Code No.: 30M07 | MR13

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H). Maisammaguda (V). Medchal (M), Medchal-Malkajgiri (Dist). Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Mathematics-II**

Branch: **Common to ME & MINING**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1M=5 Marks**

1. Find div $\overline{F}$ If $\overline{F} = x(y+z)\bar{i} + y(z+x)\bar{j} + z(x+y)\bar{k}$
2. Write the Fourier series for the function f(x) in the interval $c < x < c + 2\pi$ and write the formulas for a_0 , a_n and b_n
3. Write Gauss's backword interpolation formula.
4. Write the normal equations If $y = a_0 + a_1x$.
5. What is the value of $\int_a^b f(x)dx$ by Trapezoidal rule

II. Answer ALL questions of the following **10x2M=20 Marks**

1. Find the value of a so that the vector (x + 3y) i + (y - 2z) j+(x + az) k is solenoidal.
2. Show that $\nabla^2(r^n) = n(n+1)r^{n-2}$
3. Find the value of a_0 in the expansion of f(x) = x sinx, $0 < x < 2\pi$ as a Fourier series
4. Obtain the half-range sine series for e^x in $0 < x < 1$
5. Evaluate $\int_0^1 \frac{1}{1+x^2}dx$ using Simpson's 3 / 8 rule taking h = 1 / 6
6. Find k_1 and k_2 using Runge-Kutta method to approximate y when x = 0.2 given that y = 1 when x = 0 and $\frac{dy}{dx} = x + y^2$
7. Prove that $\mu^2 = 1 + \frac{1}{4}\delta^2$
8. Find the cubic polynomial which takes the following values
   y (0) = 1, y(1) = 0, y(2) =1, y(3) = 10
9. Find the values of a and b so that y = a + bx fits the data given in table

x	-2	-1	0	1	2
y	1	2	3	3	4

10. What is the geometrical significance of Newton-Raphson method.

PART-B

Answer the following questions **5x10M=50 Marks**

1. (a) If $\varphi_1 = x^2y$ and $\varphi_2 = xz - y^2$ find $\nabla \times (\nabla\varphi_1 \times \nabla\varphi_2)$

   (b) If $\overline{F} = (3x^2 + 6y)i - 14yzj + 20xz^2k$ evaluate the line integral $\int_c \overline{F}.d\bar{r}$ from (0,0,0) to (1,1,1) along x = t, y = t, $z = t^3$

OR

2. Using divergence theorem Evaluate $\iint_s \overline{F}.Nds$ where F = x i + y j + z^2 k and S is the surface bounded by the cone $x^2 + y^2 = z^2$ in the plane z = 4.

3. (a) If $f(x)=\begin{cases} kx; 0<x<\frac{\pi}{2} \\ k(\pi-x); \frac{\pi}{2}<x<\pi \end{cases}$,find the half range sine series

(b) Find the Fourier expansion of f(x) = x cosx; $0 < x < 2\pi$

OR

4. (a) If 'a' is not an integer, find the Fourier Series expansion of period 2π for the function $f(x)= \sin ax$ in $-\pi< x <\pi$

(b) Find the half-range Sine series for $f(t) = t - t^2$; $0 < t < 1$

5. (a) Fit a parabola to the data given below

X:	1	2	3	4	5
Y:	10	12	8	10	14

(b) Define the operator's Δ, ∇ and E and show that

i) $\Delta = E\nabla$

ii) $E = 1 + \Delta$

iii) $E^{-1} = 1 - \Delta$

OR

6. (a) The following data gives the melting point of an alloy of lead and zinc, where t is the temperature in ^oC and P is the percentage of lead in the alloy.

P (%)	60	70	80	90
T	226	250	276	304

Find the melting point of the alloy containing 84% of the lead, using Newton's interpolation

(b) Using Gauss's Forward Interpolation formula estimate f (32), given f(25) = 0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794.

