Course Code: B20BS2101

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A) **R 20**

II B. Tech I Semester Regular Examinations

NUMERICAL METHODS & VECTOR CALCULUS

(Common to CE, CSE, EEE & IT)

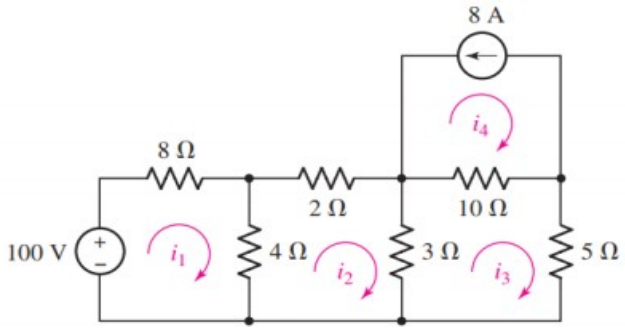
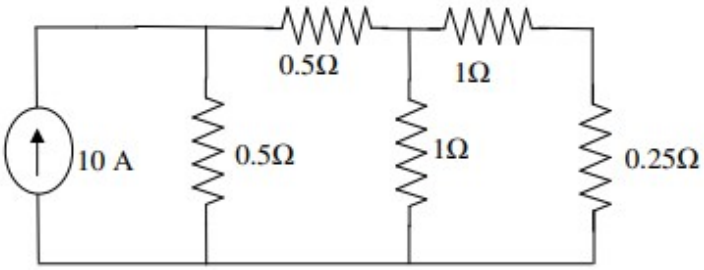
Time: 3 Hrs. **Max. Marks:70**

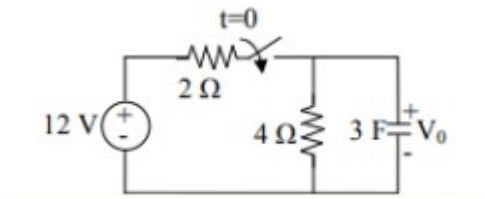
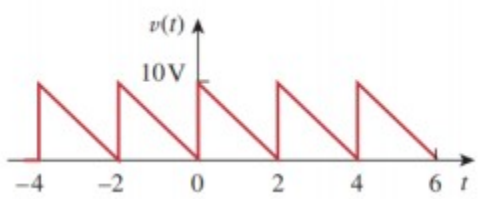
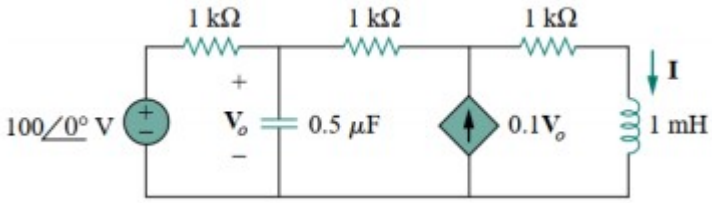
Answer any one Question from Each Unit

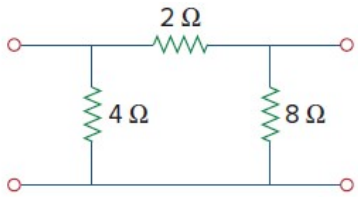
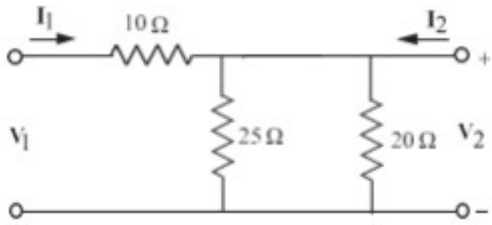
All questions carry equal Marks

	UNIT-I	**CO**	**KL**	**M**
1.a)	Determine a real root of the equation $x\log_{10}x = 1.2$ by Regula-falsi method and correct to two decimal places	1	K2	7
b)	Determine the cube root of 41 using Newton-Raphson method	1	K2	7
	(OR)			
2. a)	DetermineNewton's forward difference interpolation formula find Y (3), from the following table X: 0, 5, 10, 15, 20, 25 Y: 7, 11, 14, 18, 24, 32	1	K2	7
b)	Using Lagrange's interpolation formula find Y (10) from the following table X: 5, 6, 9, 11 Y: 12, 13, 14, 16	1	K2	7
	UNIT-II			
3.a)	Evaluate $\int_0^1 x^3$ dx with five subintervals by trapezoidal rule	2	K3	7
b)	Evaluate $\int_0^2 \frac{dx}{x^3+x+1}$ by using Simpsons 1/3rd rule with $h = 0.25$	2	K3	7
	(OR)			
4. a)	Employ Taylor's method to obtain approximate value of y at x= 0.2 for the differential equation $\frac{dy}{dx} = 2y + 3e^x, y(0) = 0$	2	K3	7
b)	Evaluate $y(0.2)$ using Runge-Kutta 4th order method, given $\frac{dy}{dx} = \frac{y^2-x^2}{y^2+x^2},\ y(0) = 1.$	2	K3	7
	UNIT-III			
5.a)	Apply change the order of integration and evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y}\, dx\, dy$	3	K3	7
b)	Evaluate $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)}\, dx\, dy$ by changing to polarcoordinates	3	K3	7
	(OR)			

