3/7/23

Roll No. : .....

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**MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY**

NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250 005 U.P.

**Pre University Test (PUT) : Even Semester 2022-23**

6/0

**Course/Branch** : B Tech –Ist Year
**Subject Name** : Engineering Maths-II
**Subject Code** : BAS-203 (SET-B) (EP-1 To EP-14).

**Semester** : II
**Max. Marks** : 100
**Time** : 180 min

CO-1 : Apply the mathematical concepts for solving differential equations.
CO-2 : Apply the concept of Laplace Transform to solve differential equations
CO-3 : Apply the concept of convergence in sequence, series and expansion of the function by Fourier series.
CO-4 : Apply the working methods of complex functions to find analytic functions.
CO-5 : Apply the concept of Taylor's series and Laurent's series for complex function and evaluation of integrals.

**Section – A # 20 Marks (Short Answer Type Questions)**

Attempt **ALL** the questions. Each Question is of 2 marks **(10 x 2 = 20 marks)**

| Q.NO. | | COx | Question Description # Attempt ALL the questions. Each Question is of 2 marks. |
|---|---|---|---|
| 1 | A | CO1 | The degree and order of the differential equation $\left(\frac{d^3y}{dx^3}\right)^4 - 6x^2\left(\frac{dy}{dx}\right)^8 = 0$ are ... and ... |
| | B | CO1 | Find the Particular Integral of $(D^2 - 2D + 1)y = e^x x^3$. $\frac{e^x x^5}{20}$ |
| | C | CO2 | Find Laplace Transform of $F(t) = \begin{cases} e^{t-a}, & t > a \\ 0, & t < a \end{cases}$ |
| | D | CO2 | Find Laplace Transform of $cosht.\sin 2t$. |
| | E | CO3 | Discuss convergence of $\{1, 2, 2^2, 2^3, \ldots\}$ Div |
| | F | CO3 | Find Fourier coefficient $a_n$ for $f(x) = xcosx$ in $-\pi < x < \pi$. |
| | G | CO4 | Find Invariant points of transformation $w = \frac{1+z}{1-z}$ |
| | H | CO4 | Define conformal mapping. |
| | I | CO5 | Evaluate $\int_{\lvert z\rvert=\frac{1}{2}} \frac{e^z}{z^2+1} dz$. |
| | J | CO5 | Define singular point an analytic function. Find nature and location of the singularity of $f(z) = \frac{z-\sin z}{z^2}$. |

**Section – B # 30 Marks (Long / Medium Answer Type Questions)**

Attempt **ALL** the questions. Each Question is of 6 marks **(5 x 6 = 30 marks)**

| | |
|---|---|
| Q.2 (CO-1) | Solve the simultaneous equations $\frac{dx}{dt} + 5x - 2y = t, \frac{dy}{dt} + 2x + y = 0$ being given $x = 0, y = 0$ when $t = 0$. <br> **OR** <br> Solve by changing the independent variable $\frac{d^2y}{dx^2} + (3\sin x - \cot x)\frac{dy}{dx} + 2y\sin^2 x = e^{-\cos x}\sin^2 x$. |
| Q.3 (CO-2) | Find the Laplace Transform of the triangular wave function of period 2c given by $f(t) = \begin{cases} t, & 0 < t \le c \\ 2c - t, & c < t < 2c \end{cases}$ <br> **OR** <br> Using Laplace Transform, solve initial value problem $\frac{d^2y}{dt^2} + 9y = 6\cos 3t; y(0) = 0, y'(0) = 0$ |
| Q.4 (CO-3) | Test convergence: $1 + \frac{x}{2} + \frac{1.3}{2.4}x^2 + \frac{1.3.5}{2.4.6}x^3 + \cdots$ <br> **OR** <br> Find the half-range sine series of $f(x) = (lx - x^2)$ in the interval $(0, l)$. Hence, deduce that $\frac{\pi^3}{32} = 1 - \frac{1}{3^3} + \frac{1}{5^3} - \frac{1}{7^3} + \cdots$. |
| Q.5 (CO-4) | Prove that the function $f(z)$ defined by $f(z) = \begin{cases} \frac{x^3(1+i) - y^3(1-i)}{x^2+y^2}; & z \neq 0 \\ 0; & z = 0 \end{cases}$ satisfies C.R. equations at the origin, yet $f'(0)$ does not exist. <br> **OR** <br> Show that $u(x,y) = x^3 - 4xy - 3xy^2$ is harmonic. Find its harmonic conjugate $v(x,y)$ and the corresponding analytic function $f(z) = u + iv$. |

