TH-1- ENGINEERING MATHEMATICS - III

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   Define the rank of a matrix. Find the rank of the matrix $\begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$

   b.   Find the complementary function if the roots of the auxiliary
        equation are 0,-2,-2,-2.

   c.   Derive a partial differential equation for the following:
        $z = xy + f(x^2 + y^2)$

   d.   Define gamma function. Evaluate $\Gamma\left(-\frac{1}{2}\right)$.

   e.   Define Numerical Integration and state Trapezoidal rule.

   f.   Define even and odd functions with example.

   g.   Find Laplace Transform of $sin^2 t$.

   h.   Find the value of Fourier co-efficient 'a_0' if
        $$f(x) = x + x^2 \ in \ (-\pi, \pi)$$

   i.   Evaluate $\Delta (\tan^{-1} x)$

   j.   Change into $a + ib \ form$ $\frac{2i}{3+4i}$

2.   Answer **Any Six** Questions   6 x 5

   a.   Find the real roots of the equation
        $$x^3 - 3x + 1 = 0$$
        By Newton's Raphson method correct to two decimal places.

   b.   Find the Particular Integral (P.I) of the differential equation
        $$\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = x \ e^x \sin x$$

   c.   Show that
        $$L(t \cos at) = \frac{s^2 - a^2}{(s^2 + a^2)^2}$$

   d.   Express $f(x) = |x|$ as a Fourier series in $-\pi < x < \pi$

   e.   Use Lagrange's Interpolation formula to fit a polynomial to the
        given data:

x	0	1	3
f(x)	1	3	55

f. Find the square root of $-8 + \sqrt{-1}$

g. Using Simpson's $\frac{1}{3}$ rd rule and taking $h = 1$, evaluate

$$\int_0^6 \frac{dx}{1+x}$$

3   a. Investigate for what value of λ and μ the simultaneous equations   7
x +y+ z=6, x+2y+3z=10, x+2y+λz=μ have
(i)No solution
(ii)a unique solution
(iii)an infinite number of solution

b. $(1-\omega+\omega^2)^5 + (1+\omega-\omega^2)^5 = 32$ 3

4   a. Obtain the Fourier series for f(x)= $\begin{cases} -k \ if \ -\pi < x < 0 \\ k \ if \ \ 0 < x < \pi \end{cases}$ 5

b. Find the Laplace transform of $\frac{sin2t}{t}$ 5

5   a. Obtain the fourier series of f(x) defined by   7
f(x)=$\begin{cases} 0, -\pi < x < 0 \\ x^2, 0 < x < \pi \end{cases}$

b. Estimate the missing term in the following table :   3

     X: 0   1   2   3   4
     Y: 2   4   10   78

6   a. $x^2(y - z)p + y^2(z - x)q = z^2(x - y)$ 7

b. Determine the rank of the matrix: 3

$$\begin{bmatrix} 1 & 0 & 1 \\ -1 & 1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$$

7   a. Find the inverse Laplace transform of   5

$$\frac{3s + 7}{s^2 - 2s - 3}$$

b. Using Trapezoidal rule and taking h=$\frac{1}{2}$, evaluate   5

$$\int_0^2 \frac{dx}{1+x}$$

TH2-CIRCUIT AND NETWORK THEORY

Full Marks: 80   Time: 3 Hours

Answer any Five Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1.   **Answer all the questions**   10x2

 a)   What is reactive power? State its SI unit

 b)   What do you mean by nodal analysis of AC networks?.

 c)   State the superposition theorem.

 d)   Define (i) Bandwidth (ii) Q factor in series circuit

 e)   What is power factor and power triangle?

 f)   Give an example of (i) Active Element (ii) Linear Element

 g)   What do you mean by coefficient of coupling in coupled circuits?

 h)   Define (i) Reluctance (ii) Permeance

 i)   Classify the filters on the basis of frequency characteristics.

 j)   What are short-circuit admittance parameters?

