MAKE-UP EXAM

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BMATS101

First Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Mathematics – I for CSE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With usual notation, prove that $\frac{1}{p^2}=\frac{1}{r^2}+\frac{1}{r^4}\left(\frac{dr}{d\theta}\right)^2$.	6	L2	CO1
	b.	Find the angle of intersection between the curves $r = ae^{\theta}$ and $re^{\theta} = b$.	7	L2	CO1
	c.	Find the radius of curvature of the curve $x = a \log(\sec t + \tan t)$, $y = a \sec t$ at any point 't'.	7	L2	CO1
		OR			
Q.2	a.	Show that the curves $r = a(1 + \sin\theta)$ and $r = a(1 - \sin\theta)$ cuts each other orthogonally.	6	L2	CO1
	b.	Find the Pedal equation of the curve $r(1 - \cos\theta) = 2a$.	7	L2	CO1
	c.	Using modern mathematical tool, write a programe / code to plot the sine and cosine curves.	7	L3	CO5
		Module – 2			
Q.3	a.	Expand $\sqrt{1+\sin 2x}$ upto the term containing x^4 using Maclaurin's series.	6	L2	CO2
	b.	If $u = f(2x - 3y, 3y - 4z, 4z - 2x)$, then prove that $\frac{1}{2}u_x+\frac{1}{3}u_y+\frac{1}{4}u_z=0$.	7	L2	CO2
	c.	Find the extreme values of the function $f(x, y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$.	7	L2	CO2
		OR			
Q.4	a.	Evaluate $\lim_{x\to 0}\left(\frac{\tan x}{x}\right)^{1/x}$	8	L2	CO1
	b.	If $u = \log\left(\frac{x^2+y^2}{x+y}\right)$, show that $xu_x + yu_y = 1$.	7	L2	CO2
	c.	Using modern mathematical tool, write a programe / code to evaluate $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$.	5	L3	CO5

		Module – 3			
Q.5	a.	Solve $\frac{dy}{dx} + y \tan x = y^3 \sec x$.	6	L2	CO2
	b.	Find the orthogonal trajectories of $r = a(1 - \cos\theta)$, where a is parameter.	7	L3	CO2
	c.	Find a solution for the non – linear differential equation $xy\,p^2 - (x^2 + y^2)p + xy = 0$.	7	L2	CO2
		OR			
Q.6	a.	Solve $(y \cos x + \sin y + y)dx + (\sin x + x \cos y + x)\,dy = 0$.	6	L2	CO2
	b.	Find the general solution of the equation $(px - y)(py + x) = 2p$ by reducing into Clairauts form by taking the substitution $X = x^2$, $Y = y^2$.	7	L3	CO2
	c.	If the temperature of the air is 30°C and the substance cools from 100°C to 70°C in 5 minutes. Find 't' when the temperature will be 40°C.	7	L2	CO2
		Module – 4			
Q.7	a.	Find the unit digit in the remainder 7^{289}.	6	L1	CO3
	b.	Solve the system of linear congruence $x \equiv 2 \pmod{3}$, $x \equiv 3 \pmod{5}$, $x \equiv 2 \pmod{7}$ by using CRT.	7	L2	CO3
	c.	Find the remainder when 146! is divided by 149.	7	L2	CO3
		OR			
Q.8	a.	Find the remainder when $135 \times 74 \times 48$ is divided by 7.	6	L2	CO3
	b.	Using RSA algorithm decrypt 09810461 using $d = 937$, $p = 43$, $q = 59$.	7	L2	CO3
	c.	Using Fermat's little theorem, find the remainder when 11^{104} is divided by 7.	7	L2	CO3
		Module – 5			
Q.9	a.	Find the rank of the matrix $\begin{bmatrix} 91 & 92 & 93 & 94 & 95 \\ 92 & 93 & 94 & 95 & 96 \\ 93 & 94 & 95 & 96 & 97 \\ 94 & 95 & 96 & 97 & 98 \\ 95 & 96 & 97 & 98 & 99 \end{bmatrix}$.	6	L2	CO4
	b.	Solve the system of equation by using Gauss – Jordan method. $x + y + z = 9$, $x - 3y + 4z = 13$, $3x + 4y + 5z = 40$.	7	L2	CO4
	c.	Using Power method, find the largest eigen value and corresponding eigen vector of the matrix $A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ by considering Initial vector as $[1, 1, 1]^T$.	7	L2	CO4

		OR			
Q.10	**a.**	Solve the following system of equations by Gauss – Seidel method. $x + y + 54z = 110$. $27x + 6y - z = 85$, $6x + 15y + 2z = 72$. Carry out four iterations.	8	L1	CO4
	b.	Investigate the values of λ & μ, such that the system of equations $x + y + z = 6$ $x + 2y + 6z = 10$ $x + 2y + \lambda z = \mu$ may have i) Unique solution ii) No solution and iii) Infinitely many solution.	7	L2	CO4
	c.	Using modern mathematical tool write a program / code to test the consistency of the equations $x + 2y - z = 1$; $2x + y + 4z = 2$; $3x + 3y + 4z = 1$.	5	L3	CO5

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MAKE-UP EXAM

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BMATS201

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Mathematics – II for CSE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Evaluate $\int_{-c}^{c}\int_{-b}^{b}\int_{-a}^{a}(x^2+y^2+z^2)dz\,dy\,dx$	7	L2	CO1
	b.	Evaluate $\int_{0}^{\infty}\int_{0}^{\infty}e^{-(x^2+y^2)}dx\,dy$ by changing into polar coordinates.	7	L2	CO1
	c.	Prove that $\beta(m,n)=\frac{\Gamma m-\Gamma n}{\Gamma m+n}$.	6	L2	CO1
		OR			
Q.2	a.	Evaluate $\int_{0}^{1}\int_{x}^{\sqrt{x}}xy\,dy\,dx$ by changing the order of integration.	7	L3	CO1
	b.	Prove that $\int_{0}^{\pi/2}\sqrt{\cot\theta}\,d\theta=\frac{\pi}{\sqrt{2}}$	7	L2	CO1
	c.	Using mathematical tools, write the code to find the area of an ellipse by double integration $A=4\int_{0}^{a}\int_{0}^{\frac{b}{a}\sqrt{a^2-x^2}}dy\,dx$	6	L3	CO5
		Module – 2			
Q.3	a.	Find div $\vec{F}$ and curl $\vec{F}$, If $\vec{F}=\nabla(x^3+y^3+z^3-3xyz)$	7	L2	CO2
	b.	Find the directional derivative of $\phi=x^2yz+4xz^2$ at (1, –2, –1) Along the direction of the vector $(2i-j-2K)$.	7	L2	CO2
	c.	Prove that the spherical coordinate system is orthogonal.	6	L3	CO2
		OR			
Q.4	a.	Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point (2, –1, 2).	7	L3	CO2
	b.	Show that $\vec{F}=(y^2-z^2+3yz-2x)i+(3xz+2xy)j+(3xy-2xz+2z)K$ is both solenoidal and irrotational	7	L2	CO2
	c.	Using the mathematical tools, write the codes to find the divergence of $\vec{F}=x^2yi+yz^2j+x^2zK$.	6	L3	CO5