| | |
|---|---|
| Q.6 (CO-5) | Verify Cauchy's theorem for the function $f(z) = 3z^2 + iz - 4$ along the perimeter of the square with vertices $1 \pm i, -1 \pm i$.<br>**OR**<br>State Cauchy Integral formula.<br>Hence evaluate $\int_C \frac{1}{(z^2+4)^2} dz$ where $C$ is the circle $\|z - i\| = 2$. |

**Section – C # 50 Marks (Medium / Long Answer Type Questions)**

Attempt **ALL** the questions. Each Question is of 10 marks.

| | |
|---|---|
| Q.7 (CO-1) | Attempt any **TWO** questions. Each question is of **5** marks. |
| a. | Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 8(e^{2x} + \sin 2x + x^2)$ |
| b. | An R-L circuit has an e.m.f. given(in volts) by $4 \sin t$, a resistance of 100 ohms, an inductance of 4 henries with no initial current, Find the current at any time t. |
| c. | Use the variation of parameter method to solve the differential equation $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} - y = x^2e^x$. |

| | |
|---|---|
| Q.8 (CO-2) | Attempt any **TWO** questions. Each question is of **5** marks. |
| a. | Find Laplace Transform of $e^{-4t} \int_0^t \frac{1-\cos 2t}{t} dt$ |
| a. | Find the inverse Laplace Transform of $\log\left(\frac{p^2+4p+5}{p^2+2p+5}\right)$.. |
| b. | State Convolution Theorem and hence evaluate $L^{-1}\left\{\frac{p}{(p^2+1)(p^2+4)}\right\}$. |

| | |
|---|---|
| Q.9 (CO-3) | Attempt any **ONE** question. Each question is of **10** marks. |
| a. | Obtain the Fourier series for the function $f(x) = \begin{cases} x, & -\pi < x \leq 0 \\ -x, & 0 < x < \pi \end{cases}$ and hence, show that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$. |
| b. | Find Fourier Series for function $f(x) = \begin{cases} x, & 0 < x < 1 \\ 1 - x, & 1 < x < 2 \end{cases}$ and hence deduce that $\sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} = \frac{\pi^2}{8}$. |

| | |
|---|---|
| Q.10 (CO-4) | Attempt any **TWO** questions. Each question is of **5** marks. |
| a. | Find Mobius transformation that maps points $z = 0, -i, 2i$ into the points $w = 5i, \infty, -\frac{i}{3}$ respectively. |
| b. | F ind the analytic function $f(z) = u + iv$, if $u - v = (x - y)(x^2 + 4xy + y^2)$. |
| c. | Show that $f(z) = \log z$ is analytic everywhere in the complex plane except at the origin and its derivative is $\frac{1}{z}$ |

| | |
|---|---|
| Q.11 (CO-5) | Attempt any **ONE** question. Each question is of **10** marks. |
| a. | Expand $\frac{1}{(z^2+4z+3)}$ in the regions: (i) $\|z\| < 1$, (ii) $1 < \|z\| < 3$, (iii) $\|z\| > 3$, (iv) $1 < \|z + 1\| < 2$. |
| b. | State Cauchy's Residue Theorem.<br>Determine the poles and residues at each pole for: $\frac{z-1}{(z+1)^2(z-2)}$ and hence evaluate $\oint_C f(z)dz$, where $C$ is the circle $\|z - i\| = 2$ |

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# MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY

NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250 005 U.P.