6. a)	Evaluate $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)dxdydz$	4	K3	7
b)	Determine the area between the parabolas$y^2 = 4ax$ and $x^2 = 4ay$	4	K3	7
	UNIT-IV			
7. a)	Obtain the directional derivative of $\varphi = xy + yz + zx$ at A in the direction of AB where $A = (1,2,-1)$, $B = (5,6,8)$.	5	K2	7
b)	Determine the values of a and b such that the surface $ax^2 - byz = (a+2)x$ and$4x^2y + z^3 = 4$ cut orthogonally at $(1,-1,2)$.	5	K2	7
	(OR)			
8. a)	Show that the vector$(x^2 - yz)\bar{\imath} + (y^2 - zx)\bar{\jmath} + (z^2 - xy)\bar{k}$ is irrotational and find its scalar potential.	5	K2	7
b)	Determine $Curl\ \bar{F}$and$div\bar{F}$for$\bar{F} = x^2y\,\bar{I} - 2xz\,\bar{J} + 2yz\bar{K}$	5	K3	7
	UNIT-V			
9.a)	Determine the work done in moving a particle once round the circle $x^2 + y^2 = 9$ in the xy- plane by the force $\bar{F} = (2x - y - z)\bar{\imath} + (x + y - z^2)\bar{\jmath} + (3x - 2y + 4z)\bar{k}$	6	K3	7
b)	Evaluate the line integral by Stokes's theorem for the vector function $\bar{F} = y^2\bar{\imath} + x^2\bar{\jmath} + (z+x)\bar{k}$and C is the triangle with vertices $(0,0,0), (1,0,0)\ and\ (1,1,0)$.	6	K3	7
	(OR)			
10.	Verify Green's theorem in the plane For $\oint_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$, where C is boundary of the region defined by $y = \sqrt{x}, y = x^2$	6	K3	7

		Course Code: B20EE2101			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)		**R 20**	
		II B. Tech I Semester Regular Examinations			
		NETWORK ANALYSIS			
		Electrical And Electronics Engineering			
Time: 3 Hrs.				**Max. Marks:70**	
		Answer any one Question from Each Unit			
		All questions carry equal Marks			
			CO	**KL**	**M**
		UNIT-I			
1.	a.	Explain the star-delta transformation and delta-star transformation and **derive** the expressions for equivalent resistances.	1	K3	**7**
	b.	By using the mesh analysis **determine** the loop currents in the following circuit shown in figure (1).  Figure (1)	1	K3	**7**
2	a.	State maximum power transfer theorem. Determine the condition for maximum power from source to the load.	1	K3	**7**
	b.	**Determine** the Thevenin's equivalent circuit across 0.25 ohm and find the current through 0.25 ohm resistor for the network shown in figure (2).  Figure (2)	1	K3	**7**
3	a.	**Obtain** an expression for voltage in a series R-C circuit excited by a unit step	2	K4	**7**

		voltage. Assume zero initial conditions.			
	b.	If the switch in given figure (3) has been open for a long time and is closed at t=0, **Calculate** $V_0(t)$.  Figure (3)	**2**	K4	7
		OR			
4	a.	In a series RLC circuit, R=6 ohms, L=2 H, C=2 F. A DC voltage of 50 V is applied at t=0. **Obtain** the expression for i(t).	**2**	K4	7
	b.	The combined inductance of two coils connected in series is 0.6 or 0.1 depending on the relative directions of the coils. If one of the coil when isolated has a self-inductance of 0.2H, **Calculate** (i) mutual inductance, (ii) Co-efficient of coupling.	**2**	K4	7
		UNIT-III			
5	a.	For the periodic wave form shown in figure (4), **determine** average and rms values.  Figure (4)	**3**	K3	7
	b.	An impedance of (3+j5) is connected across a 10V, 50Hz source. **Calculate** (i) power factor (ii) real and reactive power (iii) current drawn by the impedance.	**3**	K3	7
		OR			
6	a.	By using the nodal analysis **determine** various node voltages in the following Figure (5).  Figure (5)	**3**	K3	7
	b.	The impedance of a circuit is (6+j8)Ω and an applied phasor voltage is V=50 $\angle 45^0$ Volts. **Determine** the active power, reactive power and apparent power.	**3**	K3	7
		UNIT-IV			