2.   **Answer any six questions**   6x5

 a)   Write down the analogies between electric and magnetic circuits.

 b)   Find the Thevenin's equivalent to the left of terminals x-y in the below network.
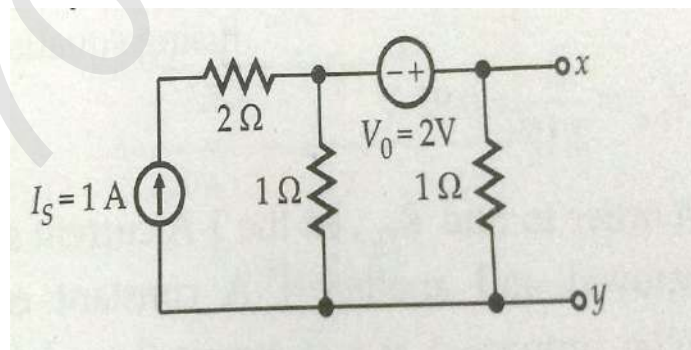
 c)   How the 3 phase power is measured by two wattmeter method?

 d)   Write a short note on hybrid (h) parameters.

 e)   Explain the sinusoidal response of parallel R-C circuit

 f)   Describe briefly about π section of a circuit network

g) Find the current in the resistor (R_L) using the principle of superposition theorem in below network.
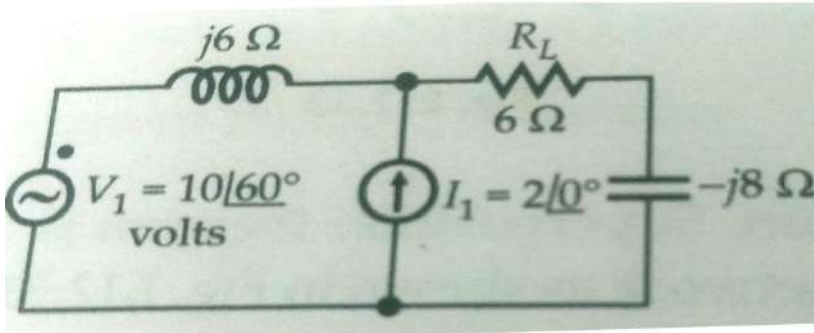
3. Derive the relation between phase and line quantities in star connection.   10

4. Describe about the resonant frequency of series resonance and parallel resonance circuit.   10

5. Explain the transient response of series R-L circuit having DC Excitation.   10

6. Write short notes on (i) Constant K low pass filter (ii)Constant K Band pass filter.   10

7. Write short notes on (i) Hysteresis Loop (ii) Source Transformation technique.   10

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Th-3 Element of Mechanical Engineering

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a.   State the 1st law of thermodynamics.
   b.   Define dryness fraction and quality of steam.
   c.   Name two mountings and two accessories of a boiler.
   d.   Define the mean effective pressure.
   e.   State the basic difference between IC engine and EC engine with one example of each.
   f.   What is D-slide valve?
   g.   Define fluid.
   h.   What do you mean by indicated power and brake power and efficiency?
   i.   State the law of continuity in fluid.
   j.   State the uses of a pneumatic system.

2.   Answer **Any Six** Questions   6 x 5
   a.   Differentiate between two stroke and four stroke engine.
   b.   What is a surface condenser? What are the advantages and disadvantages over jet condenser?
   c.   Derive the relationship between C_p and C_v.
   d.   Differentiate between an impulse turbine and a reaction turbine.

   e.   Describe briefly the different properties of fluid.
   f.   A pipe 450mm diameter is branched into two pipes of diameter 300mm and 200mm respectively. If the average velocity in 450mm diameter pipe is 3m/sec and average velocity in 300mm diameter pipe is 2.5m/sec than find velocity in 200mm diameter pipe and total discharge.
   g   Explain the working of hydraulic intensifier.

3   A cylinder contains 0.92kg of steam at 1.5MPa. If the volume of steam is $0.1m^3$,   10
      determine the dryness fraction of the steam, enthalpy and internal energy of the steam per kg.