**Pre University Test (PUT) : Even Semester 2022-23**

5/7/23

*Course/Branch* : B Tech - All (EP1 to EP14) **Semester** : II

*Subject Name* : Engg. Physics **Max. Marks** : 100

*Subject Code* : BAS-201 **Time** : 180 min

610

*CO-1 : Understand the concepts of quantum mechanics*

*CO-2 : Derive the expression for EM-wave using Maxwell's equations*

*CO-3 : Describe the different phenomena of light and its applications*

*CO-4 : Understand the concepts and applications of fiber optics and LASER*

*CO-5 : Understand the properties and applications of superconducting materials and nano materials*

## Section – A # 20 Marks (Short Answer Type Questions)

**Attempt ALL the questions. Each Question is of 2 marks** **(10 x 2 = 20 marks)**

| Q. No. | | COx | Question Description # Attempt ALL the questions. Each Question is of 2 marks |
|---|---|---|---|
| 1 | A | CO1 | Discuss the physical interpretation of wave function. |
| | B | CO1 | Why matter waves are associated with a particle generated when only it is in motion? |
| | C | CO2 | Show that magnetic monopoles do not exist. |
| | D | CO2 | Discuss depth of penetration in conducting medium. |
| | E | CO3 | Write the main condition for sustained interference. |
| | F | CO3 | State Rayleigh criterion of resolution. |
| | G | CO4 | Differentiate between spontaneous and stimulated emission of radiation. Which one is required for laser action? |
| | H | CO4 | Explain the principle of operation of an optical fibre. |
| | I | CO5 | Define persistent current and critical temperature. |
| | J | CO5 | Write down the size of nano particle with properties. |

## Section – B # 30 Marks (Long / Medium Answer Type Questions)

**Attempt ALL the questions. Each Question is of 6 marks** **(6 x 5 = 30 marks)**

Q.2 (CO-1) : Find the two lowest permissible energy states for an electron which is confined in one dimensional infinite potential box of width $3.5 \times 10^{-9}$ m

OR

Find de Broglie wavelength of alpha particle accelerated through 200 volt.

Q.3 (CO-2) : The Earth receives 2 cal/($cm^2$- min) energy from Sun. What will be the peak values of electric and magnetic field?

OR

What do you mean by Poynting vector? Write its dimension and unit also. Also calculate the magnitude of Poynting vector at the surface of the Sun. Given that power radiated by Sun is $5.4 \times 10^{26}$ W and its radius is $7 \times 10^{8}$ m.

Q.4 (CO-3) : A diffraction grating used at normal incidence gives a yellow line ($\lambda$ = 6000Å) in a certain spectral order superimposed on a blue line ($\lambda$ = 4800Å) of next higher order. If the angle of diffraction is $\sin^{-1}(3/4)$, calculate the grating element.

OR

Light of wavelength 6000 Å falls normally on a thin wedge shaped film of refractive index 1.4 forming the fringes that are 2 mm apart. Find the angle of wedge 0.0061

Q.5 (CO-4) : A communication system uses a 20 km long fiber having a loss of 2.2dB/km. The input power is 2700μW, Compute the output power.

OR

Calculate the population ratio of two states in He-Ne laser that producers light of wavelength 6200 Å at 300K

Q.6 (CO-5) : For a specimen of superconductor, the critical fields are $1.2\times10^5$ and $3.6\times10^5$ A/m respectively for temperature 14K and 13K. Calculate the transition temperature and critical field at 0 K and 4.2 K.

OR

Write a short note on Bottom -Up approach of Nanomaterials synthesis. Also explain Sol Gel method in detail

## Section – C # 50 Marks (Long Answer Type Questions)

**Attempt ALL the questions. Each Question is of 10 marks.**

Q.7 (CO-1) : **Attempt any ONE question. Each question is of 10 marks.** **(10 x 1 = 10 marks)**

a. Describe the experiment of Davisson and Germer to demonstrate the wave character of electrons.

b. Explain the reason why Compton Effect is not observed in visible spectrum. Derive a suitable expression for time dependent Schrodinger wave equation. **(2+8 marks)**

Q.8 (CO-2) : **Attempt any ONE question. Each question is of 10 marks.** **(10 x 1 = 10 marks)**

a. Derive the equation for the propagation of plane electromagnetic wave in free space. Show that the velocity of plane electromagnetic wave in free space is given by $c = 1/\sqrt{\mu_0 \epsilon_0}$ and also show that electric and magnetic vectors are normal to the direction of propagation of electromagnetic wave. **(2+4+4 marks)**

b. State and deduce Poynting theorem for the flow of energy in an electromagnetic field and write Maxwell's equations in integral form. **(2+6+2 marks)**