7. (a) Solve the following by iteration method: $x^3 + x^2 = 100$

(b) Solve for a positive root by False position method: $e^{-x} = \sin x$

OR

8. (a) Find the real root of the equation $x^4 - x - 9 = 0$ by Newton-Raphson method correct to three decimal places.

(b) Solve the system of equations $2x + y + 4z = 12, 8x - 3y + 2z = 20$, $4x + 11y - z = 33$ by Crout's method.

9. (a) Evaluate the following integrals by Simpson's one-third rule

$$\int_0^3 \cos^2 x dx, (n=6)$$

(b) Evaluate y (1.1), y (1.2) and y (1.3) using Runge-Kutta method of order four for the Initial value problem. $\frac{dy}{dx} = x^2 + y^2$, y (1) = 0 with h = 0.1.

OR

10. (a) Use Taylor's Series method to solve the differential equation $\frac{dy}{dx}=\frac{1}{x^2+y}, y(4)=4$ and compute y(4.2) and y(4.4)

(b) Given that $\frac{dy}{dx}=3x^2+y, y(0)=4$ compute y (0.25) and y (0.5) using Euler's method.

Code No.: **30230/40230**

MR13 / MR14

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Basic Electrical And Electronics Engineering**

Branch: **Common to CE & MINING**

Time: 3 hours **Max. Marks: 75**

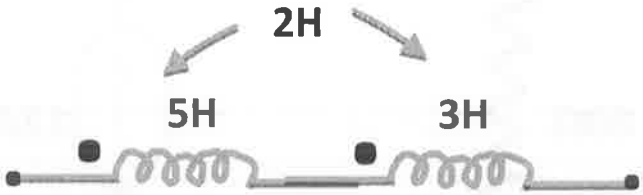
PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Give the relation between power and Energy.
2. Define reluctance.
3. What is the function of pole shoe in DC machine?
4. Draw the circuit diagram of bridge rectifier.
5. Define sensitivity.

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Explain Faradays laws of electromagnetic induction.
2. State Reciprocity theorem.
3. Find the equivalent inductance in the following circuit.

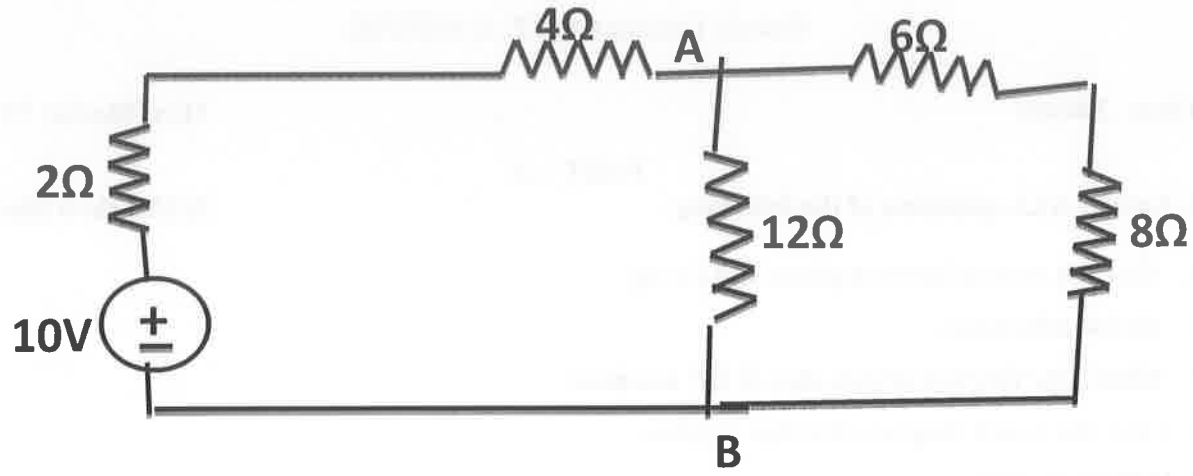


4. How does the change in frequency affect the operation of a given transformer?
5. Explain the importance of back emf in DC motor?
6. Explain the need of starter for starting a DC motor.
7. Mention the values of Ripple factor for half wave and full wave rectifiers.
8. Explain the amplification action of transistor.
9. Write the conditions for oscillations?
10. Draw the circuit diagram of RC Phase shift Oscillator and formula for frequency of oscillations.