4   The right limb of a U-tube manometer containing through which flows a liquid of   10
      specific gravity of 0.85. The centre of the pipe is 10cm below the level of mercury in the right limb. If the difference in mercury levels in two limbs is 16cm. Find the pressure in the pipe.

5   State Bernoulli's theorem and derive the equation.   10

6   Determine the diameter and stroke of a double acting steam engine developing   10
      180kW under the following conditions. Initial steam pressure 7bar , back pressure 1.12bar, crank speed 100rpm, mean piston speed 135m/min, diagram factor 0.8 and cut off takes place at 0.4 of the stroke.

7   Define boiler. With neat sketch explain any water tube boiler.   10

3RD SEM/ ELECTRICAL/ELECT & MECH/2020(W) NEW
TH4-ELECTRICAL ENGINEERING MATERIAL

Full Marks: 80   Time : 3 Hours

Answer any Five Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1.   **Answer all the questions**   **10x2**

 a)   **Define(i) Energy level of an electron (ii)Energy Band**

 b)   **What do you mean by resistivity and state its SI unit.**

 c)   **What is dielectric loss?**

 d)   **What do you mean by Curie point?**

 e)   **Which properties should a fuse material possess?**

 f)   **What are the factors affecting dielectric strength of insulating material?**

 g)   **Which material is used for making (i)frames of small electric machines(ii) tanks for transformer**

 h)   **What is eddy current?**

 i)   **Define diamagnetism. Give an example**

 j)   **What is photovoltaic cell?**

2.   **Answer any six questions**
                                                                                                  6x5
 a)   **Write a short note on hysteresis loop for a ferromagnetic material.**

 b)   **Differentiate between intrinsic and extrinsic semiconductors.**

 c)   **Describe about the soft magnetic materials briefly.**

 d)   **Explain the electric conductivity of gaseous dielectrics.**

 e)   **Write about soldering materials briefly.**

 f)   **Explain the application of superconductor material.**

 g)   **What are the factors affecting insulation resistance?**

3.   **Explain about the polarisation of dielectric material in details.**   **10**

4.   **Describe about natural and synthetic rubber and their applications.**   **10**

5.   **Write a short note on(i)Hall Effect generators(ii) Solar power**   **10**

6.   **Describe about high resistivity materials and their applications**   **10**

7.   **Explain fuse and fuse materials. Draw also a cross section view of cartridge fuse.**   **10**

TH 5 Environmental Studies

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   Define Environment.

   b.   Define deforestation.

   c.   What do you mean by decomposers?

   d.   What are hot spots of biodiversity?

   e.   Define eco system.

   f.   Write down psychological effect of noise pollution.

   g.   What is solid waste management?

   h.   Define green house effect.

   i.   What are the major reasons of population explosion?

   j.   What is Draught?

2.   Answer **Any Six** Questions   6 x 5

   a.   What are causes of deforestation.

   b.   What are the environmental effects of mining.

   c.   Give a brief description about structures of a pond eco –system.

   d.   Discuss about 3R in controlling environmental pollution.

   e.   What is global warming ? Write down the effects of global warming?

   f.   Discuss about rain water harvesting?

   g.   What is the role of an individual in controlling pollution of environment?

3   What is the need of land resources? Write the main reasons of degradation of land?   10

4   What are the changes made in agriculture? Write down the impacts of modern agriculture on   10
    environment?

5   What are ecological pyramids? Explain the pyramid of number and pyramid of energy?   10

6   Explain the sources of solid waste and solid waste management?   10

7   Write short notes on   10

   a. World food problem

   b. Acid rain

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

a.   What are homogeneous equations? State the condition to get
     non-trivial solutions for homogeneous equations.

b.   Find Particular Integral of $(D^2 + 16)y = e^{-4x}$.

c.   Frame a differential equation for the function $z = f\left(\frac{xy}{z}\right)$.

d.   Write the Existence Theorem of Laplace Transform.

e.   Find $L^{-1}\left\{\frac{2S}{S^2-9}\right\}$.

f.   Define Periodic function. Give one example of periodic function with
     its period.

g.   Write Newton Raphson Formula to find a root of equation
     $f(x) = 0$.

h.   Evaluate $\Delta(ab^{cx})$.

i.   State Trapezoidal Rule. Why this is called Trapezoidal Rule?

j.   Express $\frac{3i}{4-i}$ in the form of $a + ib$.