Q.9 (CO-3) : Attempt **any ONE question. Each question is of 10 marks.** **(10 x 1 = 10 marks)**

a. Discuss the phenomena of Fraunhofer's diffraction at a slit and show that relative intensities of the successive maximas are nearly

$$1 : (4/9\pi^2) : (4/25\pi^2) : . \ . \ . \ . \ .$$

b. Explain the formation of Newton's rings. Show that diameter for bright rings are proportional to square root of odd natural number and for dark ring, diameters are proportional to square root of natural number. **(2+8 marks)**

Q.10 (CO-4) : **Attempt any TWO question. Each question is of 5 marks.** **(5 x 2 = 10 marks)**

a. Explain different types of optical fibre based on materials, modes and refractive index..

b. Describe the principle and working of Ruby laser system. Compare it with He-Ne laser.

c. Derive the expression of acceptance angle and numerical aperture in optical fibre.

Q.11 (CO-5) : **Attempt any TWO question. Each question is of 5 marks.** **(5 x 2 = 10 marks)**

a. Write a short note on Top-down approach of Nanomaterials synthesis. Also explain chemical vapour deposition method (CVD).

b. Discuss Meissner effect. Show that the perfect diamagnetism and zero resistivity are two independent and essential properties of the superconductor

c. Differentiate between type I and type II superconductors. Discuss high temperature superconductors also.

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# MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY

NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250 005 U.P.

1/7/23

## Pre University Test (PUT): Even Semester 2022-23

6/10

Course/Branch : B Tech (All) | Semester : II

Subject Name : Programming for Problem Solving | Max. Marks : 100

Subject Code : BCS201 | Time : 180 min

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CO-1 : *Translate the algorithms to programs & perform its execution.*

CO-2 : *Implement conditional branching structure along with use of operators.*

CO-3 : *Use looping instructions, arrays and structures to develop programs.*

CO-4 : *Decompose a problem into functions and synthesize a complete program.*

CO-5 : *Utilize the pointer, file handling, dynamic memory allocation to solve the problems.*

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### Section – A # 20 Marks (Short Answer Type Questions)

Attempt ALL the questions. Each Question is of 2 marks (10 x 2 = 20 marks)

| Q. No. | | COx | Question Description # Attempt ALL the questions. Each Question is of 2 marks |
|---|---|---|---|
| 1 | A | CO1 | Define syntax error, runtime error & logical error. (BKL: K1-K2 Level). |
| 2 | B | CO1 | Explain the structure of C program using example? (BKL: K1-K2 Level). |
| 3 | C | CO2 | Differentiate between else if ladder & switch statement. (BKL: K1-K2 Level). |
| 4 | D | CO2 | Write the code of leap year using conditional operator. (BKL: K1-K2 Level). |
| 5 | E | CO3 | How entry control loop & exit control loop differs. (BKL: K1-K2 Level). |
| 6 | F | CO3 | What is the role of break & continue in loops. (BKL: K1-K2 Level). |
| 7 | G | CO4 | What is array of structure? Give proper example (BKL: K1-K2 Level). |
| 8 | H | CO4 | Write short note on enumerated datatype with syntax. (BKL: K1-K2 Level). |
| 9 | I | CO5 | What is special about void pointer? Give syntax (BKL: K1-K2 Level). |
| 10 | J | CO5 | What is double pointer and how is it initialized? (BKL: K1-K2 Level). |

### Section – B # 30 Marks (Long / Medium Answer Type Questions)

Attempt ALL the questions. Each Question is of 6 marks (5 x 6 = 30 marks)

Q.2 **(CO-1):** What are the major functional units of a digital computer? Explain each with suitable block diagram.

**OR**

Write the algorithm to generate Fibonacci series of n terms & draw the flowchart to find the largest of 3 numbers.

Q.3 **(CO-2):** What are the rules for switch statement? Write a program to draw calculator using switch statement.

**OR**

Write a program to print the roots of quadratic equation for real roots & otherwise print imaginary roots.

Q.4 (CO-3): What are storage classes? Write a program to check whether the number is Armstrong number or

OR

Write a C function to find the sum of following series $x^1/1! + x^2/2! + x^3/3!$ -------- Upto n terms entered by user.

Q.5 (CO-4): What are searching techniques? Write a C program to search a specific number using binary search.

OR

What are sorting techniques .Write a program using bubble or selection sort technique to sort integer array.

