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(Rajdeep Khatri)

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE  
[A GOVERNMENT AUTONOMOUS COLLEGE]  
COE/B.TECH.(ME/CE/EE/ECE)/BS-M201B/2023-24  
2024  
MATHEMATICS-IIB

Full Marks: 70

Time: 3 Hours

*The figures in the margin indicate full marks.*

*Candidates are requested to write their answers in their own words as far as practicable.*

GROUP-A  
[OBJECTIVE TYPE QUESTIONS]

Answer *all* questions

5 × 2 = 10

1. Show that  $\frac{1}{x(x^2-y^2)}$  is an integrating factor of the differential equation  $(x^2 + y^2)dx - 2xydy = 0$ . 2
2. Show that the function  $f(z) = xy + ix$  is nowhere analytic where  $z = x + iy$ . 2
3. Change the order of integral of  $\int_0^2 dy \int_y^2 e^{x^2} dx$ . 2
4. Show that  $\int_C dz = \beta - \alpha$  where  $C$  is any rectifiable curve joining  $\alpha$  and  $\beta$ . 2
5. Show that the following functions are linearly independent:  $1, x, x^2$ . 2

GROUP-B  
[LONG ANSWER TYPE QUESTIONS]

Answer any *five* questions

5 × 12 = 60

6. (i) Solve:  $(xy^2 - e^{\frac{1}{x^3}})dx - x^2ydy = 0$ . 4
- (ii) Find the general solution of  $y = 2px + y^2p^3$  where  $p = \frac{dy}{dx}$ . 4
- (iii) Find the general solution and the singular solution of the differential equation  
 $y = x \frac{dy}{dx} + \sqrt{4\left(\frac{dy}{dx}\right)^2 + 9}$ . 4
7. (i) Solve:  $\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} - 4y = xe^{-2x}$ . 4
- (ii) Solve:  $\frac{d^2y}{dx^2} + 4y = x \sin x$ . 4
- (iii) Solve:  $(D^3 - D^2 + 3D + 5)y = e^x \cos 3x$ , where  $D \equiv \frac{d}{dx}$ . 4
8. (i) Solve by the method of variations of parameters:  $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$ . 6
- (ii) Solve:  $(x^3D^3 + 3x^2D^2 + xD + 8)y = 65 \cos(\log x)$ , where  $D \equiv \frac{d}{dx}$ . 6
9. (i) Find the bilinear transformation which maps the points  $z = 1, 0, -1$  into the points  $w = i, 0, -i$  respectively and find the fixed points of the transformation. 4+2
- (ii) Evaluate  $\int |z|^2 dz$  around the square with vertices  $(0,0), (1,0), (1,1)$  and  $(0,1)$ . 6

10. (i) Prove that the function  $f(z)$  defined by  $f(z) = \begin{cases} \frac{(z)^2}{z}, & z \neq 0 \\ 0, & z = 0 \end{cases}$  is not differentiable at the origin though Cauchy-Riemann equations are satisfied at that point. 3+3

(ii) Show that the function  $u(x, y) = 4xy - x^3 + 3xy^2$  is harmonic and find its harmonic conjugate  $v(x, y)$  such that  $f(z) = u + iv$  is analytic. 2+6

11. (i) Use Cauchy's integral formula to evaluate  $\oint_C \frac{e^z}{z^2 + \pi^2} dz$  where  $C$  is the positively oriented circle  $|z| = 4$ . 6

(ii) Evaluate  $\int_0^{2\pi} \frac{1}{1+a^2-2a\cos\theta} d\theta$  ( $0 < a < 1$ ) using Cauchy's residue theorem. 6

12. (i) Evaluate  $\iint_R (x^2 + y^2) dx dy$  over  $R$  bounded by  $y = x^2, x = 2, y = 1$ . 6

(ii) State Greens theorem and use it to evaluate  $\oint_C [(3x - 8y^2)dx + (4y - 6xy)dy]$  where  $C$  is the boundary of the region bounded by  $x = 0, y = 0$  and  $x + y = 1$ . 6

13. (i) Evaluate  $\iint_S \vec{F} \cdot \hat{n} ds$  where  $\vec{F} = yz\hat{i} + zx\hat{j} + xy\hat{k}$  and  $S$  is the part of the sphere  $x^2 + y^2 + z^2 = 1$  which lies in the first octant. 6

