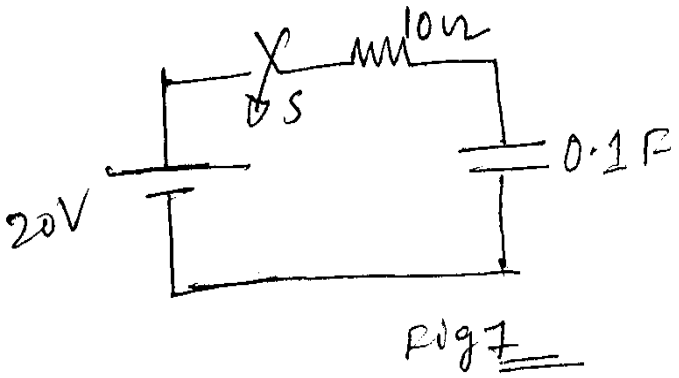

Fig 7

(DEE 213)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper - III : Electronic Devices

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) a) What are majority and minority carrier in semi conductor?

b) Define carrier life time.

c) What is meant by photo conductivity?

d) What is Zener break down?

e) What is a 'Heat Sink'?

f) How can a FET be used as a voltage controlled resistor?

g) Give three differences between BJT and FET.

h) Sketch the VI characteristics of a DIAC.

UNIT - I

2) a) Derive an expression for electron in magnetic field.

b) Classify the materials based on energy band diagram.

OR

3) a) Obtain an expression for Fermilevel in an intrinsic semiconductor.

b) Explain the principle of CRT.

UNIT - II

4) a) Derive expressions for Transition and Diffusion capacitances of PN junction diode.

b) Draw the V-I characteristics of a Zenerdiode and explain its operation.

OR

5) a) Explain the principle of operation of LED and give its applications.

b) Write short notes on Varactor diode and photo diode.

UNIT - III

6) a) Explain how a transistor functions as an amplifier.

b) Draw the V-I characteristics of a Phototransistor and explain its operation.

OR

7) a) Draw the input and output characteristics of a transistor in CE configuration and explain its working.

b) Write short notes on Thermal runway.

UNIT - IV

8) a) Draw the Drain and Transfer characteristics of a FET and explain its operation.

b) Write short notes on P-N-P-N devices.

OR

9) a) Explain the principle of operation of Depletion MOSFET.

b) Draw the electrical equivalent circuit and explain the operation of UJT.

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(DEE 214)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper - IV : Electrical & Electronics Engineering Materials

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) a) Give few examples of insulation.

b) Explain the nano wires.

c) Define fermi level.

d) Explain the fabrication of IC chip.

e) Define Isotope effect.

f) Explain domain theory.

g) Define B-H curve.

h) Explain the polarization mechanisms.

i) Define super conductivity.

j) What is total polarization.

k) What is meant by dielectric loss.

l) Define weid Mann-Franz law.

m) Define Meissner effect.

n) Write Londois equation.

o) What is the meaning of effective mass.

UNIT - I

2) a) Explain electrical characteristics of carbon tubes.

b) Discuss the applications of nano structured materials.

OR

3) a) Explain briefly the synthesis of nano wires.

b) Explain the properties of carbon nano tubes.

UNIT - II

4) a) What is electrical conductivity? Explain Weidmann-Franz law.

b) Explain the direct and indirect band gap semiconductors.

OR

5) a) Discuss the fabrication of IC chip. Also explain I-C technology.

b) What are Brillouch zones. How are they related to the energy of an electron in a metal.

UNIT - III

6) a) Explain briefly about type I and Type II super conductors.

b) Explain Meissner effect.

OR

7) a) What are Ferrites. Give applications.

b) Explain the high temperature super conductors and their applications.

UNIT - IV

8) a) Explain terms dielectric loss and dielectric breakdown briefly.

b) Derive the Clausius-Mossotti relation.

OR

9) a) What is piezoelectricity. Explain briefly and also given applications.

b) What are the applications of dielectric materials? How they can be classified.

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(DEE 215)

B.Tech. DEGREE EXAMINATION, DECEMBER - 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper - V : Digital Electronics

Time : 03 Hours **Maximum Marks : 75**

Answer Question No.1 is compulsory ***(15)***

Answer One question from each unit ***(4×15=60)***

1) a) $(B212)_{16} = (\ )_{10.}$

b) 111.011 x 1110.001.

c) $(721)_8 = (\ )_{16.}$

d) Convert $(C21A)_{16}$ to Binary.

e) Draw the truth table of EX-OR gate.

f) What is a minterm.

g) Draw 'D' flip-flop.

h) Draw the circuit of CMOS NAND gate.

i) What is a flip-flop.

j) Draw a three Variable k-map.

k) What is an encoder.

l) Draw the truth table of a half-Subtractor.

m) 1101÷110.

n) List error detecting codes.

o) What is a parity bit.