Q.6 (CO-5): What is difference between static memory allocation & dynamic memory allocation? What is the task of following memory allocation function malloc (), calloc (), realloc () & free ()?

OR

What is preprocessor directive? Explain the role of #define, #include & #ifdef directives with suitable example.

## Section – C # 50 Marks (Medium / Long Answer Type Questions)

**Q.7 (CO-1): Attempt any TWO questions. Each question is of 5 marks.**

a. Write the difference between low level language & high level language.

b. What are difference between i) compiler & interpreter ii) linker & loader?

c. Define data types. Discuss primitive data types in terms of memory, range etc.

**Q.8 (CO-2): Attempt any TWO questions. Each question is of 5 marks.**

a. Define operator. Explain any four classification of operator using suitable example.

b. Write the difference between type conversion & type casting using proper example.

c. Write a program to check whether the given character is upper, lower, numeric or symbol.

**Q.9 (CO-3): Attempt any ONE question. Each question is of 10 marks.**

a. Write difference between structure & union. Write a program to multiply two square matrices of dimension N X N (3 X 3) and store the result in another matrix.

b. Define string. Explain predefined string functions. Write a program to reverse the string without strrev() function.

**Q.10 (CO-4): Attempt any ONE question. Each question is of 10 marks.**

a. What are actual & formal parameters? Discuss types of parameter passing mechanism in C with example?

b. What is recursion & its principle? Write a C program to generate the Fibonacci Series using recursion.

**Q.11 (CO-5): Attempt any ONE question. Each question is of 10 marks.**

a. What is linked list? Write the self-referential structure of a node in linked list? Explain the command line argument in C with suitable example.

b. Explain the various file handling operations. Write a C program to read integer value from data.txt & write all odd numbers in file odd.txt & even numbers in file even.txt.

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# MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY

NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250 005 U.P.

**Pre University Test (PUT) : Even Semester 2022-23**

**Course/Branch** : B Tech / EP1 TO EP14
**Subject Name** : Fundamental of Electrical Engineering
**Subject Code** : BEE 201
**Semester** : II
**Max. Marks** : 100
**Time** : 180 min

*CO-1* : Apply Kirchhoff's laws in solving DC Circuits.
*CO-2* : Understand the steady state behavior of single phase and three phase AC circuits.
*CO-3* : Identify the application areas of a single phase two winding transformer and calculate their efficiency.
*CO-4* : Elaborate the working principle of AC and DC machines with their applications.
*CO-5* : Explain the working of low voltage electrical installation equipment.

## Section – A # 20 Marks (Short Answer Type Questions)

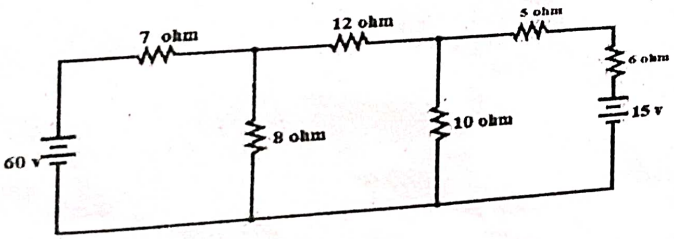
Attempt ALL the questions. Each Question is of 2 marks (10 x 2 = 20 marks)

| Q. No. | | COx | Attempt ALL the questions. Each Question is of 2 marks |
|---|---|---|---|
| 1 | A | CO1 | Define current source with its V-I characteristics? (BKL : K1-K2 Level). |
| | B | CO1 | What are Linear and Non linear elements with examples. (BKL : K1-K2 Level). |
| | C | CO2 | Define the quality factor of RLC series circuit at resonance. (BKL : K1-K2 Level). |
| | D | CO2 | What are Advantages of three phase systems over single phase systems? (BKL : K1-K2 Level). |
| | E | CO3 | Define the permeance and reluctance of the magnetic circuit. (BKL : K1-K2 Level). |
| | F | CO3 | What will happen if primary of transformer is connected to dc supply? (BKL : K1-K2 Level). |
| | G | CO4 | What will be change in emf induced if flux is reduced by 20% and the speed is increased by 20% in DC generator? (BKL : K1-K2 Level). |
| | H | CO4 | What is slip? Why Nr < Ns in three phase induction motor. (BKL : K1-K2 Level). |
| | I | CO5 | Draw the electrical characteristics of a battery. (BKL : K1-K2 Level). |
| | J | CO5 | What is Bus-Bar? (BKL : K1-K2 Level). |