(ii) Evaluate the line integral  $\int_C (2xy - x^2)dx + (x + y^2)dy$  where  $C$  is the closed curve of the region bounded by  $y = x^2$  and  $y^2 = x$ . 6

Roll No.: 

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 Name: Rajdeep Khotik

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[A GOVERNMENT AUTONOMOUS COLLEGE]  
JGEC/B.TECH/CE/EE/ME/2023-24/2024

Paper name: CHEMISTRY  
Full Marks: 70

Paper Code: BS-CH 201  
Times: 3 Hours

*The figures in the margin indicate full marks.  
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**GROUP-A**  
**[OBJECTIVE TYPE QUESTIONS]**

Answer *all* questions

5x2=10

1. Define the term zero-point energy. Write its significance?
2. Write down the physical significance of entropy.
3. What do you mean by bathochromic and hypsochromic shift in UV spectroscopy?
4. Define the term tautomerism.
5. What is Markonikoff's rule? Give an example.

**GROUP-B**  
**[LONG ANSWER TYPE QUESTIONS]**

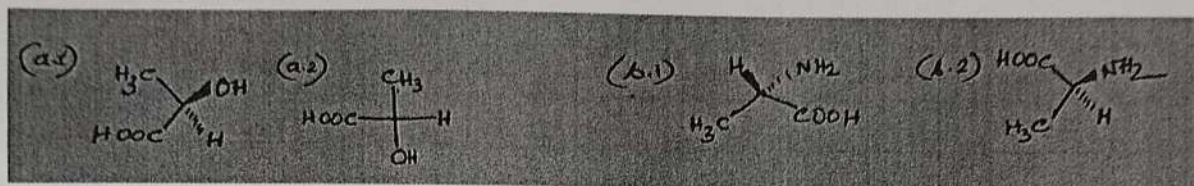
Answer any *four* questions

4x15 = 60

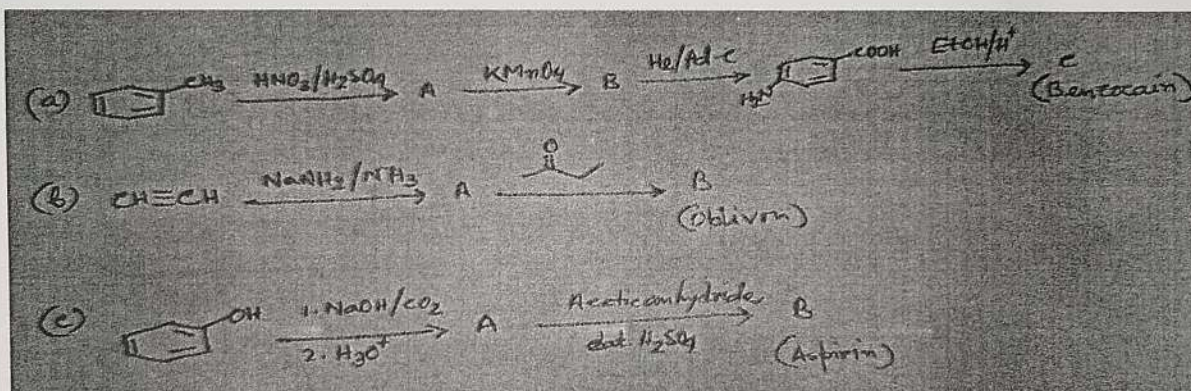
6. i) The energy associated with the particle in one dimensional box is quantized- deduce the statement. 3  
ii) What do you mean by well-behaved wave function? Write down the physical significance of  $\psi$  and  $\psi^*$  2+2  
iii) Determine the first excitation energy of xenon atom (mass =  $2.2 \times 10^{-5}$  kg) confined in a one-dimensional box of edge length 1.0 cm. 3  
iv) What is screening constant? Calculate the effective nuclear charge ( $Z_{eff}$ ) for 4s and 3d electron of Fe ( $Z=26$ ) atom. 1+4
7. i) Define the term electron gain enthalpy. Calculate the electronegativity of potassium ( $Z=19$ ) atom in Allred- Rochow scale of electronegativity. Given  $r_{cov} = 120$  pm. 1+2  
ii) State important features of CFT. Draw the splitting of d- orbitals under octahedral ligand field. 2+2  
iii) State the hybridization and calculate the CFSE of the  $[\text{Fe}(\text{CN})_6]^{4-}$  and  $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$  complexes. 2+2  
iv) In which types of molecule London forces of interactions are observed? Which would you expect to have higher boiling point, *p*-dichloro benzene or *o*-dichloro benzene and why? 2+2
8. i) State Lambert-Beer law. On passing monochromatic light through a 0.04 molar solution in a cell 2 cm thick, the intensity of the transmitted light was reduced to 50%, calculate the molar extinction coefficient. 2+2  
ii) What kind of molecules show IR spectra? What is finger print region range in IR spectra? 1+3  
iii) Why does 1,3 butadiene molecules possess higher  $\lambda_{max}$  value than ethylene molecule? 3  
iv) Predict the type of electronic transitions in the following molecules: (a) amine (b) carbonyl (c) halogens 2+2
9. i) What is corrosion? Describe different types of corrosion? 2+4  
ii)  $\text{AgCl}$  is more covalent than  $\text{NaCl}$ - justify this by Fajan's rule. 2  
iii) Predict whether the equilibrium constant for the following reaction should be greater than 1 or less than 1: If so then explain the reason in terms of HSAB theory. 2+2  
 $\text{CdI}_2(\text{s}) + \text{CaF}_2(\text{s}) \rightarrow \text{CdF}_2(\text{s}) + \text{CaI}_2(\text{s})$   
iv) One mole of an ideal diatomic gas ( $C_v = 5$  cal) was initially at 25 °C and 1 atm. The gas was transferred to the state when temperature is 100 °C and pressure 10 atm. Calculate the entropy change. 3