		Module – 3			
Q.5	**a.**	Prove that the subset $W = \{(x, y, z) / x - 3y + 4z = 0\}$ of the vector space R^3 is a subspace of R^3.	**7**	**L3**	**CO3**
	b.	Determine whether the matrix $A = \begin{bmatrix} 3 & -1 \\ 1 & -2 \end{bmatrix}$ is a linear combination of $B = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$, $C = \begin{bmatrix} 1 & 1 \\ -1 & 0 \end{bmatrix}$ and $D = \begin{bmatrix} 1 & -1 \\ 0 & 0 \end{bmatrix}$ in the vector space M_{22} of 2×2 matrices.	**7**	**L2**	**CO3**
	c.	Find the linear transformation $T : V_2(R) \rightarrow V_3(R)$ such that $T(1, 1) = (0, 1, 2)$, $T(-1, 1) = (2, 1, 0)$.	**6**	**L2**	**CO3**
		OR			
Q.6	**a.**	Determine whether the vectors $V_1 = (1, 2, 3)$, $V_2 = (3, 1, 7)$ and $V_3 = (2, 5, 8)$ are linearly dependent or linearly independent.	**7**	**L2**	**CO3**
	b.	Find the dimension and basis of the subspace spanned by the vectors $(2, 4, 2)$, $(1, -1, 0)$, $(1, 2, 1)$ and $(0, 2, 1)$ in $V_3(R)$	**7**	**L2**	**CO3**
	c.	Verify the rank-nullity theorem for the linear transformation $T : V_3(R) \rightarrow V_3(R)$ defined by $T(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$.	**6**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Find the root of the equation $xe^x = 2$ that lies between 0 and 1. Using Regula- Falsi method. Carryout Four iterations. Correct to 3 – decimal places.	**7**	**L2**	**CO4**
	b.	Use Newton's divided difference formula. Find f(q), given the data : x : 5 7 11 13 17 f(x) : 150 392 1452 2366 5202	**7**	**L3**	**CO4**
	c.	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $\frac{1}{3}^{rd}$ rule taking 4 equal parts.	**6**	**L3**	**CO4**
		OR			
Q.8	**a.**	Find the real root of the equation $3x - \cos x - 1 = 0$. Correct to 3-decimal places. Using Newton's Raphson method carryout 3 – iteration.	**7**	**L2**	**CO4**
	b.	Find Tan(0.26) given that Tan (0.10) = 0.1003 Tan (0.15) = 0.1511, Tan (0.20) = 0.2077, Tan (0.25) = 0.2553, Tan(0.30) = 0.3093. Using Newton's Backward interpolation formula.	**7**	**L2**	**CO4**
	c.	Evaluate $\int_4^{5.2} \log x \, dx$ taking 6 equal parts. Using Simpson's $3/8^{th}$ rule.	**6**	**L2**	**CO4**

		Module – 5			
Q.9	a.	Employ Taylor's series method find y at x = 0.1 and 0.2 given that $\frac{dy}{dx} = 2y + 3e^x$; y(0) = 0. Up to fourth degree terms.	7	L2	CO4
	b.	Using Runge Kutta a method of forth order to find an approximate value of y(0.2) given that $\frac{dy}{dx} = (x^2 + y)$ with y(0) = 1. Taking h = 0.2.	7	L2	CO4
	c.	Given $y' = (x - y^2)$ and the data y(0) = 0, y(0.2) = 0.02, y(0.4) = 0.0795, y(0.6)=0.1762. Compute y(0.8) by Milne's method.	6	L2	CO4
		OR			
Q.10	a.	Using modified Euler method find y(0.1) given that $\frac{dy}{dx} = (x + y)$, with y(0) = 1, Taking h = 0.1. Carryout 3-modification.	7	L2	CO4
	b.	Using Runge kutta method of fourth order, find the value of (0.2). Given that $\frac{dy}{dx} = \left(3x + \frac{y}{2}\right)$ with y(0) = 1. Taking h = 0.2.	7	L2	CO4
	c.	Using Mathematical tools, write the code solve the differential equation $\frac{dy}{dx} = 3e^x + 2y$ with y(0) = 0, using the Taylor's series method at x = 0.1 (0.1) 0.3.	6	L3	CO5

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MAKE-UP EXAM

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BCHES102/202

First/Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Applied Chemistry for CSE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is conductometric sensor? Explain its working principle and two applications.	07	L1	CO1
	b.	Define electrochemical sensor? Explain working principle of electrochemical sensors and its application?	07	L1	CO1
	c.	What is electrochemical gas sensors SO_x ? Explain electrode reactions and its application.	06	L1	CO1
		OR			
Q.2	a.	What is electrochemical gas sensors NO_x ? Explain in detail working principle and its application.	07	L1	CO1
	b.	Explain construction working and application of lithium-ion battery and its advantages and its application.	07	L2	CO1
	c.	What is disposable sensors? Explain in detail working principle in the detection of biomolecules with an example.	06	L1	CO1
		Module – 2			
Q.3	a.	Discuss in detail basic concepts of electronic memory classification.	07	L2	CO2
	b.	What are the types of organic / inorganic memory devices are used in computers with example?	07	L1	CO2
	c.	Write briefly about electronic memory device (i) Transistors (ii) Capacitors	06	L1	CO2
		OR			
Q.4	a.	What are liquid crystals display? Explain classification, properties and its application in liquid crystal display technique.	07	L1	CO2
	b.	Explain the properties and applications of organic light emitting diode in details.	07	L2	CO2
	c.	Discuss the properties and application of Quantum light emitting diodes in detail.	06	L2	CO2
		Module – 3			
Q.5	a.	Define metallic corrosion. Explain the electrochemical theory of corrosion taking iron as example.	07	L1	CO3
	b.	Define anoding. Explain the process of anoding of aluminium with electrode reaction and its application.	07	L1	CO3
	c.	A steel of area 100 $inch^2$ is exposed to air near the seashore. After 1 year it was found that the steel sheet has lost 485 g due to corrosion. What is the value of CPR in mpy and in mmpy? Can such steel sheet applicable for the construction purpose where the steel sheet is exposed? (Given area A = 100 $inch^2$, total weight lost W = 485 g, T = 1 year, D = 7.9 g/cm^3 , K = 87.6 mmpy)	06	L3	CO3