## Section – B # 30 Marks (Long / Medium Answer Type Questions)

Attempt ALL the questions. Each Question is of 6 marks (5 x 6 = 30 marks)

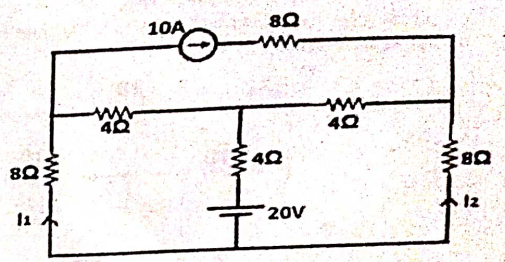
Q.2 (CO-1) : Find the current in 8 Ω & 10 Ω shown in figure using mesh analysis. (BKL >= K3 Level).




3.5
0.84
-0.31

OR

Find the current $I_1$ & $I_2$ shown in figure using mesh analysis. (BKL >= K3 Level).




Q.3 (CO-2) : Explain the phenomenon of resonance in series R L C ckt. Derive the expression for resonant frequency and draw resonance curve. Why series RLC circuit at resonance is called accepter ckt? (BKL >= K3 Level).

OR

Derive the relation between line current & phase current in case of three phase Delta connected system.. Three identical coils of resistance 4 Ω and inductive reactance 3 Ω are connected in star across 415V mains. Determine power, power factor and line current. (BKL >= K3 Level).

Q.4 (CO-3) : How many types of losses in transformer also derive the condition for maximum efficiency of transformer. (BKL >= K3 Level).

OR

Differentiate between electrical circuit and magnetic circuit. A wrought iron bar 30 cm long and 2 cm in diameter is bent into a circular shape. It is then wound with 1000 turns of wire.Calculate the current required to produce a flux of 50 mwb in magnetic ckt with an air gap of 1 mm.Assume $\mu_r = 2000$. (BKL >= K3 Level).

Q.5 (CO-4) : Draw and explain slip-torque characteristics of 3-Φ induction motor and mention all regions of operations.

A 3-phase, 50 Hz, 4 pole, induction motor has a full load speed of 1450 rpm. Calculate:- i)slip ii) frequency of rotor induced e.m.f iii) speed of rotor field w.r.t rotor structure iv) speed of rotor field w.r.to stator structure vi) speed of rotor field w.r.to stator field.. (BKL >= K3 Level).

OR

Discuss why single phase induction motor is not self starting? What are its methods of starting?Explain any two types with phasor diagram. (BKL >= K3 Level).

Q.6 (CO-5) : .Write short notes on:
(i) SFU (ii) MCB (iii) MCCB

OR

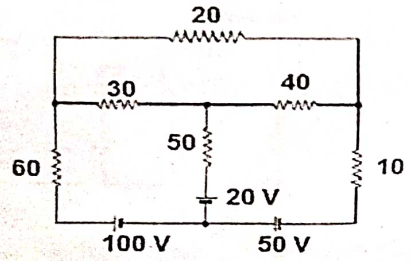
How many types of Earthing explain any one in detail ? An alkaline cell is discharged at a steady current of 4 ampere, the average terminal voltage being 1.2 V. To restore it to original state of voltage, a steady current of 3 A for 20 hours is required, the average terminal voltage being 1.44 V. If the ampere-hour efficiency of the battery is 80% calculate the backup of a battery. (BKL >= K3 Level).

## Section – C # 50 Marks (Medium / Long Answer Type Questions)

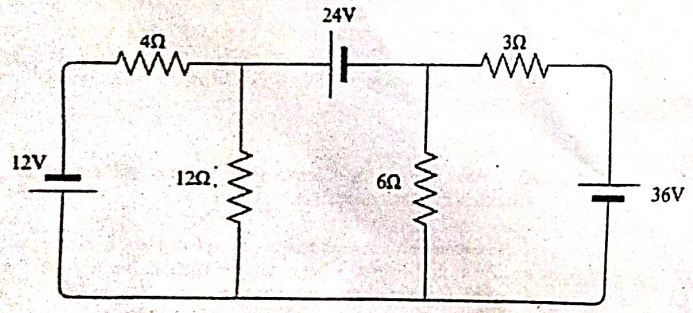
Attempt **ALL** the questions. Each Question is of 10 marks.