10. i) Classify each of the following compounds/ objects as a chiral or achiral: 3  
 (a) an cricket bat, (b) 2-chlorobutane, (c) 2,3-pentadiene
- ii) Designate the chiral center as a (R) or (S) of the following and identify the relationship (enantiomer, diastereomer or identical) 3+3



- iii) Calculate the specific rotation of a pure enantiomer of a given molecule, given that it has an optical rotation of  $+0.52^\circ$  when measured in a 10 cm polarimeter tube at  $20^\circ\text{C}$  (using the D-line of sodium) at a concentration of 0.5 g per 10 ml. 3
- iv) A sample mixture of 2-Butanol has a specific rotation  $(+)$   $6.76^\circ$ , (a) what is the percent enantiomeric excess of the sample? (b) which enantiomer is in excess, the R or S? [Given, specific rotation of (S)-2-butanol  $(+)$   $13.52^\circ$ ]. 2+1
11. i) When optically pure (R)-(-)-2-Bromooctane is allowed to react with potassium hydroxide in an  $\text{S}_\text{N}2$  reaction path, the 2-Octanol that is produced has a dextro rotation i.e.,  $(+)$  rotation. What is the configuration and stereochemical structure of  $(+)$ -2-Octanol? 1+2
- ii) Predict the main products of the following reactions: (a)  $\text{C}_2\text{H}_5\text{Br}$  react with  $\text{AgCN}$  and (b)  $\text{CH}_3\text{Br}$  react with  $\text{KNO}_2$  1+1
- iii) C-Cl bond in  $\text{H}_2\text{C}=\text{CH}-\text{Cl}$  is shorter than ethyl chloride. Explain 2
- iv) Arrange according to the stability order: benzyl cation, allyl cation, propyl cation 1
- iv) Complete the following reactions and write the name of reagents where require 3+2+2



12. Write short notes on **any three** of the following: 3x5  
 (i) Mesomeric effect and Hyperconjugation (ii) van der Waals force of interactions (iii) Carbocation and Carbanion (iv) Rearrangement reaction (v) n-type and p-type semiconductors (vi) Slater's rule

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JGEC/B.TECH/ EE/ ES-EE-201/ 2023-24  
2024

Basic Electrical Engineering

Full Marks: 70

Times: 3 Hours

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GROUP-A  
[OBJECTIVE TYPE QUESTIONS]

Answer all questions

5×2=10

1. Justify the statement: "Ohms law is not the universal law, but KVL is"
2. What is phase in ac circuits? Differentiate between vector and phasor.
3. Why a transformer can't be operated under DC?
4. What do you mean by Retentivity of magnetic materials?
5. "Induction motors are self starting motors"- verify the statement