2.   Answer **Any Six** Questions   5x6

a.   Find the root of the equation $2x^3 - 2x - 5 = 0$ correct to 3-places
     of decimal by Newton Raphson Method.

b.   Find the Laplace Transform of $f(t) = cos^2(3t)$

c.   State Dirichlet's condition for a function to be expanded in Fourier
     Series. Find a_0 of the $Fourier$ $Series$ for the $function$ $f(x) = 2$
     In $0 \leq x \leq 2\pi$.

d.   Evaluate $\int_{2.5}^{4} lnx \, dx$ using Trapezoidal Rule with 5 subintervals.

e.   Find the Inverse Laplace Transform of
     $F(s) = \frac{1}{(s+1)(s^2-1)}$

f. Find $f(x)$ when x=32 from the following data using Newton Forward Interpolation Formula

x	30	35	40	45	50
f(x)	15.9	14.9	14.1	13.3	12.5

g Solve the following differential equation
$$(D^3 - 7D + 6)y = 0$$

3 i) Express $f(x) = \frac{1}{2}(\pi - x)$ as a Fourier Series in the interval $(0,2\pi)$ 7

Hence deduce the value of the series $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \cdots$

ii) Find $\sqrt{-15 + 8i}$ 3

4 i) Solve the following partial differential equation   6
$$x^2(y - z)p + y^2(z - x)q = z^2(x - y)$$

ii) Evaluate $\int_0^6 \frac{dx}{4x+5}$ using Simpson's $\frac{1}{3}rd$ Rule correct up to 3-places of decimal taking h=1.   4

5 i) Solve the differential equation   5
$$(D^2 + 5D + 6)y = e^{-2x}\sin 2x$$

ii) Find the Laplace Transform of $L(t^3 e^{-3t})$ 5

6 i) Find k if the following equations are consistent   5
   X+2y-3z=-2
   3x-y-2z=1
   2x+3y-5z=k

ii) Find f(x) when x=15

X	3	7	11	19
F(x)	42	43	47	60

   5

7 i) Solve the following differential equation   5
$$(D^2 - 2D - 3)y = e^{3x} + \sin x$$

ii) If ω is the cube root of unity, show that   5
$$(1 - \omega + \omega^2)^6 + (1 + \omega - \omega^2)^6 = 128$$

TH-II Circuit & Network Theory

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   **Answer All questions**   2 x 10

     a.   State Ohm's law.

     b.   What do you mean by active element. Give two examples.

     c.   Define permeability and reluctance.

     d.   State KCL & KVL.

     e.   Give the statement of Thevenin's theorem.

     f.   State the necessary mathematical formulation for conversion from star to delta and vice versa.

     g.   Define power factor and power triangle.

     h.   Define Q-factor and selectivity in series circuit.

     i.   Define coefficient of coupling.

     j.   Write two property of series resonance.