UNIT -I

2) a) Explain with an example BCD code.

b) How do you convert a binary number into Gray code.

OR

3) a) Using K-map minimise. F(A,B,C,D) = Σ (8,9,2,1,11,12).

b) Discuss the properties of minimal functions.

UNIT –II

4) a) Explain the features of Parity Generator and Checker.

b) What is a BCD adder. Explain.

OR

5) a) Design a full adder and explain with a truth table.

b) How do you perform error detection and correction using Hamming code.

UNIT -III

6) a) Draw a neat figure and explain a JK flip-flop.

b) Design a 3 bit up counter using 'T' flip-flop.

OR

7) a) Explain a 4 bit shift register.

b) How do you convert SR to JK and SR to D flip flop.

UNIT –IV

8) a) Explain ECL logic.

b) Write Short notes in PAL.

OR

9) a) Compare CMOS and 11L families.

b) Give the significance of PLA.

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(DEE 216)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper – VI : Electro Mechanics-I

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15×1 = 15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) Write the general expression for the instantaneous value of the torque of dynamo-electric machines.

b) What is a transducer?

c) What is co-energy?

d) What is the function of a commutator in a D.C machine?

e) State Faraday's laws of electromagnet induction.

f) List out the functions of Yoke.

g) Define pole pitch.

h) Draw the circuit for a short shunt compound generator.

i) Give any two applications of D.C shunt motors.

j) What is armature reaction?

k) What is the main function of interpoles?

l) What will happen if the field of a D.C shunt motor is opened?

m) List out any two advantages of Swinburne's test?

n) What is Metadyne?

o) What is a starter?

UNIT - I

2) a) Explain the principle of energy conversion of electro mechanical system.

b) Explain the energy conversion via electric field with a suitable example.

OR

3) a) Derive the expression for electromagnetic torque developed in a electromagnetic field.

b) Explain the concept of co-energy with i-λ curve

UNIT - II

4) a) Derive an expression for induced emf in a d.c generator.

b) A 500 V, wave wound, 750 rpm d.c shunt generator supplies a load of 195A. The armature has 720 conductors and shunt field resistances is 100 ohms. Find the demagnetising ampere turns/pole if the brushes are advanced through 3 commutator segments at this load.

OR

5) a) With neat diagrams explain the phenomena of armature reaction in a d.c machine. Discuss its effects?

b) Explain the different types of D.C generators with the help of neat diagrams & with necessary equations.

UNIT - III

6) a) Explain the procedure for operating D.C series generators in parallel.

b) Explain the different types of D.C motors and also give their applications.

OR

7) a) Discuss the various speed control methods of D.C series motors.

b) Explain the principle of operation & working of a 3 point starter with the help of a neat diagram.

UNIT - IV

8) a) Explain the testing method available for testing a D.C series motor.

b) The total iron loss in a D.C machine is 8 kW at the rated speed and excitation. With the same excitation & speed reduced by 30%. The total iron losses were found to be 5 kW. Calculate hysteresis & eddy current losses at

i) Full speed
ii) Half of full speed

OR

9) a) Discuss the working of Metadyne with the help of neat diagram in detail.

b) Discus the various losses in a D.C machine .

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B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper - VII : Environmental Studies

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) Write briefly on:

a) Vermi Composting.

b) Ozone layer Depletion.

c) Ecosystem.

d) Water logging.

e) Renewable sources.

UNIT - I

2) Write a detailed note on the role of any four organizations in the field of environment and their contribution to better management.

OR

3) Discuss about environmental crisis and sustainable development.

UNIT - II

4) Discuss causes, effects and control measures of Air pollution.

OR

5) Write short note on:

a) Climate changes b) Global warming c) Acid rain

UNIT - III

6) Discuss about the:

a) Resettlement and rehabilitation of people.

b) Urban problems related to energy.

OR

7) Write note on:

a) Water shed management.

b) Rain water harvesting.

UNIT - IV

8) Write the documentation on environmental assets in your visit.

OR

9) Briefly discuss the prohibitions under the Wild Life Protection Act, 1972 and the penalties for violation of the provisions.