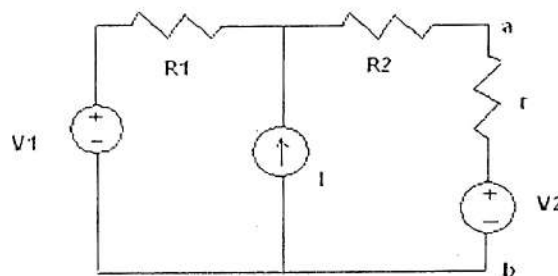
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2  
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GROUP-B  
[LONG ANSWER TYPE QUESTIONS]

Answer any four questions

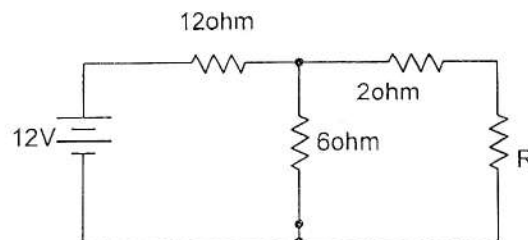
4×15 = 60

6. a) Find Thevenin's voltage across a-b terminal in the circuit given below. Also find the internal resistance across the open circuited a-b terminal, where  $R_1=10\text{ohm}$ ,  $R_2=20\text{ohm}$ ,  $V_1=10\text{volt}$ ,  $V_2=20\text{volt}$ ,  $I=5\text{A}$



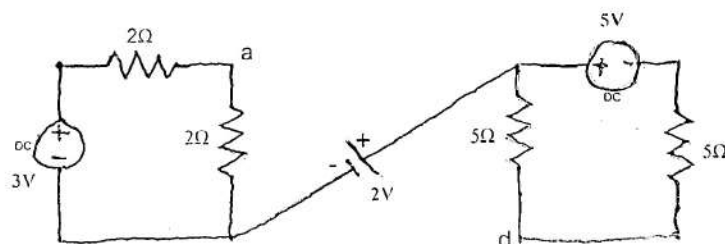
5

- b) In the network calculate the resistance R which will allow maximum power dissipated in it. Also calculate the maximum power.



5

- c) For the circuit shown below, find the potential difference between a and d:



5



7. a) Derive an expression of:  
 i) Average 5  
 ii) R.M.S. value of a half-wave rectified voltage wave.  
 b) A two-element series circuit consumes 700W of power and has power factor of 0.707 leading when energized by a voltage source of wave-form  $= 141 \sin(314t + 30^\circ)$ . Find out the circuit elements. 5  
 c) Derive a mathematical expression for the average real power delivered by a single-phase ac source with an emf of  $e = \sqrt{2}E_m \sin \omega t$  when the source current is  $i = \sqrt{2}I_m \sin(\omega t - 0)$ . 5
8. a) Classify DC Machine according to their mode of operation and construction. 5  
 b) Draw and explain the speed-torque characteristics of a DC shunt motor. 5  
 c) The armature of a 6 pole DC machine has 125 turns and runs at 1000 rpm. The EMF generated on open circuit is 500 Volts. Find the useful flux per pole when the armature is (a) Lap connected and (b) wave connected. 5
9. a) Define an ideal transformer. Draw and explain the no load phasor diagram of an ideal single-phase transformer. 2+3  
 b) Prove that efficiency of transformer is maximum when iron loss is equal to copper loss. 5  
 c) The open circuit and short circuit test data of a 5kVA, 200/400 volts, 50Hz, single phase transformer are:  
 i. O.C. test: primary voltage=200 volts,  $I=0.75$  A,  $W=75$ W 5  
 ii. S.C. test: Primary voltage=18 volts, S.C current on the secondary side=12.5A,  $W=60$  W  
 Find the parameters of the equivalent circuits.
10. a) A 4 pole, 3 phase induction motor when fed from a supply has a rotor frequency of 4 Hz. Calculate (i) slip (ii) rotor speed (iii) synchronous speed. 3  
 b) Give the principle of operation of 3-phase induction motor. Analyse the concept of RMF generation in the air-gap of the machine. 3+5  
 c) Derive an expression for the torque-slip characteristics of a 3 phase induction motor. 4
11. a) What is circuit breaker? Name the different types of circuit breakers and mention their applications. 2+3  
 b) Discuss the advantages and limitations of buck and boost converters in power electronics applications. 5  
 c) What is Duty cycle? Describe its role in regulating the output voltage of DC-DC converters. 2+3
12. Write Short notes on any three of the followings:  
 a) Loop and Mesh  
 b) Resonance in series RLC circuit 3×5  
 c) Voltage build up in DC shunt generator  
 d) MCCB  
 e) Lead Acid Batteries