Q.7 (CO-1) : Attempt any TWO question. Each question is of 5 marks. (BKL >= K3 Level).

**a.** Determine the current Through 30, 40 and 50 ohms resistance by using Nodal Analysis. All resistances are in ohms.

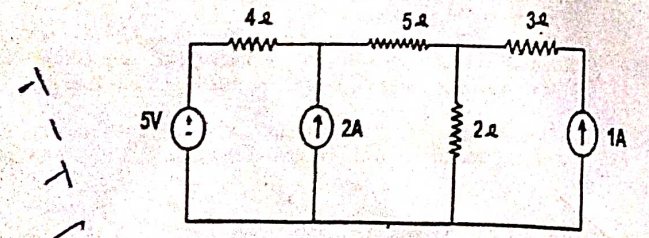



**b.** Calculate the resistive branch current by using nodal analysis.




25.2
1.2

**c.** Find the current in all branches shown in figure using mesh analysis.




Q.8 (CO-2) : Attempt any ONE questions. Each question is of 10 marks. (BKL >= K3 Level).

**a.** Find the r.m.s & average value, form factor and peak factor of the half wave rectifier output.

**b.** Derive the expression for resonant frequency of RLC parallel circuit. Also Define the quality factor of this circuit

Q.9 (CO-3) : Attempt any ONE questions. Each question is of 10 marks. (BKL >= K3 Level).

**a.** How many types of transformer on the basis of construction. Also Derive e.m.f equation of transformer.

**b.** A 25 KVA transformer has a core loss of 200W and full load cu loss of 400W. If the power factor of the load is 0.8 lagging, Calculate :- i) Half load efficiency ii) Efficiency at half load unity power factor (iii) KVA supplied at maximum efficiency iv) Maximum efficiency at 0.8 p.f. lagging

Q.10 (CO-4) : Attempt any ONE questions. Each question is of 10 marks. (BKL >= K3 Level).

**a.** Derive the e.m.f. equation of dc generator. A 6 pole, wave wound dc generator has a useful flux of 70 mWb per pole. Calculate the generated e.m.f. when it is rotated at a speed of 1000 r.p.m. with the help of prime mover. Armature consists of 440 number of turns.

**b.** Derive the torque equation of D.C Motor. A DC Shunt Motor runs at 600 rpm taking 60A from a 230V Supply. Armature resistance is 0.2 ohm and field resistance is 115 ohm. Find the speed when the current through the armature is 30A.

Q.11 (CO-5) : Attempt any TWO questions. Each question is of 5 marks. (BKL >= K3 Level).

**a.** Define all characteristics of a battery

**b.** Write short notes on:

(i)ACB (ii) Types of wires and cables.

**c.** Why we need the earthing and also Explain the working of ELCB with neat and clean diagram.

Roll No. : .....

# MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY

NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250 005 U.P.

**Pre University Test (PUT) : EVEN Semester 2022-23**

8/7/23

6/10

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| Course/Branch | : B Tech. (EP 1,2,3,4,5,6,7,8,9,10,11,12,13,14) | Semester | : II |
| Subject Name | : ENVIRONMENT & ECOLOGY | Max. Marks | : 100 |
| Subject Code | : BAS204 | Time | : 180 min |

*CO-1 : On completion of this course, the student will be able to understand basic concepts related to ecosystem, EIA and need of sustainable development.*

*CO-2 : On completion of this course, the student will be able to understand about natural resources and impacts of of human actions on natural resources.*

*CO-3 : On completion of this course, the student will be able to develop critical thinking for environmental pollution and environmental protection.*

*CO-4 : On completion of this course, the student will be able to understand various current environmental issues and concerns of national and global importance.*

*CO-5 : On completion of this course, the student will be able to develop sensitive attitude to adopt sustainability as a practice in life, society and industry.*