(DEE 221)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper – I : Mathematics-IV

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15×1 = 15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) Define analytic function.

b) Define regular point.

c) Write the Cauchy-Riemann equations in polar form.

d) Define conjugate of a function.

e) When do you say that a function is harmonic.

f) State Cauchy's integral theorem.

g) Define Laurent's series.

h) Define essential singularity.

i) State Poissons integral formula.

j) Determine the poles of f(z)= $\frac{z-3}{z^2+2z+5}$.

k) State Residue theorem.

l) Write the orthogonal property of Bessel function.

m) Write the Bessel's equation

n) State Rodrigue's formula of Legendre polynomials

o) Write the expression for $P_2(x)$.

UNIT - I

2) a) If f(z) is an analytic function with constant modulus, show that f(z) is constant.

b) Find the analytic function whose real part is $u = \frac{y}{(x^2+y^2)}$.

OR

3) a) Show that $f(z) = xy + iy$ is everywhere continuous but is not analytic.

b) Find the orthogonal trajectories of the family of curves.

UNIT - II

4) a) State and prove Cauchy integral formula.

b) Find the Taylor's expansion of f(z) = $\frac{2z^3+1}{z^2+z}$ about the point $z = i$.

OR

5) a) Find the Laurent's series expansion of $f(z) = \frac{z^2-1}{z^2+5z+6}$ about z = 0 in the region $2 < |z| < 3$.

b) Find the nature and location of the singularities of the function $f(z) = \frac{z^2-1}{(z-1)^3}$.

UNIT - III

6) a) Find the residue of $f(z) = \frac{z^3}{(z-1)^4(z-2)(z-3)}$ at its poles and hence evaluate $\oint_c f(z)dz$ where c is the circle |z|=2.5.

b) Solve the equation $x\frac{d^2y}{dx^2} + \frac{dy}{dx} - y = 0$ in power series.

OR

7) a) Show that $\int_0^{\pi} \frac{d\theta}{17-8\cos\theta} = \frac{\pi}{15}$.

b) Solve the equation $xy'' + 2y' + xy = 0$ by Frobenius method.

UNIT - IV

8) a) Prove that $\frac{d}{dx}[x\,J_n(x)\,J_{n+1}(x)] = x[\,J_n^2(x) - J_{n+1}^2(x)]$.

b) Prove that $\int_{-1}^{1} p_m(x)p_n(x)dx = \frac{2}{2n+1}$, for m= n.

OR

9) a) Express $J_6(x)$ in terms of $J_0(x)$ and $J_1(x)$.

b) If $f(x) = 0, -1 < x \leq 0$

$= x,\ 0 < x < 1,$

Show that $f(x) = \frac{1}{4}P_0(x) + \frac{1}{2}P_1(x) + \frac{5}{16}P_2(x) - \frac{3}{32}P_4(x) + \ldots\ldots$

(DEE 222)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper - II : Electronic Circuits -I

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) What is a rectifier.

b) Define PIV and efficiency of a rectifier.

c) What is a clamper.

d) Draw a π section filter.

e) Draw a two ended clipping circuit.

f) Define h- parameter.

g) What is bandwidth.

h) Give advantages of FET amplifier.

UNIT - I

2) a) Draw a full wave rectifier with filter and derive expression for ripple factor.

b) Obtain the steady state response of a diode clamping circuit.

OR

3) a) Draw the response of a RC high pass filter and explain its function.

b) Compare half wave, full wave and bridge rectifiers.

UNIT - II

4) a) Draw a two stage transistor CE amplifier circuit at low frequency and derive A_i, A_v R_i and R_o.

b) What are the salient features of hybrid parameter.

OR

5) a) Derive the equations for voltage gain, current gain, input and output impedance for a BJT using the approximate h-parameter model for CE configuration.

b) Draw a two stage transistor amplifier and derive current and voltage gains of the same.

UNIT - III

6) a) Draw the circuit and obtain current gain for a BJT – CE short circuit with resistive load.

b) Draw the amplifier response curve for a single state CE transistor at high frequencies.

OR

7) a) Draw a hybrid PI model and get expressions for A_v and A_i in terms of h-parameters.

b) Explain the operation of emitter follower at high frequencies.

UNIT - IV

8) a) Write short notes on effect of bypass capacitors.

b) Draw a circuit of FET amplifiers in CG configuration at low frequencies and obtain expressions for A_v and A_i.