7	a.	An RLC Series circuit consists of R=1kΩ, L=100mH, C=10μF. If a voltage of 100V is applied across the combination, **determine** resonant frequency, quality factor and bandwidth.	**4**	K3	7
	b.	**Derive** voltage and current relations in Star connected Balanced load and draw the phasor Diagrams.	**4**	K3	7
8	a.	**Express** the advantages of three phase system over single-phase system.	**4**	K3	7
	b.	A balanced 3- phase, 3-wire 50 Hz, 100 V supply is given to a load consisting of three impedances (1+j1) Ω, (1+j2)Ω, (3+j4)Ω connected in star. **Calculate** the line and phase voltages and also currents.	**4**	K3	7
		UNIT-V			
9	a.	**Determine** the y-parameters of the network shown in Figure (6)  Figure (6)	**5**	K3	7
	b.	**Determine** h-parameters of a two-port network whose z parameters are $Z_{11}=Z_{22}=6$ ohms and $Z_{12}=Z_{21}=4$ ohms.	**5**	K3	7
		OR			
10	a.	Enlist the restrictions of pole-zero on driving point impedance function.	**5**	K3	7
	b.	Define a transfer function? **Derive** the transfer function V_2/V_1 of the given Figure (7) below.  Figure (7)	**5**	K3	7

					Course Code:B20EC2101
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R 20**
		II/IV B.Tech I Semester (R20) Regular Examinations			
		ELECTRONIC DEVICES AND CIRCUITS			
		Common to ECE & EEE			
Time: 3 Hrs.					**Max. Marks:70**
		Answer any one Question from Each Unit			
		All questions carry equal Marks			
			CO	**KL**	**M**
		UNIT-I			
1	a	Discuss in detail the various current components in a p-n junction diode.	**1**	**3**	**7**
	b	A Silicon diode operates at a forward voltage of 0.4 V. Calculate the factor by which the current will be multiplied when the temperature is increased from 25 degree centigrade to 150 degrees centigrade.	**1**	**3**	**7**
		OR			
2	a	With a neat diagram, explain the operation of a full wave rectifier and obtain expressions for ripple factor and efficiency.	**1**	**3**	**7**
	b	Distinguish between Zener breakdown and Avalanche breakdown.	**1**	**2**	**7**
		UNIT-II			
3	a	Explain input and output characteristics of the transistor in CE configuration with a neat sketch.	**1**	**2**	**7**
	b	Compare CE, CC and CB configurations of a transistor.	**1**	**3**	**7**
		OR			
4	a	Explain the early effect and its consequences in the Common base transistor.	**1**	**2**	**7**
	b	Define α, β, γ and write the relation between them	**1**	**2**	**7**
		UNIT-III			
5	a	Explain how a self-bias circuit improves stability of the operating point and obtain an expression for the stability factor 'S' for the self-bias circuit.	**2**	**2**	**7**
	b	Explain how diodes can be used to compensate against variations in V_{BE} and I_{CO} due to change in temperature.	**2**	**3**	**7**
		OR			
6	a	A transistor with β= 100 is to be used in Common Emitter Configuration with collector to base bias. R_E = 1 KΩ, V_{CC} = 10V. Assume V_{BE} = 0.7V. Choose R_B so that the quiescent collector to emitter voltage is 4V. Find Stability Factor S.	**2**	**3**	**7**
	b	Explain thermal runaway and thermal stability in transistors.	**2**	**2**	**7**
		UNIT-IV			
7	a	Compare JFET and BJT.	**3**	**3**	**7**
	b	Draw the basic structure of N- channel JFET and explain the operation with	**3**	**3**	**7**

		the help of characteristic curves.			
OR					
8	a	Explain the construction and operation of Enhancement MOSFET with drain and transfer characteristics.	**3**	**2**	**7**
	b	Derive the expression for pinch off voltage of JFET.	**3**	**4**	**7**
UNIT-V					
9	a	Derive expressions for current gain, Voltage gain, Input impedance and Output impedance of a generalized transistor amplifier using h-parameters.	**4**	**4**	**7**
	b	Explain the frequency response of the CE amplifier with a neat sketch.	**4**	**2**	**7**
OR					
10	a	Discuss the effect of bypass and coupling capacitors in CE amplifiers.	**4**	**3**	**7**
	b	Draw and explain a hybrid - model of a transistor used at high frequencies.	**4**	**4**	**7**

				Course Code:B20EE2102	
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R 20
II B. Tech I Semester Regular Examinations					
ELECTRO MAGNETIC FIELD THEORY					
Electrical And Electronics Engineering					
Time: 3 Hrs.				Max. Marks:70	
Answer any one Question from Each Unit					
All questions carry equal Marks					
			CO	KL	M
UNIT-I					
1	a.	Derive an expression for Electric field intensity due to infinite line charge distribution?	1	K3	7
	b.	A 2C point charge is located at A (4,3,5) in free space. Find E and Ez at P (8,12,2)	1	K3	7
OR					
2	a.	Derive an expression for Electric field intensity due to infinite sheet of charge distribution by using Gauss's law?	1	K3	7
	b.	Uniform line charges of 120nC/m lie along the entire extent of three coordinate axes. Assuming free space conditions. Find Electric field Intensity E at P (-3,2,-1).	1	K3	7
UNIT-II					
3	a.	Define an electric dipole and derive an expression for E due to electric dipole.	2	K3	7
	b.	Find the stored energy in a system of 4 identical charges of Q = 4nC at the corners of a square of a 1m on a side?	2	K3	7
OR					
4	a.	Derive the electrostatic boundary conditions between a conductor and free space	2	K3	7
	b.	State and prove the Uniqueness theorem	2	K3	7
UNIT-III					
5	a.	State Biot-savart's Law and Derive an expression for magnetic field intensity due to an infinite long straight current carrying conductor.	3	K3	7
	b.	A 'Z' directed current distribution is given by, J=(r2+ur) A/m2 for r ≤ a Find B at any point r ≥ a using Ampere's circuit law	3	K3	7
OR					
6	a.	Derive an expression for a curl and applying Ampere's Circuital law to an incremental surface.	3	K3	7