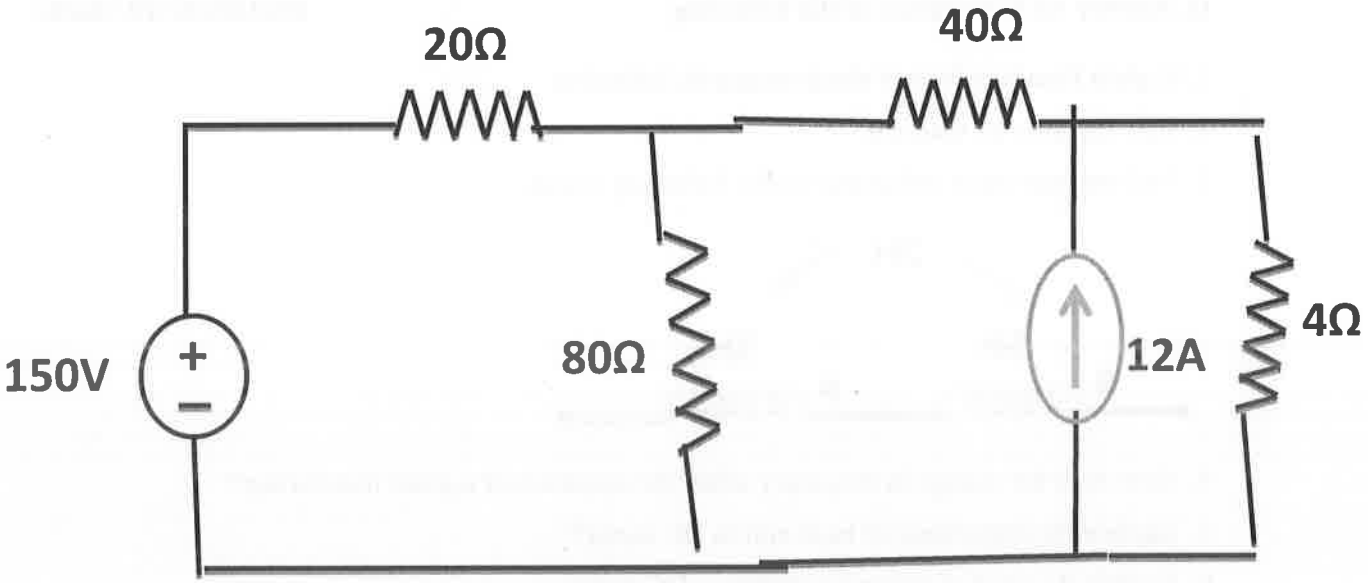
PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

Q1. a). Verify the Reciprocity Theorem with respect to AB. (5M)