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**JGEC/B.TECH/ CE/EE/ME/CSE/ECE/IT/IIM-IIU201/ 2023-24**  
**2024**  
**ENGLISH**

Full Marks: 70

Times: 3 Hours

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**GROUP-A**  
**[OBJECTIVE TYPE QUESTIONS]**

Answer *all* questions

5x2=10

Correct the errors in the following sentences:

- |    |   |   |
|----|---|---|
| 1. | I would rather to work from home than come to the office. | 2 |
| 2. | She is married with a dentist.                            | 2 |
| 3. | Every students like the teacher.                          | 2 |
| 4. | When I will arrive, I will call you.                      | 2 |
| 5. | You speak good English.                                   | 2 |

**GROUP-B**  
**[LONG ANSWER TYPE QUESTIONS]**

Answer any *four* questions

4x15 = 60

- |    |  |    |
|----|--|----|
| 6. | a) Write an essay on the proverbial saying, "Where there is a will there is a way".  | 10 |
|    | b) Fill in the blanks with prepositions:   | 5  |
|    | i) The dog is grateful <u>to</u> his owner.  |    |
|    | ii) I know Jack <u>from</u> he was a little boy.   |    |
|    | iii) The soldiers are <u>in</u> war.   |    |
|    | iv) The scientist looked <u>on</u> the microscope.   |    |
|    | v) When he flew <u>over</u> it he saw there was little water at the bottom.  |    |
| 7. | a) You are the sales representative of your company. Write a letter to the service manager of another company, introducing one of your new products or services. Invent important details.   | 10 |
|    | b) Change the voice.   | 5  |
|    | i) The Browns have built a large house.  |    |
|    | ii) They gave her a nice present. <i>she was given a nice present by them.</i>   |    |
|    | iii) Ben will direct the show.   |    |
|    | iv) Donot leave your bicycle in the hall. <i>Is French called be learn easily by you.</i>  |    |
|    | v) Can you learn French easily?  |    |
| 8. | a) Suppose you are the Head Manager of your office. Write down an email informing your employees regarding the change in office timings for the monsoon season, due to heavy traffic conditions in the city. Invent necessary details.   | 10 |
|    | b) Fill in the blanks with correct forms of verbs:   | 5  |
|    | Alice was beginning to get very tired of <u>sitting</u> (sit) by her sister on the bank and of having nothing to do : once or twice she had <u>peeped</u> (peep) into the book her sister was reading, but it <u>was</u> (have) no pictures or conversations in it, "and what is the use of a book," <u>would</u> (think) Alice, "without pictures or conversation?" Alice wondered whether the pleasure of <u>making</u> (make) a daisy chain would be worth the trouble of getting up and picking the daisies. |    |
| 9. | a) Write a memo for a company that's hosting a retirement party for a senior employee.   | 10 |
|    | b) Do as directed:   | 5  |
|    | i) She laid the table after she had finished the cooking. (begin: When...)   |    |
|    | ii) Every family has a black sheep. (Begin: There is no...)  |    |
|    | iii) The delivery boy was requested to bring the parcel the next day. (Rewrite using direct speech)  |    |
|    | iv) He is old but still he works hard. (Begin: Despite...)   |    |
|    | v) As soon as the sports meet ended, the children ran on the field. (Begin: Hardly...)   |    |

- 10 a) You have read an advertisement in the newspaper for the post of an engineer in Alex Company. You believe that you have the requisite qualifications, experience and you are innovative. Write a CV to apply for this post emphasizing your strong points. 10
- b) Make meaningful sentences to point out the difference in meaning of each pair of words: 5
- i) bored/board ii) ring/Wring iii) root/route iv) allowed/aloud v) sighs/size
- 11 a) Write an essay on pollution due to urbanization. 10
- b) Join the sentences to form one sentence: 5
- i) She went to work. She did not want to go.
- ii) The scientists trained him well. They helped him find a job when his training was through.
- iii) Polar bears are fierce, territorial animals. Grizzly bears are the same.
- iv) My cat was hungry. It had not eaten since breakfast.
- v) That movie looks great! I would love to see it with you.
-



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**COE/B.TECH./CSE/ECE/IT/BS-PH201/2023-24**  
**2024**  
**PHYSICS**

Full Marks: 70

Times: 3 Hours

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**GROUP-A**  
**[OBJECTIVE TYPE QUESTIONS]**

Answer *all* questions.