UNIT-IV					
7	a.	Derive magneto-static boundary conditions.	**4**	**K4**	**7**
	b.	A charge particle with uniform velocity 4axm/s in a region where E=2ay V/m B=B0azwb/m2.Determine B0 such that velocity of particle remains constant. Use Lorentz force equation	**4**	**K4**	**7**
OR					
8	a.	The Vector magnetic potential, A due to direct current in a conductor in free space is given by A=(x2+y2)azμωb/m2.Determine the magnetic field produced by the current element at (1,2,3) .	**4**	**K4**	**7**
	b.	Discriminate Inductance and Mutual Inductance, Determine inductance of a solenoid	**4**	**K4**	**7**
UNIT-V					
9	a.	Write down the Maxwell's equations for both static and time varying fields in integral and point form.	**5**	**K4**	**7**
	b.	Derive an expression for the modified Ampere's circuital law.	**5**	**K4**	**7**
OR					
10	a.	Compute power flow of electromagnetism's using Poynting's theorem. .	**5**	**K4**	**7**
	b.	A certain material has σ=0, r=0. If E=800sin(106t-0.01z) ay V/m, make use of Maxwell equations to find r	**5**	**K4**	**7**

			Course Code: B20EE2103		
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)				R 20	
II B. Tech I Semester Regular Examinations					
ELECTRICAL MACHINES-I					
Electrical And Electronics Engineering					
Time: 3 Hrs.				Max. Marks:70	
Answer any one Question from Each Unit					
All questions carry equal Marks					
			CO	KL	M
UNIT-I					
1.	a.	Derive the expression for torque in singly excited magnetic system	1	K3	7
	b.	Explain the energy flow in electromechanical systems with energy flow diagrams.	1	K3	7
OR					
2	a.	Derive the expression for torque in doubly excited magnetic system	1	K3	7
	b.	Explain the construction and principle of DC machine with neat sketch	2	K4	7
UNIT-II					
3	a.	Explain lap and wave windings of DC machines.	2	K4	7
	b.	A 6-pole machine has an armature with 90 slots and 8 conductors per Slot and runs at1000rpm, the flux per pole is 0.05wb. Determine the induced emf if windings i) Lap connected ii) Wave connected	2	K4	7
OR					
4	a.	Explain the characteristics of dc series and shunt motor?	3	K4	7
	b.	A 500V dc shunt motor takes 8 amperes on no-load the armature and field resistances are0.2 and250 ohms respectively. Find the efficiency of the machine when running as a motor taking a current of 90 amperes from the supply.	3	K4	7
UNIT-III					
5	a.	Briefly describe the methods of speed control of DC shunt motor?	3	K4	7
	b.	Explain field's test on DC series machine.	3	K4	7
OR					
6	a.	Write the procedural steps to calculate the losses an efficiency of dc machine using Swinburne's test.	3	K4	7
	b.	In Hopkinson's test on two identical machines the following readings were obtained. Line current: 460V, motor armature current: 300A, Field currents are 5A and 4.4A for motor and generator respectively. Calculate the efficiency of each machine.	3	K4	7

UNIT-IV					
7	a.	Derive the approximate expression for regulation of a single-phase transformer. Obtain the condition for zero voltage regulation.	**4**	K4	7
	b.	A20KVA2500/250v,50HZ, single phase transformer has following results: O.C Test (L.V side): 250 v, 1.4 amp, 105 watts S.C Test (H.V side): 104 v, 8 amp, 320 watts Calculate the efficiency at full load and 0.8 pf lagging?	**4**	K4	7
OR					
8	a.	Derive an expression for the e.m.f induced in a transformer winding. Show that e.m.f per turn in primary is equal to e.m.f per turn in secondary.	**4**	K4	7
	b.	Discuss the advantages and disadvantages of an auto transformer as compared to a two-winding transformer.	**5**	K3	7
UNIT-V					
9	a.	Explain the conditions for parallel operation of single-phase transformer.	**5**	K3	7
	b.	Mention different three phase transformer connections in detail.	**5**	K3	7
OR					
10	a.	Explain the Scott-connection in three phase transformer.	**5**	K3	7
	b.	Two transformers Aand B of different ratings but equal voltage ratios share a load of 500KVA at 0.8 p.f. Lagging at 400V by operating in parallel. Transformer A has a rating of 500KVA, resistance drop of 1.5% and reactance drop of 5%. Transformer B has a rating of 1000KVA, resistance drop of 1% and reactance drop of 4%. Calculate load Shared by each transformer and the power factor at which it is working.	**5**	K3	7