		OR			
Q.6	a.	What are reference electrodes? Explain the construction, working and application of calomel electrode.	07	L1	CO3
	b.	Explain theory, instrumentation of potentiometric estimation of ferrous ammonium sulphate and its applications?	07	L2	CO3
	c.	A concentration cell is constructed by dipping copper rods in 0.001 M and 0.1 M copper sulphate solutions. Calculate EMF of cell at 298 K.	06	L3	CO3
		Module – 4			
Q.7	a.	Define conducting polymers? Explain synthesis and conducting mechanism of polyacetylene and its application.	07	L1	CO4
	b.	Explain the synthesis, properties and commercial applications of Kevlar.	07	L2	CO4
	c.	A polymer has the following composition 100 molecular mass 1000g/mol, 200 molecules of molecular mass 2000g/mol and 500 molecules of molecular mass 5000g/mol. Calculate the number and weight average, molecular weight.	06	L3	CO4
		OR			
Q.8	a.	Define PV Cell. Explain construction working with diagram and its advantages and applications.	07	L1	CO4
	b.	Explain generation of energy (green hydrogen) by electrolysis of water splitting and its applications.	07	L2	CO4
	c.	Explain any four advantages and disadvantages of hydrogen production sustainability.	06	L2	CO4
		Module – 5			
Q.9	a.	What is E-waste? Mention the source of E-waste and explain the need for e-waste management.	07	L1	CO5
	b.	Explain thermal treatment and pyrometallurgical methods of direct recycling from E-waste.	07	L2	CO5
	c.	Explain the five ill effects of toxic materials used in manufacturing electrical and electronic E-waste in details.	06	L2	CO5
		OR			
Q.10	a.	Explain the extraction of Gold from E-waste in detail steps involved.	07	L2	CO5
	b.	Explain hydrometallurgical extraction methods involved in extraction from E-waste.	07	L2	CO5
	c.	Write brief note on role of stakeholder for example producer, consumer, recycler and statutory bodies.	06	L1	CO5

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MAKE-UP EXAM

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BPHYS102/202

First/Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023

Applied Physics for CSE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *VTU Formula Hand Book is permitted.*
3. *M : Marks , L: Bloom's level , C: Course outcomes.*
4. *Physical constants: Plank's constant, $h = 6.625 \times 10^{-34}$ J-S; Speed of light, $c = 3 \times 10^{8}$ ms^{-1}; Mass of electron, $m = 9.1 \times 10^{-31}$ kg; Charge of electron, $e = 1.6 \times 10^{-19}$ C; Boltzmann constant, $k = 1.38 \times 10^{-23}$ JK^{-1}; Acceleration due to gravity, $g = 9.8$ ms^{-2}.*

		Module – 1	M	L	C
Q.1	a.	Obtain the expression for energy density of radiation under thermal equilibrium condition interms of Einstein's co-efficient.	09	L2	CO1
	b.	Explain the different types of optical fibers with suitable diagrams.	06	L2	CO1
	c.	An optical fiber of length 2 km has input power of 200 mW, which emerges out with power of 160 mW. Calculate the attenuation co-efficient of the fiber.	05	L3	CO1
		OR			
Q.2	a.	Describe the construction, principle and working of a semiconductor LASER with neat diagrams.	07	L2	CO1
	b.	Define numerical aperture and acceptance angle. Obtain an expression for numerical aperture interms of refractive indices of core, cladding and surrounding medium.	08	L2	CO1
	c.	In diffraction grating experiment the LASER light undergoes first order diffraction with diffracting angle 23.86°. The grating constant is 1.66×10^{-6} m^{-1}. Calculate the wavelength of LASER source.	05	L3	CO5
		Module – 2			
Q.3	a.	State Heisenberg's uncertainty principle. Using this principle, prove that the electron does not exists inside the nucleus.	08	L2	CO2
	b.	Set up one dimensional time-independent Schrodinger wave equation.	08	L2	CO2
	c.	An electron is bound in one dimensional infinite potential well of width 0.12 nm. Find the energy value and de-Broglie wavelength in first excited level.	04	L3	CO2
		OR			
Q.4	a.	State and explain de-Broglie's hypothesis and derive the expression for de-Broglie wavelength by analogy.	06	L2	CO2
	b.	Derive the expression for energy eigen functions and eigen values for a particle in one dimensional infinite potential well.	10	L2	CO2
	c.	Estimate the potential difference through which an electron is needed to be accelerated so that its de-Broglie wavelength becomes equal to 20 Å.	04	L3	CO2
		Module – 3			
Q.5	a.	Define single and two qubits. Explain the block sphere representation of qubit.	08	L2	CO2
	b.	Explain the controlled NOT gate (CNOT gate) with four different input states with the truth table.	08	L2	CO2
	c.	Show that S - gate can be formed by connecting two T – gates in series.	04	L3	CO2
		OR			

Q.6	a.	Mention the Pauli's matrices. Discuss the operations of Pauli's matrices on $\|0>$ and $\|1>$ states.	10	L2	CO2
	b.	Explain the operations of phase gate [S – gate] with $\|0>$ and $\|1>$ states with truth table. Mention its matrix representation.	06	L2	CO2
	c.	A linear operator X operates such that $X\|0> = \|1>$ and $X\|1> = \|0>$. Find the matrix representation of the operator X.	04	L3	CO2
		Module – 4			
Q.7	a.	What is Meissner effect? Explain Type I [Soft] and Type II [Hard] super conductors.	08	L2	CO3
	b.	What is Fermi factor? Discuss the variation of Fermi factor with temperature and energy.	08	L2	CO3
	c.	Superconducting tin has a critical magnetic field of 0.0217 T at 2K. If the critical temperature for superconducting transition for tin is 3.7K, find the critical magnetic field at 3K.	04	L3	CO3
		OR			
Q.8	a.	Define critical temperature and critical magnetic field. Explain briefly BCS theory of superconductivity.	08	L2	CO3
	b.	Enumerate the failures of classical free electron theory and mention the assumptions of quantum free electron theory.	08	L2	CO3
	c.	The Fermi level in potassium is 2.1 eV. What is the energy of the energy level for which the probability of occupation at 300 K is 0.98?	04	L3	CO3
		Module – 5			
Q.9	a.	Explain the odd rule with odd rule multipliers with suitable examples.	08	L2	CO4
	b.	Explain Poisson distribution and probability mass function with example.	07	L2	CO4
	c.	In case of animating a jump, the push height is 0.5m and jump magnification is 5. Calculate the jump height and push acceleration.	05	L3	CO4
		OR			
Q.10	a.	Discuss slow in and slow out with neat diagrams.	08	L2	CO4
	b.	Write a note on Monte-Carlo method and discuss the determination of the value of π using Monte-Carlo method.	07	L2	CO4
	c.	In an optical fiber experiment the LASER light propagating through optical made a spot diameter of 21 mm on the screen. When the distance between the end of the fiber and the screen is 31 mm, calculate the acceptance angle and numerical aperture.	05	L3	CO5