- |    |   |               |
|----|---|---------------|
|    |   | <b>5x2=10</b> |
| 1. | +q, -q, +2q and -2q point charges are fixed at (0, 0), (1, 0), (1, 1), and (0, 1). What will be the dipole moment corresponding to this charge configuration? | 2             |
| 2. | What is the physical significance of $\vec{\nabla} \cdot \vec{B} = 0$ .   | 2             |
| 3. | If the fractional change in frequency of light is 1%, calculate the fractional change in wavelength.  | 2             |
| 4. | Argue that $\psi^*(x, t)\psi(x, t)$ must be real and either positive or zero.   | 2             |
| 5. | State and explain de Broglie hypothesis.  | 2             |

**GROUP-B**  
**[LONG ANSWER TYPE QUESTIONS]**

Answer any *four* questions.

- |    |   |                |
|----|---|----------------|
|    |   | <b>4x15=60</b> |
| 6. | i) State and derive <b>Malus' Law</b> .   | 3              |
|    | ii) Show that if an unpolarized beam is incident at an angle $\theta_p = \tan^{-1}(\frac{n_2}{n_1})$ , then the reflected beam will be linearly polarized with its electric vector perpendicular to the plane of incidence.   | 5              |
|    | iii) Comment on the state of polarization of the electric field given by: $\vec{E} = E_0 \cos(kz - \omega t) \hat{i} - E_0 \cos(kz - \omega t + \pi/2) \hat{j}$ .   | 3              |
|    | iv) What are the positive and negative crystal? Give examples for each type of the crystal.   | 2+2            |
| 7. | i) Solve the <b>three-dimensional wave equation</b> by the method of separation of variables and interpret the solution physically.   | 5              |
|    | ii) On the surface of the earth we receive about 1.33 kW of energy per square meter from the sun. Calculate the electric field associated with the sunlight (on the surface of the earth) assuming that it is essentially monochromatic with $\lambda = 600 \text{ nm}$ . | 5              |
|    | iii) Find an expression for the intensity of <b>Fraunhofer diffraction</b> pattern due to a single slit. Discuss the conditions for <b>maxima</b> and <b>minima</b> .   | 5              |
| 8. | i) Derive <b>Compton equation</b> . Hence calculate <b>Compton wavelength</b> .   | 5+1            |
|    | ii) A particle is free to move one dimensionally in region of zero potential between two rigid walls at $x = 0$ and $x = a$ .   |                |
|    | a) Find the <b>eigenfunctions</b> and <b>eigenvalues</b> of the Hamiltonian.  | 4              |
|    | b) Sketch the <b>wavefunction</b> of the <b>ground state</b> and the <b>first excited state</b> .   | 2              |
|    | iii) The mean life time of the excited state of a certain nucleus emitting $\gamma$ rays is 5 ns. Estimate the <b>width</b> of the distribution in the energies (in eV) of the emitted photons.   | 3              |

9. i) A particle travels with uniform angular speed  $\omega$  around a circle of radius  $b$ . Prove that its projection on a diameter oscillates with simple harmonic motion of period  $2\pi/\omega$  about the center. 3
- ii) A particle of mass 5 g moves along x-axis under the influence of two forces: A) a force of attraction to the origin O which in dynes is numerically equal to 4 times the instantaneous distance from O, and B) a damping constant  $\beta$ . 3
- I) For what range of values of the damping constant will the motion be a) overdamped b) underdamped c) critically damped? 3
- II) Also calculate the natural period and frequency of motion. 2
- iii) Define logarithmic decrement for damped oscillatory motion. 2
- iv) Find the resultant of  $N$  simple harmonic motion all having the same amplitude and with their phases increasing in arithmetic progression. 5
10. i) Show that  $\vec{\nabla} \times \vec{\nabla} \phi = 0$  3
- ii) Show that  $\frac{d}{du}(\vec{A} \cdot \vec{B}) = \vec{A} \cdot \frac{d\vec{B}}{du} + \frac{d\vec{A}}{du} \cdot \vec{B}$  3
- iii) A particle moves along a curve whose parametric equations are  $x = 3e^{-2t}$ ,  $y = 4\sin 3t$ ,  $z = 5\cos 3t$ . where  $t$  is the time. Find its acceleration at  $t = 0$ . 3
- iv) If  $\vec{A} = (3x^2 - 6yz)\hat{i} + (2y + 3xz)\hat{j} + (1 - 4xyz^2)\hat{k}$ , evaluate  $\int \vec{A} \cdot d\vec{r}$  from  $(0, 0, 0)$  to  $(1, 1, 1)$  along the straight line joining  $(0, 0, 0)$  to  $(1, 1, 1)$ . 3
- v) Find a unit normal to the surface  $x^2y - 2xz + 2y^2z^4 = 10$  at the point  $(2, 1, -1)$  3
11. i) A non-relativistic particle is moving three times fast as electron. The ratio of their de Broglie wavelengths, particle to electron, is  $1.813 \times 10^{-4}$ . Identify the particle. 3
- ii) By rotating the pass axis of the analyzer in a plane perpendicular to the direction of propagation of the light you find a little variation in intensity of light. Comment on state of polarization of light with proper explanation. 3
- iii) In Fraunhofer diffraction pattern produced by an infinitely long slit of width  $b$ , one notices intensity variation of light on the screen without any distinct minima. Can you guess the value of  $b$ ? 3
- iv) Prove that  $\vec{\nabla} \phi$  is vector perpendicular to the surface  $\phi(x, y, z) = c$ , where  $c$  is a constant. 3
- v) Normalize the wavefunction  $\psi = Ae^{-\frac{r}{a_0}}$ , where  $a_0$  is a constant.