					Course Code:B20BS2204
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R 20**
		II B. Tech II Semester Regular Examinations			
		COMPLEX VARIABLES AND STATISTICAL METHODS			
		(Common to CE & EEE)			
Time: 3 Hrs.					**Max. Marks:70**
		Answer any one Question from Each Unit			
		All questions carry equal Marks			
Q. No.		**Question**	**CO**	**KL**	**M**
1	A	Determine p such that the function $f(z) = \frac{1}{2}log_e(x^2+y^2) + i\ tan^{-1}(\frac{px}{y})$ will be an analytic function.	1	K3	7
	B	In an electrostatic field, if the potential function is $\emptyset = 3x^2y - y^3$, then determine the flux function and the complex potential function.	1	K3	7
		OR			
2	A	If $f(z) = u + iv$ is an analytic function of $z = x + iy$, establish that $\left[\frac{\partial}{\partial x}\lvert f(z)\rvert\right]^2 + \left[\frac{\partial}{\partial y}\lvert f(z)\rvert\right]^2 = \lvert f'(z)\rvert^2$.	1	K3	7
	B	Determine the bilinear transformation which maps the points z= 1, i,-1 into the points w = 0, 1, ∞ respectively. Determine also the fixed points of the transformation.	1	K3	7
3	A	Evaluate $\oint_C \frac{z^3-2z+1}{(z-i)^2}dz$ where C is |z|=2, using Cauchy integral formula.	2	K3	7
	B	Develop the function f(z)= $\frac{4z+3}{z(z-3)(z-2)}$ as Laurent series (i) (i) in |z|<1 and (ii) in the annular region 1 <|z|<3.	2	K3	7
		OR			
4	A	Determine the residues of $f(z) = \frac{z^3}{(z-1)\ \ (z-2)(z-3)}$ at its poles and hence evaluate $\oint_C f(z)dz$, where C is the circle |z| = 2.5	2	K3	7
	B	Apply the calculus of Residues to evaluate $\int_0^{2\pi}\frac{d\theta}{5-3\cos\theta}$.	2	K3	7
5	A	Determine the difference equation generated by $y_n = (A+Bn)3^n$.	3	K3	7
	B	Solve the difference equation $y_{n+2} + y_{n+1} - 56y_n = 2^n(n^2-3)$.	3	K3	7
		OR			
6	A	Given $Z\{u_n\} = \frac{z}{z-1} + \frac{z}{z^2+1}$ determine the Z-transform of u_{n+2}.	4	K3	7
	B	Utilize Z-transforms to solve $u_{n+2} - 2u_{n+1} + u_n = 3n + 5$.	4	K3	7
7	A	If X is the random variable of a Poisson distribution such that	5	K3	7

<table>
<tr><td></td><td></td><td>the probability for X = 2 is two-thirds of the probability for X = 1. Determine the probability for X = 0 and the probability for X = 3. What is the probability for X >3.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>B</td><td>The average and S.D. of the marks obtained by 500 students in a examination are respectively 40% and 10%. Assuming the normality of the distribution, determine approximately
(i)how many will pass if 50% is fixed as minimum,
(ii)how many have scored marks above 60%?</td><td>5</td><td>K3</td><td>7</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td rowspan="2">8</td><td>A</td><td>Derive moment generating function of Poisson distribution.</td><td>5</td><td>K3</td><td>7</td></tr>
<tr><td>B</td><td>In a Normal distribution, 31% of the items are under 45 and 8% are over 64. Determine the mean and standard deviation of the distribution.</td><td>5</td><td>K3</td><td>7</td></tr>
<tr><td rowspan="2">9</td><td>A</td><td>Develop the test procedure for testing the difference of proportions.</td><td>6</td><td>K3</td><td>7</td></tr>
<tr><td>B</td><td>A sample of 1000 days is taken from meteorological records of a certain district and 120 of them are found to be foggy. Determine the probable limits for the percentage of foggy days in the district.</td><td>6</td><td>K3</td><td>7</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td rowspan="2">10</td><td>A</td><td>A machine is supposed to produce washers of mean thickness 0.12cm. But the mean thickness of a random sample of 10 washers produced by the machine was found to be 0.128cm with a standard deviation of 0.008cm. Determine whether the machine is working properly at 5% level of significance.</td><td>6</td><td>K3</td><td>7</td></tr>
<tr><td>B</td><td>The number of aircraft accidents that occurred during the various days of the week is given below:
<table>
<tr><td>Day:</td><td>Sun</td><td>Mon</td><td>Tue</td><td>Wed</td><td>Thu</td><td>Fri</td><td>Sat</td></tr>
<tr><td>No. of accidents</td><td>14</td><td>16</td><td>8</td><td>12</td><td>11</td><td>9</td><td>14</td></tr>
</table>
Determine whether the accidents are uniformly distributed over the week.</td><td>6</td><td>K3</td><td>7</td></tr>
</table>