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MAKE-UP EXAM

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BETCKF205/BETCK205F

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Waste Management

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Solid Waste. Explain the type based classification of Solid waste.	10	L2	CO1
	b.	Briefly explain functional elements of SWM with schematic diagram, showing interrelationship between them.	10	L2	CO1
		OR			
Q.2	a.	Explain source based classification of Solid waste.	10	L2	CO1
	b.	Briefly explain the factors affecting SWM system.	10	L2	CO1
		Module – 2			
Q.3	a.	Briefly explain physical and chemical characteristics of Solid Waste.	10	L2	CO1
	b.	Explain the adverse health and environmental impacts due to improper handling of Solid Waste.	10	L2	CO1
		OR			
Q.4	a.	Discuss the factors that contribute to the variations in quantity and composition of Solid wastes.	10	L2	CO1
	b.	Briefly explain about E – Waste and its Environmental significance.	10	L2	CO1
		Module – 3			
Q.5	a.	Briefly explain the factors that influence the waste collection system.	10	L2	CO2
	b.	Define Transfer Station. Briefly explain types of transfer station.	10	L1 L2	CO2
		OR			
Q.6	a.	Explain briefly the various options available for waste disposal.	10	L2	CO2
	b.	Briefly explain the environmental effects of the landfill.	10	L2	CO2
		Module – 4			
Q.7	a.	With a neat sketch, explain any one type of shredding equipment.	10	L2	CO3
	b.	Explain briefly the following component separation techniques : i) Air separation ii) Magnetic separation.	10	L2	CO3
		OR			

Q.8	a.	What is Source reduction? Explain the purpose / need for source reduction in Waste Management.	10	L1 L2	CO3
	b.	Write a note on significance of recycling of solid waste.	10	L1	CO3
		Module – 5			
Q.9	a.	Explain the four characteristics used to identify hazardous waste.	10	L2	CO2
	b.	How do you assess a waste as hazardous? State their classification.	10	L1 L2	CO3
		OR			
Q.10	a.	List the various options of hazardous waste treatment. Explain in detail, the physical and chemical treatment of hazardous waste.	10	L1 L2	CO2
	b.	How is hazardous waste managed in India?	10	L2	CO3

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MAKE-UP EXAM

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BETCKE205/BETCK205E

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Renewable Energy Sources

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. VTU Handbooks are permitted.

		Module – 1	M	L	C
Q.1	a.	Explain Conventional and Non – conventional Energy sources briefly.	10	L2	CO1
	b.	Explain Renewable Energy sources in India.	10	L2	CO1
		OR			
Q.2		Explain the following : i) Solar energy ii) Wind energy iii) Biomass energy iv) Ocean thermal energy.	20	L2	CO1
		Module – 2			
Q.3	a.	Explain Solar Radiation and its estimation with neat diagram.	10	L2	CO2
	b.	Explain with neat diagram : i) Pyrano meter ii) Pyrhelio meter.	10	L2	CO2
		OR			
Q.4	a.	What is Solar Pond? Explain with neat sketch of a Solar Pond Power Plant.	10	L2	CO2
	b.	What is Photo Voltaic Cell? Explain Photo voltaic cell, with neat diagram.	10	L2	CO2
		Module – 3			
Q.5	a.	What is Wind Energy? Explain the availability of Wind energy in India.	10	L2	CO3
	b.	Explain with a neat diagram of Horizontal axis with turbine system.	10	L2	CO3
		OR			
Q.6	a.	Explain i) Photosynthesis process ii) Biomass Conversion Technologies.	10	L2	CO3
	b.	Explain the Fixed dome Biomass technologies.	10	L2	CO3
		Module – 4			
Q.7	a.	What is Tidal Energy? Explain Single basin Tidal Power Plant, with neat diagram.	10	L2	CO4
	b.	What are the advantages and limitations of Tidal Energy?	10	L2	CO4
		OR			

Q.8	a.	Explain working of OTEC Power station, with neat diagram.	10	L2	CO4
	b.	Mention : i) Advantages and limitations of OTEC. ii) Advantages and limitations of Wave energy.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain Fuel Cell technology and classify the Fuel cell technologies.	10	L2	CO5
	b.	What is Zero Energy concept and explain Zero energy building concept briefly.	10	L2	CO5
		OR			
Q.10	a.	Explain the Electrolysis method of Hydrogen production.	10	L2	CO5
	b.	Explain Hydrogen Energy storage and its applications.	10	L2	CO5

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MAKE-UP EXAM

USN | | | | | | | | | |

BPOPS103/203

First/Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Principles of Programming using C

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

			M	L	C
		Module – 1			
Q.1	a.	Compare the generation of computers.	10	L2	CO1
	b.	Describe any two input devices.	05	L2	CO1
	c.	Design an algorithm and program to find area of a circle.	05	L3	CO2
		OR			
Q.2	a.	Explain the various rules for forming identifier names. Give an example for valid and invalid identifier.	08	L2	CO2
	b.	Compare between primary memory and secondary memory along with examples.	06	L3	CO2
	c.	Design a flowchart to calculate the sum of first 10 natural numbers.	06	L3	CO2
		Module – 2			
Q.3	a.	Develop a C program that takes 3 coefficients (a, b and c) of a quadratic equation $ax^2 + bx + c$ as I/P and compute all the possible roots and print then with appropriate messages.	08	L3	CO5
	b.	Distinguish between the break and continue statement.	06	L2	CO2
	c.	Describe any 4 types of operators in C with example.	06	L2	CO2
		OR			
Q.4	a.	Develop a simple calculator program in C language to do simple operations like addition, subtraction, multiplication and division. Use switch statements in your program.	08	L3	CO2
	b.	Comparison between typecasting and type conversion with an example.	06	L2	CO2
	c.	Explain while loop along with syntax and example program.	06	L2	CO2
		Module – 3			
Q.5	a.	Implement matrix multiplication and validate the rules of multiplication.	10	L3	CO3
	b.	Summarize the recursive function concept with suitable example.	05	L2	CO3
	c.	Explain declaration and initialization of 1D and 2D Array with an example for each.	05	L2	CO3
		OR			
Q.6	a.	Explain the syntax of function declaration, function call and function definition with an example C program.	06	L2	CO4
	b.	Describe the different types of storage classes with an example.	08	L2	CO3
	c.	Write a C program to sort the array elements in ascending order.	06	L2	CO3
		Module – 4			
Q.7	a.	Develop a C program to compare 2 strings without using built in function.	06	L2	CO4
	b.	Comparison between print( ) and puts( ) functions.	04	L2	CO4
	c.	Define String. Explain any 4 string manipulation function with an example.	10	L2	CO4
		OR			
Q.8	a.	Define a pointer. Summarize the arithmetic operations performed on pointers.	06	L2	CO3
	b.	Develop a C program using pointer to compute the sum, mean and standard deviation of all elements stored in any array of N real numbers.	08	L3	CO3
	c.	Differentiate between NULL pointer and void pointer with suitable example.	06	L2	CO3