2.   Answer **Any Six** Questions   5X6

   a.   (a) Find the power loss in 1Ω resistor of the figure as shown below.
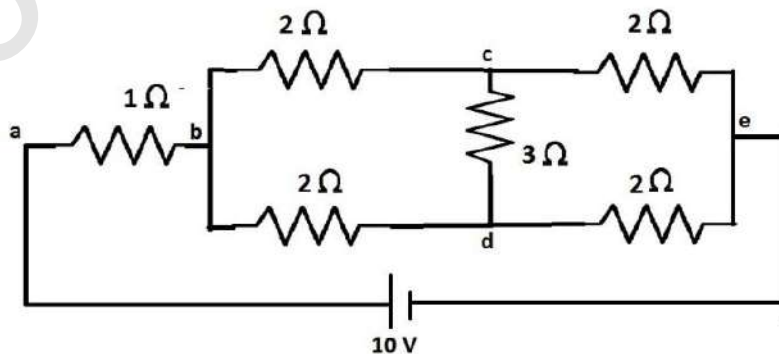
     b.   (a) Find the total inductance of the series connected coupled coils as shown below.
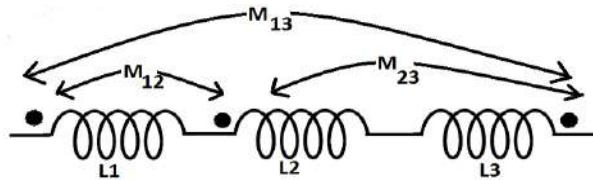
M12=0.5H,M23=1H,M31=1 H,L1=2H,L2=1 H,L3=2 H

c. Explain briefly about B-H curve.

d. State the condition of resonance in series R,L,C circuit. Derive the expression of resonant frequency for series R,L,C circuit.

e. State and derive the condition for maximum power transfer in a circuit and write the expression for maximum power.

f. Define filter. Classify pass band, stop band filters with neat diagram.

g   Briefly explain about the Z,Y,ABCD and h parameters.

3   By using superposition theorem find the current through 20 Ω resistor of the circuit as shown in the figure below.   10
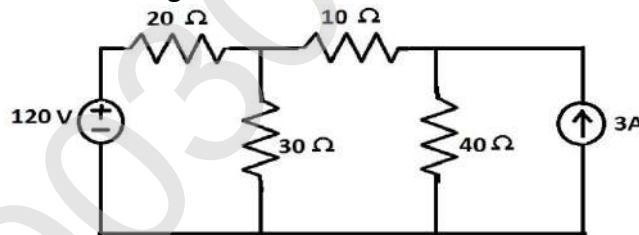
4   Draw the characteristics curve between charging current and time during charging current and time during charging and discharging condition of a series RL circuit.   10

5   Design a HPF (both T and ∏ network) having a cut off frequency of 2 kHz with a load resistance of 300 Ω.   10

6   Obtain Z-parameters of the below circuit.   10
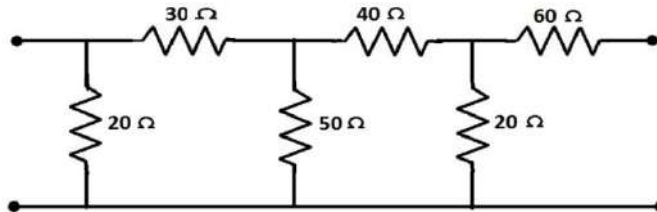
7   A resistance of 10 Ω, an inductor of inductance of 20 H and a capacitor of capacitance 100 micro farad are connected to a single phase 230 V AC source. Find (i) current, (ii) power factor, (iii) active power consumption corresponding to supply frequencies of 50 Hz and 100 Hz respectively.   10

Th4 Electrical Engineering Materials

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   What do you mean by resistivity and state its SI unit.

   b.   Define dielectric constant. What is the dielectric constant of air?

   c.   What is N-type semiconductor? Give an example.

   d.   Which properties should a fuse material possess?

   e.   What are the factors affecting dielectric strength of insulating
        material?

   f.   Name the materials used in making (i) element of a filament lamp (ii)
        resistors for loading rheostats.

   g.   What is magnetostriction in magnetic materials?

   h.   What is photovoltaic cell?

   i.   What do you mean by thermocouple? Give an example of
        thermocouple.

   j.   State an application of (i) Teflon (ii) PVC insulating material.