					Course Code: B20EC2201
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R 20**
		II B. Tech II Semester Regular Examinations			
		ELECTRONIC CIRCUIT ANALYSIS AND DESIGN			
		(Common to ECE & EEE)			
Time: 3 Hrs.					**Max. Marks:70**
		Answer any one Question from Each Unit			
		All questions carry equal Marks			
			CO	**KL**	**M**
		UNIT-I			
1	a.	Derive the expressions for gain of an BJT RC coupled amplifier at low frequency.	**1**	**K3**	**7**
	b.	A transistor is connected as a CE amplifier with load resistance of 10KΩ. The parameters are hie=5KΩ and hfe=330. Calculate the overall gain for mid frequency range when four such stages are connected in cascaded RC coupling. Assume Rs=0.	**1**	**K3**	**7**
		OR			
2	a.	Explain what you understand by the term bandwidth shrinkage factor as applied to cascaded RC stages. Determine the expression for the same.	**1**	**K3**	**7**
	b.	A two stage RC coupled amplifier uses the transistor whose h-parameters are h_{ie}=4.5 KΩ ,h_{fe}=330. If the load resistance R_L=5.5 KΩ then find the required value of coupling capacitor $\mathbf{C_C}$, so that the lower cut-off frequency is 60 Hz.	**1**	**K2**	**7**
		UNIT-II			
3	a.	Determine expressions for input impedance and output impedance in case of a voltage series feedback topology.	**2**	**K2**	**7**
	b.	An amplifier gain change by ±10% using negative feedback amplifier is to be modified to yield gain of 100 with 0.1% variation.Calculate the required loop gain and amount of negative feedback.	**2**	**K2**	**7**
		OR			
4	a.	Determine expressions for input impedance and output impedance of voltage –shunt and current-shunt topologies and identify the types of amplifiers.	**2**	**K3**	**7**
	b.	A negative feedback of β=0.002 is applied to an amplifier of gain 1000.Calculate the change in overall gain of the feedback amplifier ,if the internal amplifier is subject to a gain reduction of 15%.	**2**	**K3**	**7**
		UNIT-III			
5	a.	Explain the working of RC phase shift oscillator using BJT and derive frequency of oscillations.	**3**	**K3**	**7**
	b.	In a colpitt's oscillator C1= 0.02 μF and C2=0.2 μF. if the frequency of	**3**	**K3**	**7**

		oscillator is 10KHz, Find the value of inductor and also find the required gain for oscillator.			
OR					
6	a.	Obtain the frequency and condition for sustained oscillations of colpitt's oscillator	**3**	**K3**	**7**
	b.	In Hartley oscillator, calculate L2 if L1=15 mH, C = 50 pF, mutual inductance of 5 μH and the frequency of oscillations is 168 KHz.	**3**	**K3**	**7**
UNIT-IV					
7	a.	Obtain frequency response of staggered tuned amplifier	**4**	**K3**	**7**
	b.	Explain the working of transformer coupled class A power amplifier and calculate it's efficiency. Discuss its merits and demerits	**4**	**K3**	**7**
OR					
8	a.	Determine frequency response of single tuned amplifier	**4**	**K3**	**7**
	b.	Explain the working of class B push pull power amplifier and calculate it's efficiency. Discuss its merits and demerits.	**4**	**K3**	**7**
UNIT-V					
9	a.	Analyze dual input unbalanced output differential amplifier	**5**	**K4**	**7**
	b.	For a dual input unbalanced output differential amplifier, V_{CC}=13V,V_{EE}=-13V,R_C=4.7K , R_E=6.8K,R_S=50Ω. Determine (i)Q point values (ii) Voltage gain (iii)differential input resistance (iv)output resistance.	**5**	**K4**	**7**
OR					
10	a.	Analyze the practical differentiator circuit.	**5**	**K3**	**7**
	b.	Evaluate the output voltage of op-amp for input voltages 150μV and 140μV. If the differential gain is 4000V and value of CMRR is 10^5.	**5**	**K3**	**7**

					Course Code: B20EE2201
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R 20**
II B. Tech II Semester Regular Examinations					
ELECTRICAL MACHINES-II					
Time: 3 Hrs.					**Max. Marks:70**
Answer any one Question from Each Unit					
All questions carry equal Marks					
			CO	KL	M
UNIT - I					
1.	a).	Derive the emf equation of an alternator.	1	K3	7
	b).	A 3 phase, star connected synchronous generator driven at 750rpm is required to generate a line-to-line voltage of 440V at 50HZ on open circuit. The stator is wound with 2slots per pole per phase and each coil has 4 turns. Calculate the useful flux per pole.	1	K4	7
OR					
2.	a).	Explain how the rotating magnetic field is produced by three-phase currents.	2	K3	7
	b).	A 3 phase, 6 pole, star-connected alternator revolves at 1000 r.p.m. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05wb (sinusoidally distributed). Calculate the voltage generated by the machine if the winding factor is 0.96.	2	K4	7
UNIT - II					
3.	a).	Explain the effect of armature reaction on an alternator operating with UPF, lead p.f. and lag p.f.	2	K3	7
	b).	A 3300V, 3phase star connected alternator has a full load current of 100A. On short circuit a field current of 5A was necessary to produce full load current. The emf on open circuit for the same excitation was 900V. The armature resistance was 0.8Ω/ph. Determine the full load voltage regulation for (1)0.8pf lagging (2)0.8pf leading.	2	K4	7
OR					
4.	a).	Explain how voltage regulation is determined from E.M.F method	2	K3	7
	b).	A 3-Φ generator rated at 25MVA, 0.8pf lag, 13.8KV is operated at normal voltage & rated load. X_d, X_q and R_a are 7.62 , 4.57 , 0.15 Ω/ph respectively. Determine direct axis & quadrature axis components of armature current and internal induced voltage. Also find regulation.	2	K4	7
UNIT - III					
5.	a).	Explain starting methods of synchronous motor	3	K3	7