OR

9) a) Draw a circuit of high frequency response of two cascaded stages of CE-CB amplifiers. Get the expression for A_v and A_i.

b) Explain the circuit for FET amplifiers at low frequencies in CD configurations and explain its operation.

EEE

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B. Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper – III : Electromagnetic Field Theory

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) Does the potential V=2x+5 satisfy Laplace equation?

b) What does it mean by 'electrostatic field is conservative'?

c) Express emf produced by stationary loop in a static B field?

d) Express torque on a current loop with magnetic moment in a magnetic field?

e) When a dielectric material is said to be linear and homogeneous?

f) Define magnetic dipole moment?

g) Derive Poisson's equation from Gauss law?

h) Find loss tangent in a nonmagnetic medium with intrinsic impedance 240 $L30^{o}$?

i) Explain the concept of Skin Depth and express skin resistance?

UNIT - I

2) a) Apply Gauss law to compute E for uniformly charged sphere?

b) Explain electric potential? Derive relation between E and V?

OR

3) a) Derive an expression for energy density in steady electric field?

b) Determine D at (0, 4, 3) if a point charge 30 nC is located at (4, 1, -3) and plane y=3 carries 10nC/m^2? Draw the relevant coordinate system?

UNIT - II

4) a) Derive an expression for an inductance of solenoid with neat schematic?

b) A thin ring of radius 5 cm is placed on plane z=1 cm so that its center is at (0, 0, 1). If the ring carries 50mA along a_{ϕ}, find H at

i) (0, 0, -1)

ii) (0, 0, 10)

OR

5) a) Derive H for infinite line current distribution from Biot-Savart's law with neat schematic?

b) A very long solenoid with 2x2 cm cross section has an iron core (μ_r = 1000) and 4000 turns per meter. If it carries a current of 500mA, find

i) its self-inductance per meter

ii) the energy per meter stored in its field?

UNIT - III

6) a) Explain concept of displacement current? Derive an expression of curl of H for time varying field?

b) Determine

i) J_d and

ii) H, for given E=20 cos (ωt -50z) a_y V/m in free space?

OR

7) a) Derive law refraction of the magnetic field at a boundary form Maxwell's equations?

b) Given that $H_1 = a_x + a_y + a_z$ in the region y – x – 2 $\leq$ 0 where $\mu_1 = 5\ \mu_0$, calculate

i) M_1 & B_1

ii) H_2 & B_2

UNIT - IV

8) a) Derive the expressions of α, β, η, E & H of plane waves in a free space?

b) In a certain medium with $\mu = \mu_0$, $\varepsilon = 4\varepsilon_0$, $H = 12\, e^{-0.1y} \sin(\pi + 10^8\, t - \beta y) a_z$ A/m. Find

i) T

ii) λ

iii) E

iv) Phase difference between E and H?

OR

9) a) Derive the relation between reflection coefficient and transmission coefficient due to reflection of plane waves at normal incidence?

b) In free space $H = 0.2 \cos(t - x)\, a_z$ A/m. Find total power through

i) a square plate of side 10 cm on plane $x + z = 1$.

ii) a circular disc of radius 5 cm on plane $x = 1$?

EEE

(DEE 224)

B. Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper – IV : Network Analysis-II

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) In terms of ABCD parameters, under which condition, a two-port network is symmetrical?

b) What are the major defects of constant k-type filters?

c) What are the most generally used filters?

d) What is meant by coupled circuits?

e) What is a low pass filter?

f) Why Y-parameters are called as short circuit admittance parameters?

g) What are the properties of a tree in a graph?

h) Define cut set.

i) How capacitor is represented in the S-domain?

j) Define impulse source.

k) In star connection which parameters are identical?

l) In 3-phase systems, what is the angle with which line voltages are displaced.

m) What is the use of initial and final value theorems?

n) Relate g-parameters of a two port network with voltages and currents.

o) Define mutual Inductance.

UNIT - I

2) a) Explain nodal analysis with an example.

b) Using mesh analysis find V_x in the circuit shown in figure 1.