2.   Answer **Any Six** Questions   5X6

   a.   Differentiate between soft and hard magnetic materials.

   b.   Describe about the electron energy and energy band theory briefly.

   c.   Write a short note on soldering materials.

   d.   Explain the domain theory of ferromagnetic material briefly.

   e.   What are the factors affecting insulation resistance?

   f.   Describe the applications of superconductor materials.

   g   Explain the mechanical properties affecting the selection of insulator
        in brief.

3   Explain the low resistivity materials and their applications in details.   10

4   Describe about fuse and fuse materials. Draw also a cross section   10
     view of cartridge fuse.

5   Write a short note on(i)Hall Effect generators(ii) Solar power   10

6   Explain the electrical conductivity and the breakdown of (i) Gaseous   10
     dielectrics(ii) Liquid dielectrics

7   Describe about natural and synthetic rubber and their applications.   10

3rd Sem. Common   2021(W)
Th-5 Environmental Studies

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

   a. Define acid rain.

   b. What is ecological succession?

   c. What do you mean by soil erosion?

   d. Define genetics and species.

   e. Mention any two causes of marine pollution.

   f. Define environment.

   g. What is mortality?

   h. What do you mean by sustainable development?

   i. What leads to conflicts over water?

   j. Define water pollution.

2. Answer **Any Six** Questions 6 x 5

   a. Define and explain food chain with at least one example.

   b. Explain the changes caused by modern agriculture.

   c. Explain Biodiversity at National level.

   d. Give a brief note on ozone layer depletion along with its consequences.

   e. Discuss in brief 'Human Rights'.

   f. Discuss the needs of public awareness towards environment.

   g. Explain cyclone disaster management.

3		Explain the effects of mine extraction on environment and tribal people.	10
4		Explain different threats to biodiversity.	10
5		Describe forest ecosystem.	10
6		Write down the causes, effects and controlling measures of soil pollution.	10
7	a	Urban problems related to energy.	5
	b	Family welfare program.	5

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions 2×10

a.   Find the modulus and amplitude of the complex number $1 + i\sqrt{3}$.

b.   Define the rank of a matrix. Find the rank of the matrix $\begin{pmatrix} 1 & 3 \\ 3 & 9 \end{pmatrix}$.

c.   Find the complementary function of $(D^2 + 2D - 15)y = \sin 3x$.

d.   Construct a partial differential equation for the function $z = f(x^2 - y^2)$.

e.   Define Laplace transform of a function and find $\mathcal{L}(1)$.

f.   Define periodic function and find the period of the function $\cos(2x + 5)$.

g.   Find a_0 in the Fourier series of $f(x) = x$ in the interval $[-\pi, \pi]$.

h.   Define the Shift operator and write the relation between shift operator (E) and forward
      difference operator (Δ).

i.   Calculate $\Delta \tan^{-1} x$ by taking the interval difference as unity.

j.   State Lagrange's interpolation formula to interpolate a function.

2.   Answer **Any Six** Questions 5×6

a   If $x + \frac{1}{x} = 2 \cos \theta$, Show that $x^n + \frac{1}{x^n} = 2 \cos n\theta$.

b.   Determine the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$ by using elementary row transformation
      method.

c.   Solve $(D^2 + 4D + 3)y = e^{-x} \sin x$.

d.   Find the Laplace transform of the function $f(t) = \begin{cases} 3, & 0 \leq t < 2 \\ -1, & 2 \leq t < 4 \\ 0, & t \geq 4 \end{cases}$

e.   Find the Fourier series of the function $(x) = \begin{cases} 0, & 0 < x < \pi \\ 1, & \pi < x < 2\pi \end{cases}$.

f.   Find a real root of the equation $x^3 - 2x - 5 = 0$,
      by using bisection method in three steps.

g. Find the cubic polynomial which takes the following values:

x	:	0	1	2	3
$f(x)$	:	1	2	1	10

Hence, evaluate $f(4)$.