	b).	A 3300V, 3 phase synchronous motor running at 1500 rpm has its excitation kept constant corresponding to no-load terminal voltage of 3000V. Determine the power input, power factor and torque developed for an armature current of 250A if the synchronous reactance is 5 Ω per phase and armature resistance is neglected.	3	K4	7
		OR			
6.	a).	Explain V and inverted V curves of a synchronous motor?	3	K4	7
	b).	A 2000V, 3 phase, 4 pole, star connected synchronous motor runs at 1500rpm. The excitation is constant and corresponding to an open circuit voltage of 2000V. The resistance is negligible in comparison with synchronous reactance of 3.5Ω /ph. For an armature current of 200A. Determine (i) power factor (ii) power input (iii) torque developed.	3	K4	7
		UNIT - IV			
7.	a).	Sketch and explain the torque slip characteristics of the 3 Φ cage and slip-ring induction motors.	4	K4	7
	b).	A 50 HP, 6–Pole, 50 Hz, slip ring IM runs at 960 rpm on full load with a rotor current of 40A. Allow 300 W for copper loss in S.C. and 1200 W for mechanical losses, find R_2 per phase of the 3- phase rotor.	4	K4	7
		OR			
8.	a).	Explain in detail the construction of circle diagram of an induction motor.	4	K4	7
	b).	The power input to the rotor of a 3 phase, 50 HZ, 6 pole induction motor is 80 KW. The rotor emf makes 100 complete alternations per minute. Find i. Slip ii. Motor Speed iii. Mechanical power developed iv. Rotor copper loss per phase vi. Torque developed.	4	K4	7
		UNIT - V			
9.	a).	Explain the cascade method of speed control for a 3-Φ induction motor with neat diagram	5	K3	7
	b).	Give the classification of single phase motors .Explain any two types of single phase induction motors.	5	K3	7
		OR			
10.	a).	Explain double revolving field theory.	5	K3	7
	b).	Develop equivalent circuit of a single phase induction motor ignoring core losses.	5	K3	7

					Course Code: B20EE2202
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R 20**
		II B. Tech II Semester Regular Examinations			
		ELECTRICAL POWER GENERATION TRANSMISSION & DISTRIBUTION			
		Electrical And Electronics Engineering			
Time: 3 Hrs.					**Max. Marks:70**
		Answer any one Question from Each Unit			
		All questions carry equal Marks			
		*****			
			CO	KL	M
		UNIT – I			
1.	a).	**Explain** the working of thermal power plant with a neat layout.	1	K3	7
	b).	A factory has a maximum load of 240 kW at 0.8 p.f. lagging with an annual consumption of 50,000 units. The tariff is Rs 50 per KVA of maximum demand plus 10 paise per unit. **Calculate** the flat rate of energy consumption. What will be annual saving if p.f. is raised to unity?	1	K3	7
		OR			
2.	a).	**Explain** the importance of the following terms in generation: i) Load curve ii) Load duration curve	1	K3	7
	b).	A power station has a maximum demand of 20000 kW. The annual load factor is 50% and plant capacity factor is 40%. **Determine** the reserve capacity of the plant.	1	K3	7
		UNIT – II			
3.	a).	**Compare** the volume of conductor material required for a d.c. 3-wire system and 3-phase, 3-wire system on the basis of equal maximum potential difference between one conductor and earth. Make suitable assumptions.	2	K4	7
	b).	State and prove Kelvin's law for size of conductor for transmission. Discuss its Limitations.	2	K3	7
		OR			
4.	a).	**Compare** AC transmission and DC transmission.	2	K4	7
	b).	A 2 wire DC distributor ABCDEA in the form of a ring main is fed at point 'A' at 230V and is loaded as follows: 20A at B, 40A at C, 60A at D and 20A at E. The resistances of various sections (ground and return) are AB = 0.1Ω, BC = 0.05Ω, CD = 0.01Ω, DE = 0.025Ω and EA =0.075Ω. **Determine** the point of minimum potential and current in each section of distributor.	2	K3	7
		UNIT – III			
5.	a).	**Derive** an expression for the Inductance of a three phase line having unsymmetrical spacing.	3	K3	7
	b).	The three conductors of a 3-phase line are arranged at the corners of a triangle of sides 4, 5 and 6 meters. **Calculate** inductance per km of the each conductor	3	K3	7