Module – 5

Q.9	a.	What is a structure? Explain C syntax of structure declaration with an example.	06	L2	CO3
	b.	Implement structures to read, write and compute average marks of the students, list the students scoring above and below the average marks for a class of N students.	08	L3	CO5
	c.	Differentiate structures and unions with syntax and example.	06	L2	CO3
		OR			
Q.10	a.	Discuss the different modes of operations on files with suitable example.	08	L3	CO4
	b.	Write a C program to copy a text file to another, read both the input file name and target file name.	06	L3	CO4
	c.	Differentiate between putc( ) and fputc( ) function.	06	L2	CO4

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MAKE-UP EXAM

USN | | | | | | | | | |

BPLCK205B/ BPLCKB205

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Introduction to Python Programming

Time: 3 hrs. Max. Marks: 100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Demonstrate with example print( ), input( ) and format ( ).	5	L1	CO1
	b.	Explain conditional branching statements with syntax and write a suitable program for the same.	7	L2	CO1
	c.	Write a python program to check whether a given number is Armstrong or not. [Hint – An Armstrong number is any number of n digits which is equal to the sum of n^{th} power of digits in the number. For example, 371 is an Armstrong number since 3**3 + 7**3+1** 3 = 371]	8	L3	CO1
		OR			
Q.2	a.	Write a python program to guess the secret number between 1 to 25 within 5 guess if the number is same then it is right guess else wrong guess.	8	L3	CO1
	b.	What are user defined function? How can we pass the arguments to the functions? Explain with suitable examples.	6	L1	CO1
	c.	What are comparison and Boolean operators? List all the comparison and Boolean operators in python.	6	L1	CO1
		Module – 2			
Q.3	a.	Explain the methods of list data types in python for the following operation with suitable code snippets for each. i) Adding values to a list ii) Removing values from a list iii) Finding a value in a list iv) Sorting the values in a list	8	L1	CO2
	b.	Explain the concept of list slicing and list traversing with an example.	6	L1	CO2
	c.	What is a dictionary? Write a python program to count occurrences of characters in a string and print the count.	6	L3	CO2
		OR			
Q.4	a.	Write a python program that find the missing number from the given a list n-1 numbers ranging from 1 to n, There are no duplicates (Hint – eg : Input = 1 2 4 6 3 7 8, output : 5)	10	L3	CO2
	b.	How is triple different from list( )? Explain with example the function used to convert list into triple and triple into list.	6	L1	CO2
	c.	Explain insert( ) and remove( ) methods of list with example.	4	L1	CO2

		Module – 3			
Q.5	a.	Write a python program to count number of lines in a file.	5	L3	CO1
	b.	Explain the following functions with example : i) makedirs( ) ii) getcwd( ) iii) velpath( ) iv) listdir( ) v) sub( )	10	L1	CO1
	c.	What are three "mode" arguments that can be passed to open( ) function with example.	5	L1	CO1
		OR			
Q.6	a.	With code snippet, explain saving variables using the shelve module and print pformat( ) functions.	6	L2	CO2
	b.	Write a python program that accepts a sentence and find the number of words, digits, upper case letters and lower case letters.	7	L3	CO2
	c.	Write a program to make a new string with all the consonant eliminated from the string read from the user [Hint – For example Input: Hello, have a good day. Output : HII, hv gd dy]	7	L3	CO2
		Module – 4			
Q.7	a.	What is meant by compressing Files? Explain reading, extracting and creating ZIP files with an example.	10	L1	CO1
	b.	Define assertions. What does an assert statement in python consists of?	5	L1	CO2
	c.	How does OS.walk( ) work in python?	5	L3	CO3
		OR			
Q.8	a.	Discuss the basicConfig( ) method to configure the lagging with an example.	7	L2	CO2
	b.	Write a program to depict Raising Exception.	7	L1	CO2
	c.	Explain the functions of Shutil module with example.	6	L2	CO2
		Module – 5			
Q.9	a.	Compare the difference between class, static and instance method.	6	L2	CO4
	b.	Define classes and objects in python. Create a class called Employee and initialize it with employee id and name. Design method to : i) Set Age – to assign age to the employee ii) Set Salary – to assign salary to the employee iii) Display – to display all information of the employee.	9	L2	CO4
	c.	Explain ---- init ---- and str --- method with an example.	5	L2	CO4
		OR			
Q.10	a.	Write a program to implement polymorphism in python using method overriding.	7	L3	CO4
	b.	Define pure function? Give an example program that returns square of a passed integer.	7	L3	CO4
	c.	How class can be instantiated in python? Write a python program to instances as return values to define a class RECTANGLE with member width. Height cornerX cornerY and member function to find center area and perimeter of a rectangle.	6	L2	CO4

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MAKE-UP EXAM

USN | | | | | | | | | | |

BPLCK105B/BPLCKB105

First Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Introduction to Python Programming

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain string concatenation and string replication operation with an example.	06	L1	CO1
	b.	Illustrate the use of break and continue with example.	08	L2	CO1
	c.	Write a Python program to check whether the given number is positive, negative or zero.	06	L1	CO1
		OR			
Q.2	a.	What are functions in Python and how they are defined and used to modularize code?	06	L1	CO2
	b.	Explain the local and global scope with local and global variables.	08	L1	CO2
	c.	Write a program to generate Fabonacci sequence of length (N). Read N from console.	06	L1	CO2
		Module – 2			
Q.3	a.	What are lists in Python and how they used to store and manipulate collections of data.	06	L2	CO3
	b.	Explain any four built-in methods available for working with lists.	08	L1	CO3
	c.	Read N numbers from console and create a list. Develop a program to print the mean of numbers.	06	L2	CO2
		OR			
Q.4	a.	Differentiate between lists and dictionary.	06	L2	CO2
	b.	Explain with example keep( ), values( ) and items( ) methods.	08	L2	CO2
	c.	Write a program to add elements into dictionary using while loop.	06	L2	CO2
		Module – 3			
Q.5	a.	Explain any five built-in methods available for working with string along with example.	10	L2	CO3
	b.	Read a multi-digit number (as chars) from console. Develop a program to print the frequency of each digit with suitable example.	10	L2	CO3
		OR			
Q.6	a.	Explain the file reading and writing process with suitable example.	10	L2	CO3
	b.	Illustrate the role of shelve module in working with files.	10	L2	CO3
		Module – 4			
Q.7	a.	Explain the functions of shutil module with examples.	10	L2	CO3
	b.	What is meant by compressing files? Explain reading, extracting and creating ZIP files with code snippet.	10	L2	CO3
		OR			
Q.8	a.	Explain the buttons in the Debug control window.	10	L1	CO3
	b.	Write a note on raising exception.	10	L2	CO3
		Module – 5			
Q.9	a.	What do you mean by class, object and attributes? Explain with example.	08	L3	CO4
	b.	Illustrate the concept of inheritance and class diagrams with example.	12	L2	CO4
		OR			
Q.10	a.	List and explain any four object oriented characteristics possessed by Python.	08	L2	CO4
	b.	Briefly discuss the importance of __init__( ) and __str__( ) methods along with example.	12	L3	CO4