3 a. For what values of λ and μ the equations   7

$2x + 3y + 5z = 9, \quad 7x + 3y - 2z = 8, \quad 2x + 3y + \lambda z = \mu,$

have (i) no solution, (ii) a unique solution and (iii) an infinite number of solutions.

b. If $1, \omega, \omega^2$ are the three cube roots of unity,

Prove that $(1 - \omega + \omega^2)^5 + (1 + \omega - \omega^2)^5 = 32$ 3

4 a. Solve $x(y - z)p + y(z - x)q = z(x - y).$ 7

b. Find the inverse Laplace transform of $F(s) = \left(\frac{4s - 3}{s^2 + 9}\right)$ 3

5 a. Find $\mathcal{L}(t \sin^2 t)$ 5

b. Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using Simpson's 1/3 rule,

and compare the result with its actual value.   5

6 Obtain the Fourier series for

$$f(x) = \begin{cases} 0, & -\pi < x < 0 \\ \frac{\pi x}{4}, & 0 < x < \pi \end{cases}.$$ 10

Hence Prove that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \cdots \ldots \ldots$

7 a. Develop a recurrence formula for finding the value of $\sqrt{10}$, using Newton-Raphson   7
method and hence, compute this value correct to three decimal places.

b. Find the square roots of $-5 + 12\sqrt{-1}$.   3

Th-2 Circuit and Network Theory

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   What is magnetizing force? Also state its SI unit.

   b.   What do you mean by mesh analysis of AC networks?.

   c.   State the Thevenin's theorem.

   d.   Define (i) Q-factor (ii) Selectivity in series circuit

   e.   Find the total inductance of three series connected coupled coils as shown below
        with L_1=1H; L_2=2H; L_3= 5H,

        M_{12}=0.5H;M_{23}=1H;M_{13}=1H
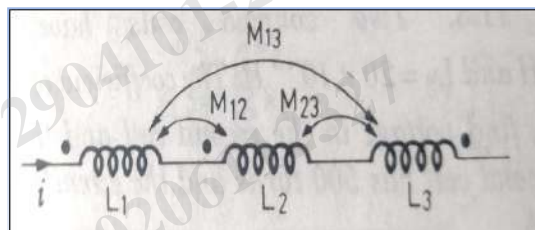

   f.   Give an example of (i) Passive Element (ii) Non linear Element

   g.   What do you mean by phase sequence in polyphase system?

   h.   What is impedance and impedance triangle?

   i.   Define filter. Give an example

   j.   What are short-circuit admittance parameters?

2.   Answer **Any Six** Questions   6 x 5

   a.   Explain the hysteresis loop of magnetic materials in details with a neat diagram.

   b.   How the 3-phase power is measured by two wattmeter method?

   c.   Describe briefly about π section of a circuit network.

d. Write a short note on hybrid (h) parameters

e. Find the open circuit parameters of the following two port network.
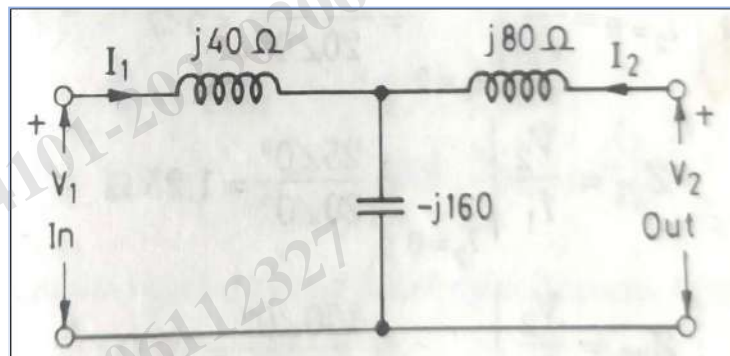
f. Explain the sinusoidal response of series R-C circuit.