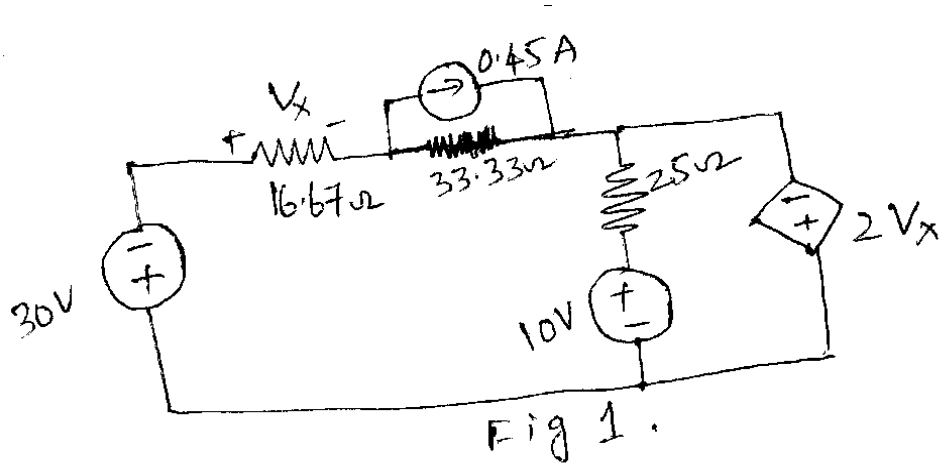

Fig 1.

OR

3) a) Derive image parameters of a two port network.

b) The z-parameters of a two port network are $z_{11} = 10\Omega$, $z_{22} = 15\Omega$, $z_{12} = z_{21} = 5\Omega$, find equivalent T and ABCD parameters.

UNIT - II

4) a) Derive the voltage expression for RC transient circuit using Laplace transform method.

b) Determine the voltage v for the circuit shown in fig 2. Use Laplace transforms.

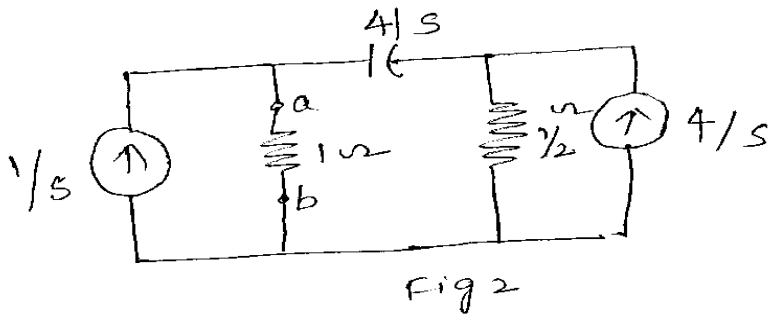

Fig 2

OR

5) a) Explain poles and zeros of network function.

b) For the two-port network shown in fig 3, determine the driving point impedance $z_{11}(s)$ and the transfer impedance $z_{21}(s)$.

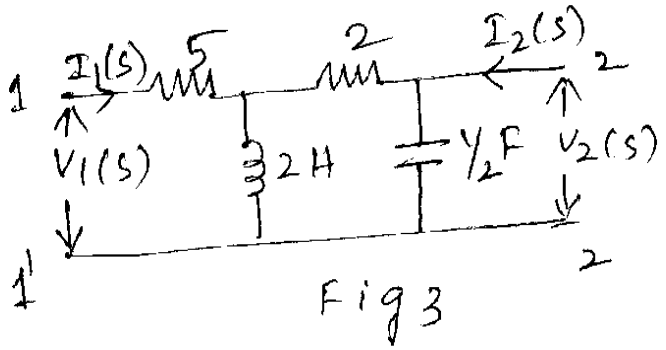

Fig 3

UNIT - III

6) a) Derive the expression for co-efficient of coupling between the two coupled costs.

b) Explain the function of single tuned circuit and derive the expression for maximum output voltage.

OR

7) a) Design constant K low pass filter.

b) Design m-derived high pass T-section filters to have terminated 600Ω resistance cut-off frequency at 4kHz and infinite attenuation occurs at infinity.

UNIT - IV

8) a) Explain the analysis of 3 – phase unbalanced systems.

b) A 3ϕ, 400V, star connected motor has an output of 50kW, with an efficiency of 90 percent and a power factor of 0.85. Calculate the line current. Sketch a phasor diagram showing the voltages and currents.

OR

9) a) Derive for delta connected system, an expression for total power input for a balanced three phase load interms of line voltage, line current and power factor.

b) A 3ϕ delta connected load, each phase of which has an inductive reactance of 40Ω and a resistance of 25Ω is fed from the secondary of a 3ϕ transformer which has a phase voltage of 230V. Draw the circuit diagram of the system and calculate the current in each phase of the load and potential difference across each phase of the load.