		when conductors are regularly transposed. The diameter of each line conductor is 2cm.			
		OR			
6.	a).	**Derive** an expression for the Capacitance of a single phase two wire line.	3	K3	7
	b).	A 3-phase overhead transmission line has its conductors arranged at the corners of an equilateral triangle of 2 m side. **Calculate** the capacitance of each line conductor per km. Given that diameter of each conductor is 1·25 cm.	3	K3	7
		UNIT – IV			
7.	a).	**Derive** the generalized circuit constants for short transmission line	4	K3	7
	b).	A 3phase, 50Hz, 150 km line has a resistance, inductive reactance and capacitive shunt admittance of 0·1 Ω, 0·5 Ω and 3 $\times 10^{-6}$S per km per phase. If the line delivers 50 MW at 110 kV and 0·8 p.f .lagging. **Calculate** the sending end voltage and current. Assume a nominal π circuit for the line.	4	K3	7
		OR			
8.	a).	Using rigorous method, **Derive** expressions for sending end voltage and current for a long transmission line.	4	K3	7
	b).	A 3-φ transmission line 200 km long has the following constants: Resistance/phase/km = 0·16 Ω Reactance/phase/km = 0·25 Ω Shunt admittance/phase/km = 1·5 × 10^{-6} S. **Calculate** by rigorous method the sending end voltage and current when the line is delivering a load of 20 MW at 0·8 p.f. lagging. The receiving end voltage is kept constant at 110 kV.	4	K3	7
		UNIT – V			
9.	a).	**Derive** an Expression for the sag of transmission line conductor, suspended between two supports of the same height.	5	K3	7
	b).	An overhead line has a span of 260 m, the weight of the line conductor is 0·68 kg per metre run. **Calculate** the maximum sag in the line. The maximum allowable tension in the line is 1550 kg.	5	K3	7
		OR			
10.	a).	The self-capacitance of each unit in a string of three suspension insulators is C. The shunting capacitance of the connecting metal work of each insulator to earth is 0·15 C while for line it is 0·1 C. **Calculate** (i) the voltage across each insulator as a percentage of the line voltage to earth and (ii) string efficiency.	5	K3	7
	b).	**Explain** the following terms with reference to corona: (i) Critical Disruptive voltage (ii) Visual critical voltage, (iii) Power loss due to corona.	5	K3	7

			Course Code: B20EE2203		
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)				R 20	
II B. Tech II Semester Regular Examinations					
ELECTRICAL MEASUREMENTS AND INSTRUMENTATION					
Electrical And Electronics Engineering					
Time: 3 Hrs.				Max. Marks:70	
Answer any one Question from Each Unit					
All questions carry equal Marks					
			CO	KL	M
UNIT-I					
1	a.	Explain the principle of working of a PMMC instrument with neat diagram	1	K4	7
	b.	Explain different types of damping torques in measuring instruments.	1	K3	7
OR					
2	a.	Explain the operation of Moving Iron instrument with torque expression.	1	K4	7
	b.	Explain how you extend the range of ammeter and voltmeter using shunts and series resistance.	2	K4	7
UNIT-II					
3	a.	Explain with a neat circuit of single phase Dynamometer type Wattmeter and derive the equation for deflection torque.	1	K4	7
	b.	Explain the operation of Power Factor meter with neat diagram.	1	K3	7
OR					
4	a.	Explain measurement of single phase energy by induction type energy meter with suitable diagram.	1	K4	7
	b.	Explain with the help of neat diagram how would you extend range of a wattmeter.	1	K4	7
UNIT-III					
5	a.	Explain the working principle of Kelvin's double bridge method for measurement of low resistance.	3	K4	7
	b.	Explain the measurement of inductance by Maxwell's inductance bridge with necessary phasor diagram.	3	K4	7
OR					
6	a.	Explain measurement of unknown resistance and Derive the balance conditions with Wheatstone's bridge and State its limitations	3	K4	7
	b.	Explain how capacitance is measured with Schering Bridge.	3	K4	7

UNIT-IV					
7	a.	Explain in detail about the factors to be considered while selecting a transducer.	**4**	**K3**	**7**
	b.	Discuss in detail about the advantages and limitations of Thermocouple.	**4**	**K3**	**7**
OR					
8	a.	Define Strain gauge and gauge factor. Describe the operation and construction of strain gauge. State its limitations	**4**	**K4**	**7**
	b.	Explain with the help of a diagram and characteristics the operation of LVDT.	**4**	**K4**	**7**
UNIT-V					
9	a.	The Lissajous pattern on a CRO is stationary and has five horizontal and two vertical tangencies. The frequency of horizontal input is 600 Hz. Determine the frequency of vertical input and draw the pattern	**5**	**K3**	**7**
		Explain the operating principle of a Dual Slope type DVM.	**5**	**K3**	**7**
OR					
10	a.	Explain the operating principle of a Flash type ADC.	**5**	**K3**	**7**
	b.	Explain the operating principle of a R2R type DAC.	**5**	**K3**	**7**