## Section – A # 20 Marks (Short Answer Type Questions)

**Attempt ALL the questions. Each Question is of 2 marks (10 x 2 = 20 marks)**

| Q. No. | | COx | Question Description # Attempt ALL the questions. Each Question is of 2 marks |
|---|---|---|---|
| 1 | A | CO1 | What are the segments of environment? (K2) |
| | B | CO1 | What is the concept of sustainable development? (K2) |
| | C | CO2 | What are the causes and impacts of deforestation? (K2) |
| | D | CO2 | What are natural resources? Classify them (K2) |
| | E | CO3 | What is biomagnification? (K2) |
| | F | CO3 | What is eutrophication? (K2) |
| | G | CO4 | What are various population characteristics (attributes)? Give list only. (K2) |
| | H | CO4 | Distinguish between primary and secondary pollutants giving examples. (K2) |
| | I | CO5 | What do you understand by TFR and IMR? (K2) |
| | J | CO5 | What a "hazardous substance" is as defined in Environmental Protection Act, 1986? (K2) |

## Section – B # 30 Marks (Long / Medium Answer Type Questions)

**Attempt ALL the questions. Each Question is of 6 marks (6 x 5 = 30 marks)**

**Q.2 (CO-1) :** What is EIA? With the help of a flow chart, describe EIA process. (K3)

OR

Critically evaluate the environmental problems associated with modern agriculture and mineral extraction. (K5)

**Q.3 (CO-2) :** Discuss the causes and impacts of Fluoride and Arsenic problem in drinking water. (K4)

OR

Discuss water borne & water induced diseases with examples. (K2)

**Q.4 (CO-3) :** What is smog? Discuss the causes and effects of photochemical and sulphurous smog? (K4)

OR

Critically examine the environmental impacts of burning of paddy straw openly. (K4)

**Q.5 (CO-4) :** Discuss the problem of automobile pollution and suggests suitable ways and means to control it. (K3)

OR

Discuss population explosion in Indian context. Discuss the factors responsible for population explosion in India. What should be the objectives of a sound population policy? (K2)

**Q.6 (CO-5) :** Environmental education can play an important role in environmental protection. Justify (K5)

OR

Discuss role of Government regarding protection of environment. (K2)

## Section – C # 50 Marks (Medium / Long Answer Type Questions)

**Attempt ALL the questions. Each Question is of 10 marks.**

**Q.7 (CO-1) : Attempt any ONE question. Each question is of 10 marks.**

a. With the help on neat sketch discuss the structure of atmosphere along with temperature profile of atmosphere and related phenomenon. (K3)

b. What is mean by structure of an ecosystem? Explain the various components of an ecosystem structure. Discuss the function of an ecosystem also. (K2)

c. What are ecological pyramids? Discuss their types. Also mention which pyramid is always upright and why? (K3)

**Q.8 (CO-2) : Attempt any ONE question. Each question is of 10 marks.**

a. Give a brief account of conventional and non-conventional energy resources giving suitable examples. (K2)

b. Describe various environmental movements held in India for conservation of environment. (K2)

c. Define biogeochemical cycle. With a neat sketch, explain Nitrogen and Sulphur cycle in nature. (K3)

**Q.9 (CO-3) : Attempt any ONE question. Each question is of 10 marks.**

a. What is air pollution? What are its causes & effects? Discuss the measures used for controlling air pollution. (K4)

b. Write a detailed note on waste water treatment plant with physical, biological and chemical processes. (K2)

c. Describe in brief the concept of solid waste management with the basic problem involved in it. Distinguish between incineration, combustion and pyrolysis methods of solid waste disposal. (K4)

**Q.10 (CO-4) : Attempt any ONE question. Each question is of 10 marks.**

a. What is acid rain? What are the causes and effect of acid rain? How can be problem be overcome? (K4)

b. What are greenhouse gases? Discuss the phenomenon of 'Greenhouse Effect'. What are its effects? What remedial measures you suggest? (K4)

c. What is ozone hole or ozone layer depletion? What are the causes of ozone hole formation? Discuss the effects of ozone layer depletion and its remedial measures. (K4)

**Q.11 (CO-5) : Attempt any ONE question. Each question is of 10 marks.**

a. Briefly discuss the salient features of Environment (Protection) Act, 1986. (K2)

b. Discuss the importance of women education for the success of the schemes relating to environmental quality management and public health. (K2)

c. Discuss the role of Non-Governmental Organizations (NGOs) in public awareness and environmental protection. (K2)