EEE

(DEE 225)

B. Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper – V : Prime Movers and Pumps

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) Write briefly on the following:

a) Define specific volume.

b) What are the devices used for measuring the pressure.

c) Give two differences between impulse turbine and reaction turbine.

d) What is the purpose of cosing.

e) Draw the PV diagram for Carnot cycle.

f) What is delivery head.

g) Classify reaction turbine.

h) What is conservation of mass.

i) What is I law of thermodynamics.

j) What is steady flow energy equations.

k) What is Brayton cycle.

l) What are different types of steam turbines.

m) What is blade efficiency.

n) Give two differences between 2-stroke and 4-stroke engine.

o) What is intercooling.

UNIT - I

2) a) Calculate the density, specific weight and weight of one litre of petrol of specific gravity = 0.7.

b) Derive the equation for force exerted by a jet on stationary inclined flat plate.

OR

3) a) Explain with neat sketch the working of 2 stage centrifugal pump.

b) Derive an expression for discharge of centrifugal pump.

UNIT - II

4) a) What are advantages of draft tube? Describe with neat sketches different types of draft tubes.

b) What are the differences between pelton wheel and kaplan turbine? Explain.

OR

5) a) What are different types of reaction turbines? Explain any one with neat diagram.

b) A pelton wheel has to be designed for following data power to be developed = 6000 kw, net head available = 300m speed = 550 rpm. Ratio of jet diameter to wheel diameter = $\frac{1}{8}$ and overall efficiency = 80%.

Find number of jets, diameter of jets and diameter of the wheel.

UNIT - III

6) Air at a pressure of 50 bar and volume $0.2m^3$ is expanded at constant pressure until the volume is doubled. It is then expanded according to $PV^{1.3}$ = const, until the volume is $0.8m^3$. Calculate the workdone in each process.

OR

7) Derive the equation for finding efficiency of diesel cycle and Brayton cycle.

UNIT - IV

8) a) Explain the working of a four stroke cycle diesel engine by drawing a neat sketch.

b) Give advantages of gas turbine over steam turbine.

OR

9) Explain with neat sketch pressure and velocity compounding of steam turbine.

EEE

(DEE 226)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

ELECTRICALS AND ELECTRONICS

Paper – VI : Electro Mechanics -II

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) State Faraday's laws of electromagnetic induction.

b) What is the difference between core and shell type of transformers.

c) What is the function of a breather?

d) Define hysteresis angle of advance.

e) Draw the vector diagram for a transformer on inductive load.

f) Write the expression for total equivalent resistance of a transformer when referred to secondary.

g) By conducting short circuit test on a transformer, what parameters can be found?

h) Why transformer rating is in KVA.

i) Write the expression for % regulation down.

j) What is the condition for maximum efficiency?

k) Mention the factors on which hysteresis losses depends.

l) What is cogging?

m) Why single phase induction motor is not self starting?

n) Write any two applications of induction generators.

o) What parameters can be found out by conducting blocked rotor test on an induction motor?

UNIT – I

2) a) Obtain the equivalent circuit of a single phase transformer

b) A 30 KVA ,2400 /120V, 50 Hz transformer has a high voltage winding resistance of 0.1Ω and a Leakage reactance of 0.22Ω .The low voltage winding resistance is 0.035Ω and The leakage reactance is 0.012Ω.Find the equivalent winding resistances reactance and impedance referred to

i) high voltage side

ii) Low voltage side.

OR

3) a) Explain how Sumpner's test can be conducted on transformers with necessary equation.

b) Derive the condition for maximum efficiency in a transformer.

UNIT - II

4) a***)*** Discuss the operation of autotransformer. Also derive the exprsession for saving of copper & list out the uses of autotransformers.

b) An autotransformer supplies a load of 3kW at 115 volts at a unity power factor. If the applied primary voltage is 230 volts, Calculate the power transferred to the load
i) inductively and ii) conductively

OR

5) Discuss the open delta and scotl connection of three phase transformers.

UNIT - III

6) a) Explain how blocked rotor test is conducted on 3-phase induction motor by deriving necessary equations.

b) An 18.65 kW, 4-pole, 50 Hz ,3 – phase induction motor has friction and windage losses of 2.5 percent of the output. The full load slip is 4%. Compute for full Load

i) rotor copper loss and rotor input

ii) shaft and gross electromagnetic torques.

OR

7) a) Draw and explain the torque slip characteristics

b) Derive the expressions for stator output, rotor output in terms of corresponding ,torques.

UNIT - IV

8) Discuss the speed control methods of induction motors.

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OR

9) a) Discuss the Capacitor start and run motor in detail.

b) Draw and explain the equivalent circuit of single phase induction motor.