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MAKE-UP EXAM

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BESCK104C/BESCKC104

First Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Introduction to Electronics & Communication

Time: 3 hrs. Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *VTU Formula Hand Book is permitted.*
3. *M : Marks , L: Bloom's level , C: Course outcomes.*

		Module – 1	M	L	C
Q.1	a.	With a neat circuit diagram and waveform, explain the working of Bridge rectifier with filter.	8	L2	CO1
	b.	With a neat block diagram, explain the working of DC power supply. Also mention, the principle components used in each block.	7	L2	CO1
	c.	A 6V Zener diode has a maximum rated power dissipation of 500mW. If the diode is to be used in a simple regulator circuit to supply a regulated 6V to a load of 500Ω. Determine a suitable value of series resistor for a supply of 12V.	5	L3	CO1
		OR			
Q.2	a.	With a neat block diagram, derive the expression for overall gain of a Negative feedback amplifier.	6	L2	CO1
	b.	Define the following with respect to amplifier i) Input resistance ii) Amplifier gain iii) Bandwidth iv) Phase shift.	8	L2	CO1
	c.	What are multistage amplifiers? Write different methods used for interstage coupling.	6	L2	CO1
		Module – 2			
Q.3	a.	Explain the conditions for sustained oscillations. Determine the frequency of oscillation of a three stage ladder network in which C = 10nF and R = 10KΩ	6	L3	CO2
	b.	With suitable circuit diagram, explain single stage Astable multivibrator using operational Amplifier.	7	L2	CO2
	c.	With a neat circuit diagram, describe the operation of a crystal controlled oscillator.	7	L2	CO2
		OR			
Q.4	a.	Define the following with respect to operational amplifier and write their typical values. i) Open loop voltage gain ii) Input offset voltage iii) Slew rate iv) Full power Bandwidth	8	L2	CO2
	b.	Sketch the circuits of each of the following based on use of operational amplifier, i) Differentiator ii) Integrator iii) Voltage follower	7	L1	CO2
	c.	Write a note on Ideal characteristics of an operational amplifier.	5	L1	CO2

		Module – 3			
Q.5	**a.**	State and prove Demorgan's theorem with its truth table.	7	L1	CO3
	b.	i) Subtract using 10's compliment method $M = 72532$, $N = 03250$ ii) Subtract using 2's complement method $M = 1010100$, $N = 1000100$	6	L3	CO3
	c.	With the help of truth table ; explain the operation of full adder with sum and carry expressions, along with circuit diagram.	7	L2	CO3
		OR			
Q.6	**a.**	Convert i) $(306.D)_{16} = (?)_2$ ii) $(41)_{10} = (?)_2$ iii) Compute One's (1's) complement of $(11101)_2$ iv) Compute 9's compliment of $(0.3267)_{10}$	8	L3	CO3
	b.	Simplify the following : i) $x(x'+y)$ ii) $xy + x'z + yz$	6	L3	CO3
	c.	Mention any 3 theorem of Boolean Algebra and prove each of them.	6	L1	CO3
		Module – 4			
Q.7	**a.**	Compare embedded system and general computing system (any 5)	6	L2	CO4
	b.	List the comparison between Microprocessor and Microcontroller.	6	L2	CO4
	c.	Write a note on classification of embedded system, also provide application of embedded system.	8	L2	CO4
		OR			
Q.8	**a.**	Explain the differences between CISC and RISC processors.	6	L2	CO4
	b.	With a neat block diagram, explain an instrumentation and control system.	8	L2	CO4
	c.	Write a short note on : i) Sensors ii) Actuators iii) 7 segment LED Display.	6	L2	CO4
		Module – 5			
Q.9	**a.**	Brief about modern communication system with its block diagram.	8	L2	CO5
	b.	Consider the following binary data 1100101 and sketch the ASK, FSK and PSK modulated waveforms.	6	L3	CO5
	c.	Explain with a neat diagram, the concept of Radio wave propagation and its different types.	6	L2	CO5
		OR			
Q.10	**a.**	List the advantages of Digital communication over analog communication.	6	L2	CO5
	b.	Describe about radio signal transmission and multiple access techniques.	7	L2	CO5
	c.	Write a note on different types of a modulation and briefly describe each in detail.	7	L2	CO5

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MAKE-UP EXAM

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BESCK204C/BESCKC204

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec.2023
Introduction to Electronics and Communication

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Assume missing data.

			M	L	C
		Module – 1			
Q.1	**a.**	With a neat block diagram explain DC power supply.	**8**	**L2**	**CO1**
	b.	With appropriate circuit diagram explain the working of Half-wave rectifier.	**8**	**L2**	**CO1**
	c.	A mains transformer having a turns ratio of 44:1 is connected to 220V r.m.s. main supply. If the secondary output is applied to half wave rectifier, determine the peak voltage that will appear across the load.	**4**	**L3**	**CO1**
		OR			
Q.2	**a.**	With appropriate circuit diagram, explain the working of Full-wave rectifier. Draw the input and output waveforms.	**12**	**L2**	**CO1**
	b.	With neat block diagram of an amplifier showing the input and output current and voltages provide the formula for voltage gain, current and power gain.	**4**	**L2**	**CO1**
	c.	An amplifier provides an output voltage of 5V for a input of 100mV. If the input and output currents are 4mA and 200mA, find voltage, current and power gain.	**4**	**L3**	**CO1**
		Module – 2			
Q.3	**a.**	With a neat diagram, explain Wein bridge oscillator.	**8**	**L2**	**CO2**
	b.	What are multivibrators? Mention the different types of it.	**8**	**L2**	**CO2**
	c.	Write a note on crystal controlled oscillators.	**4**	**L2**	**CO2**
		OR			
Q.4	**a.**	Explain the following operational amplifier parameters: i) Open loop voltage gain ii) Closed loop voltage gain iii) Input offset voltage iv) Sleeve rate.	**16**	**L2**	**CO2**
	b.	Write a note on voltage follower using operational amplifier.	**4**	**L2**	**CO2**