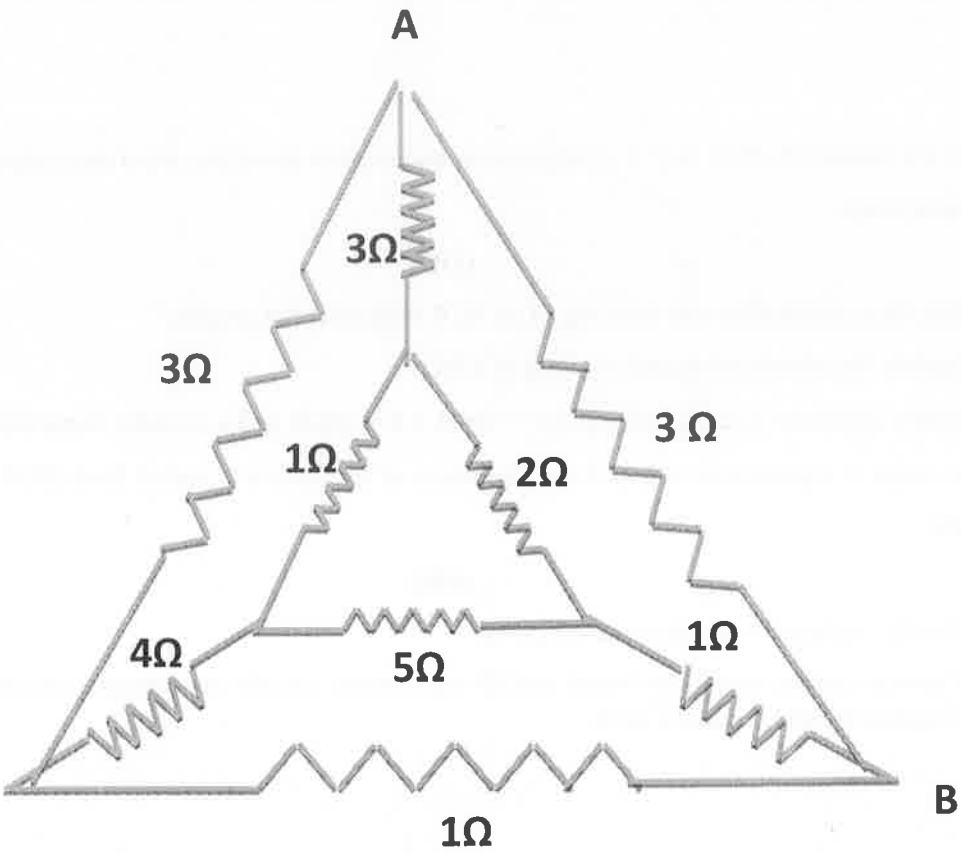
b). Find the current through 4 Ω resistor by using super position theorem. (5M)



(OR)

Q2. a). Explain Ideal and practical energy sources. (5M)

b). Find the equivalent resistance across AB for the network shown below. (5M)



Q3. a). Write the analogy between electric and magnetic circuits. (5M)

b). The following results were obtained from tests on 30 KVA, 3000/110 V, and transformer

O.C. test: 3000V, 0.5 A, 350 W

S.C. test: 150 V, 10 V, 500 W

Compute the efficiency of the transformer at full load with 0.8 lagging power factor. (5M)

(OR)

Q4. a). Briefly explain the importance of coupling coefficient. (3M)

b). A single phase transformer has a turn ratio of 6. The resistance and reactance of primary winding are 0.9Ω and 5Ω respectively and those of the secondary are 0.03Ω and 0.13Ω respectively. If 330 V at 50 Hz be applied to the high voltage winding with the low-voltage winding short circuited. Find the current in the low-voltage winding and its power factor. Neglect magnetizing current. (7M)

Q5. a). The armature of a 4 pole, lap-wound 220V DC generator has 500 conductors and runs at 1200 RPM .calculate the flux/pole at no load. (5M)

b). What are the various losses of dc motors? (5M)

(OR)

Q6. a). Derive the expression for torque developed in the armature of a DC motor. (5M)

b). Discuss any two methods for speed control of a DC shunt motor in detail. (5M)

Q7. Draw the circuit of a BJT in C.E configuration and explain about the input and output characteristics. (5M)

(OR)

Q8. Explain the construction and working of an SCR with relevant graphs. (5M)

Q9. a). Explain the construction and working of CRO. (6M)

b).Hartley oscillator is designed with L1 = 2mH, L2 = 20μH and a variable capacitance. Determine the range of capacitance values if the frequency of oscillation is varied from 2050 KHz to 3050 KHz. (4M)

(OR)

Q10 a). Briefly explain the Barkhausen criterion. (4M)

b). Classify various oscillators based on O/P waveforms, circuit components, operating frequencies and feedback used. (6M)