g Find the current in 5Ω resistor using Norton's theorem across a-b terminals of the network shown below.
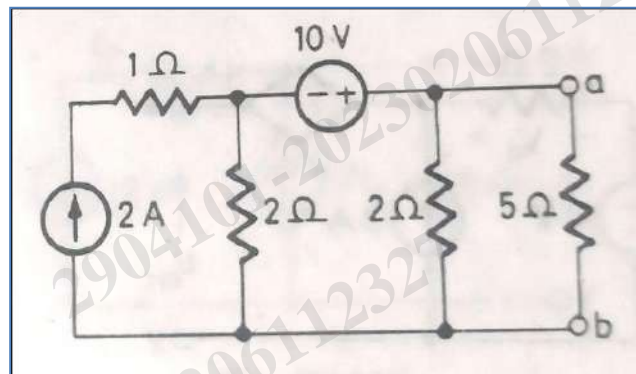
3	Derive the relation between phase and line quantities in star connection.	10
4	Write short notes on (i) Source Transformation technique (ii) Dot Convention.	10
5	Explain the transient response of series R-L-C circuit having DC Excitation.	10
6	Write short notes on (i) Constant K low pass filter (ii) Star to delta transformation	10
7	Explain the series and parallel magnetic circuits in details with neat diagrams.	10

3RD SEM/ ELECTRICAL/ 2022(W)

Th-3 Element of Mechanical Engineering

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a. What do you understand by Indicated Horse Power of an engine?
   b. Define super-heated steam.
   c. State the use of accumulator in a hydraulic circuit.
   d. State 1st Law of Thermodynamics.
   e. What is the difference between Density and Weight Density?
   f. Define condenser.
   g. How an IC Engine works?
   h. What is the function of a pump?
   i. State the Continuity Equation.
   j. Name the different types of Boilers.

2.   Answer **Any Six** Questions   6 x 5
   a. A pipe 400 mm diameter is branched into two pipes of diameter 250 mm and 110 mm respectively. If the average velocity in 400 mm diameter pipe is 2.1 m/sec and average velocity in 250 mm diameter pipe is 2 m/sec then find the velocity in 110 mm diameter pipe and total discharge.
   b. Explain Specific Weight, Dynamic Viscosity and Surface Tension of a fluid.
   c. Define surface condenser? List the merits and limitations of a condenser.
   d. Compare Wet Bulb Temperature with Dry Bulb Temperature.
   e. Differentiate Hydraulic devices and Pneumatic devices.
   f. What is an intensifier? State its use in a hydraulic/pneumatic circuit.
   g. Derive the relationship of specific heat of gases at constant volume and constant pressure.

3.   State Bernoulliï's Theorem. Derive the equation.   10
4.   Explain about 2-stroke Diesel Engine with neat sketch.   10
5.   Define Pressure. Discuss briefly about different pressure measuring instruments.   10
6.   Describe about Boiler Mountings and Accessories.   10
7.   A cylinder contains 1.1 kg of steam at 1 MPa. If the volume of steam is 0.09 m³, determine the dryness fraction of the steam, enthalpy and internal energy of the steam per kg.   10

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3RD SEM. / COMMON / 2022(W)

Th-5   Environmental studies

Full Marks: 80   Time- 3 Hours

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

  a.   Define natural resources.

  b.   Write down two examples of non-renewable resources.

  c.   Define soil erosion.

  d.   Define producers in eco system.

  e.   What is bio diversity?

  f.   What do you mean by poaching of wild life?

  g.   What is the unit of sound intensity?

  h.   What is endangered species.

  i.   Define greenhouse effect.

  j.   What are the various objectives of family welfare programme.

2.   Answer **Any Six** Questions   6 x 5

  a.   What are the environmental effects of mining?

  b.   Give a brief description of man wild life conflict.

  c.   What are the effects of acid rain.

  d.   Define rainwater harvesting? State the objective of rain water harvesting?

  e.   Describe about Bio gas plant.

  f.   Write down the role of an individual protecting environment.

  g   What are the effects of modern agriculture?

3   Define Global warming, write down the causes and effect of global warming.   10

4   Explain sources of solid waste and solid waste management.   10

5   Describe aquatic ecosystem.   10

6   Write down the effect, prevention and control of noise pollution.   10

7   Write short notes on   10
          a.   Pyramid of energy
          b.   Green house effect

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