Module – 3					
Q.5	**a.**	Convert the following binary numbers to decimal i) 101110 ii) 1110101.11 iii) 110110100	**12**	**L3**	**CO3**
	b.	Write a note on Gray code and ASCII code.	**8**	**L2**	**CO3**
OR					
Q.6		What are logic gates? Write the graphic symbol, algebraic function and truth table of all 8 logic gates.	**20**	**L2**	**CO3**
Module – 4					
Q.7	**a.**	Differentiate between a general purpose computing system and embedded system.	**12**	**L2**	**CO4**
	b.	Differentiate between a microcontroller and microprocessor.	**8**	**L2**	**CO4**
OR					
Q.8	**a.**	Write a note on 7-segment display. Write the two configurations in 7-segment display.	**8**	**L2**	**CO4**
	b.	What is a stepper motor? Mention its classification based on coil winding arrangements and explain in detail.	**12**	**L2**	**CO4**
Module – 5					
Q.9	**a.**	With a neat block diagram of a basic communication system explain modern communication system scheme.	**12**	**L2**	**CO5**
	b.	Explain Amplitude Modulation with Relevant waveforms.	**8**	**L2**	**CO5**
OR					
Q.10	**a.**	With a neat diagram indicating the 3 different mode of propagation of the waves (Radio waves).	**12**	**L2**	**CO5**
	b.	Write a note on multiple access techniques.	**8**	**L2**	**CO5**

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MAKE-UP EXAM

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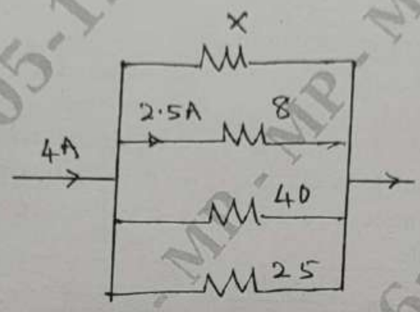
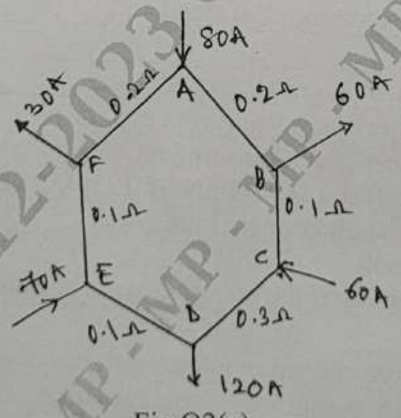
BESCK104B/BESCKB104

First Semester B.E./B.Tech Degree Examination, Nov./Dec. 2023

Introduction to Electrical Engineering

Time: 3 hrs. Max. Marks: 100

***Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What are conventional and non conventional energy resources?	6	L1	CO1
	b.	State and explain Kirchoff's laws.	6	L2	CO1
	c.	For the network of single parallel circuit shown in Fig.Q1(c) find : i) Current in all the resistors ii) Value of unknown resistance 'X'.  Fig.Q1(c)	8	L3	CO1
		OR			
Q.2	a.	What are the different methods of electrical power generation? Explain with a neat block diagram, nuclear power generation method.	7	L1	CO1
	b.	What is Ohm's Law? What are its limitations?	5	L1	CO1
	c.	Find the current flowing in each branch for the network shown in Fig.Q2(c).  Fig.Q2(c)	8	L3	CO1
		Module – 2			
Q.3	a.	Explain the following terms : i) Time period ii) Frequency iii) Amplitude with a neat wave form.	6	L1	CO2
	b.	Obtain an expression for R.M.S value in terms of maximum value of an alternating quantity.	6	L2	CO2
	c.	A resistor of 6Ω is connected in series with an inductor of inductance 25.46mH across a 220V, 50Hz AC supply find : i) Impedance ii) Power factor iii) Real and reactive powers.	8	L3	CO2

		OR			
Q.4	a.	What are the advantages of three phase over single phase system.	6	L2	CO3
	b.	Obtain relationship between line and phase voltages in a star connected system.	6	L2	CO2
	c.	Given $V = 200 \sin 377t$ volts and $i = 8 \sin (377t - 30°)$ for an AC circuit. Find : i) power factor ii) true power iii) real and reactive power.	8	L2	CO3
		Module – 3			
Q.5	a.	Explain different parts of a DC generator.	6	L2	CO2
	b.	With visual notations obtain torque equation of a DC motor.	6	L2	CO2
	c.	A 6-pole wave connected DC generator has a total flux of 150 MWb. If it runs at a speed of 1000 rpm, find the emf generated? At what speed should it be driven to generate an emf of 300V if is lap connected. Take armature conductors to be 1200.	8	L3	CO3
		OR			
Q.6	a.	Obtain an expression for emf generated in a DC generator.	6	L2	CO2
	b.	Explain why? i) A dc series motor should not be started without load on it. ii) A shunt motor is called a constant speed motor.	6	L2	CO2
	c.	A 500V shunt motor having 4 poles and wave connected winding with 492 arm conductors takes a full load current of 20A. The flux/pde is 0.05wb, arm and shunt field resistances are 0.1Ω and 250Ω respectively. Find the speed and developed torque.	8	L3	CO3
		Module – 4			
Q.7	a.	With usual notations obtain emf equation of a transformer.	6	L2	CO2
	b.	Explain the concept of rotating magnetic field.	6	L2	CO2
	c.	A 4-pole, 3-phase, induction motor operates from a supply whose frequency is 50Hz. Calculate : i) The speed at which magnetic field rotates ii) Motor speed at a slip of 4% iii) Frequency of rotor current when slip is 3% iv) The frequency of rotor currents at stand still.	8	L3	CO3
		OR			
Q.8	a.	Explain different losses that occur in a transformer.	6	L2	CO4
	b.	Differentiate between slip ring and squirrel cage rotors.	6	L2	CO4
	c.	A single phase transformer has 1000 turns on its primary winding and 400 turns on secondary winding. AC supply if 1250V, 50Hz is supplied to primary with secondary winding open. Find : i) Secondary emf induced ii) Max value of flux density if the effective cross sectional area is $60cm^2$.	8	L3	CO4
		Module – 5			
Q.9	a.	Explain two way and three control of a load with neat wiring diagram.	6	L2	CO5
	b.	What is the unit of energy consumed? Explain two part tariff system.	8	L2	CO5
	c.	What is earthing? Explain any one type of earthing with a neat diagram.	6	L2	CO5
		OR			
Q.10	a.	What are the precautions to be taken to avoid electric shock.	6	L2	CO5
	b.	Differentiate between fuse and miniature circuit breaker.	8	L2	CO5
	c.	A consumer has a maximum demand of 200KW at 40% load factor. If the tariff is 100 per KWh of maximum demand plus 10 paise per KWh, find the monthly charges (30 days).	6	L3	CO5

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MAKE-UP EXAM

USN

BESCK204B/BESCKB204

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec.2023

Introduction to Electrical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

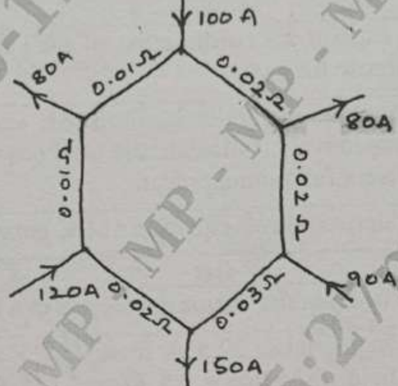
<table>
<tr><th colspan="3">Module – 1</th><th>M</th><th>L</th><th>C</th></tr>
<tr><td>Q.1</td><td>a.</td><td>With block diagram, explain hydel power generation.</td><td>6</td><td>L1</td><td>CO1</td></tr>
<tr><td></td><td>b.</td><td>State and explain Ohm's law with its limitations.</td><td>6</td><td>L1</td><td>CO1</td></tr>
<tr><td></td><td>c.</td><td>Find the current in the various branches of the given network shown in Fig. Q1 (c).
 

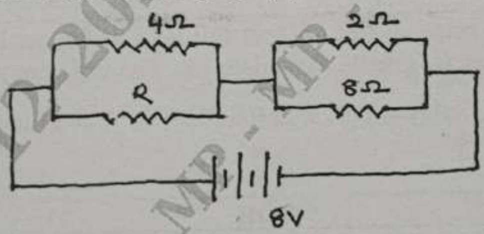
Fig. Q1 (c)</td><td>8</td><td>L3</td><td>CO1</td></tr>
<tr><th colspan="6">OR</th></tr>
<tr><td>Q.2</td><td>a.</td><td>Write the difference between conventional and non-conventional sources.</td><td>6</td><td>L1</td><td>CO1</td></tr>
<tr><td></td><td>b.</td><td>State and explain Kirchoff's current law and voltage law with example.</td><td>6</td><td>L1</td><td>CO1</td></tr>
<tr><td></td><td>c.</td><td>The total power consumed by the network is 16 watts. Find the value of R and the total current as shown in Fig. Q2 (c).
 

Fig. Q2 (c)</td><td>8</td><td>L3</td><td>CO1</td></tr>
<tr><th colspan="6">Module – 2</th></tr>
<tr><td>Q.3</td><td>a.</td><td>Define the following by referring a sine wave :
(i) Amplitude (ii) Cycle (iii) Frequency
(iv) RMS value (v) Form factor (vi) Peak factor</td><td>6</td><td>L1</td><td>CO2</td></tr>
</table>

	b.	Show that the current through pure Inductive circuit lags the applied voltage by 90° and average power consumed is zero. Draw the wave shapes of current, voltage and power.	6	L2	CO2
	c.	A circuit consists of a resistance of 20 Ω and inductance of 0.054 connected in series. A supply of 230 V and 50 Hz is applied across the circuit. Find the current, power factor and power consumed by the circuit.	8	L3	CO2
		OR			
Q.4	a.	Derive an equation for the power consumed by an R-C series circuit. Draw the waveforms of voltage, current and power.	6	L2	CO2
	b.	What are the advantages of three phase system over single phase system?	6	L2	CO3
	c.	A circuit consist resistance of 10 Ω, inductance of 16 mH and a capacitance of 150 μF connected in series. A supply voltage of 100 V at 50 Hz is given to the circuit. Find the current, power factor and power consumed by the circuit.	8	L3	CO3
		Module – 3			
Q.5	a.	With a neat sketch, explain the construction of the various parts of a D.C generator and the purpose they save.	8	L2	CO3
	b.	A 30 kW, 300 V DC shunt generator has armature and field resistance of 0.05 Ω and 100 Ω respectively. Calculate the total power developed by the armature when it delivers full output power.	8	L3	CO3
	c.	With usual notations derive an emf equation of DC generator.	4	L2	CO3
		OR			
Q.6	a.	Derive an expression of armature torque developed in a DC motor.	8	L2	CO3
	b.	A 4 pole DC shunt motor takes 22.5 A from 250 V supply. If armature resistance and shunt field resistance is 0.5 Ω and 125 Ω respectively. The armature is wave wound with 300 conductors if the flux per pole is 0.02 wb. Calculate the speed, torque developed and power developed.	8	L3	CO3
	c.	What is the significance of back emf of a D.C. motor?	4	L3	CO3
		Module – 4			
Q.7	a.	Derive the EMF equation of a transformer.	6	L2	CO3
	b.	Explain the various losses in a transformer and how they are minimized.	8	L2	CO3
	c.	A transformer is rated at 200 KVA at full load its copper losses is 1800 W and its iron losses is 750 W. Calculate (i) The efficiency at full load 0.9 P.F. (ii) The efficiency at half load 0.8 PF (iii) The efficiency at $\frac{1}{4}^{th}$ load 0.6 P.F.	6	L3	CO3
		OR			
Q.8	a.	Show that a rotating magnetic field is produced when a three phase balance supply is given to the stator winding of a 3 ϕ IM.	8	L3	CO2
	b.	Write the difference between squirrel cage and slip ring induction motor.	6	L2	CO2
	c.	A 6 pole induction motor (IM) is supplied by a 10 pole alternator which is running at 600 rpm. If the motor is running at 970 rpm. Calculate the percentage slip.	6	L3	CO2

		Module – 5			
Q.9	a.	With a neat circuit diagram and switching table, explain two way and three way control of lamp.	8	L2	CO5
	b.	With diagram, explain the working of MCB.	6	L2	CO5
	c.	What is Earthing? With neat diagram, explain the plate Earthing.	6	L2	CO5
		OR			
Q.10	a.	Define "Unit" used for consumption of electrical energy and explain the two part tariff with its advantages and disadvantages.	8	L1	CO5
	b.	What is electric shock? Give the list of preventive measures against the shock.	6	L1	CO5
	c.	List out the power rating of household appliances including, (i) Air conditioners 1 ton – 1 No. (ii) Computer – 1 No. (iii) Fridge – 1 No. (iv) DVD player – 1 No. (v) Ceiling fan – 1 No. Find the total power consumed.	6	L1	CO5

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