### Useful constants and results

- Speed of light:  $3 \times 10^8$  m/s
- Planck's constant:  $6.626 \times 10^{-34}$  J.s
- Electron charge magnitude:  $1.6 \times 10^{-19}$  C
- Electron rest mass:  $9.109 \times 10^{-31}$  kg
- Proto rest mass:  $1.672 \times 10^{-27}$  kg
- Neutron rest mass:  $1.675 \times 10^{-27}$  kg
- Free space permittivity:  $8.8542 \times 10^{-12}$  C<sup>2</sup>/N-m<sup>2</sup>
- Free space permeability:  $4\pi \times 10^{-7}$  N-sec<sup>2</sup>/C<sup>2</sup>
- $\int_0^\infty x^2 e^{-x} dx = 2$



**JALPAIGURI GOVERNMENT ENGINEERING COLLEGE**  
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**JGEC/B.TECH/ CSE/IT/ECE/ ES-CS201/ 2023-24**  
**2024**  
**Programming for Problem Solving**

Full Marks: 70

Times: 3 Hours

*The figures in the margin indicate full marks.*

*Candidates are instructed to write the answers in their own words as far as practicable.*

**GROUP-A**  
**[OBJECTIVE TYPE QUESTIONS]**

5x2=10

Answer **all** questions

1. Convert  $(100011.011011)_2 = (?)_{10}$   
Write the output and explain in short
2. 

```
int main()
{
    int a[5]={20,30,40,10};
    printf("%d",*(a+2));
}
```

```
#define MUL(x) (x*20)
void main()
{
    int a=3, b;
    b= MUL(a + 2);
    printf("\n%d",b);
}
```
3. What will be the output?  
What will be the output?
4. 

```
int a=5;
a=a<<2;
printf("%d",a);
```
5. What do you mean by C keyword? Give two examples.

**GROUP-B**  
**[LONG ANSWER TYPE QUESTIONS]**

Answer any **four** questions

4x15 = 60

6. a) Write down the difference between Entry controlled loop and Exit controlled loop with suitable example.  
Which statement is used to terminate the execution of the nearest enclosing loop in which it appears?
  - b) Distinguish between  $i++$  and  $++i$  with suitable example. Explain ternary operator with example
  - c) Print the following pattern  
1  
2 3  
4 5 6  
7 8 9 10
- 5+5+5
7. a) Write a C program to sort a 1-D array in descending order.(Input should be taken from user)
  - b) Let a 2 D array is declared as `float a[2][3]`;What is the total memory size allocated by this array and maximum how many elements can be stored in this array? If the base address is 2000, compute the address of `a[1][2]`.  
[Size of a float variable 4 bytes].(assuming array elements are stored in row major order)
  - c) Write a C program to read N integers into an array A and to find the sum of all odd numbers  
sample input: 2 4 5 13 7 8  
output: sum = 5+13+7 =25
- 5+5+5
8. a) Define flowchart. Draw the flowchart to compute simple interest
  - b) Write down the differences between System software and Application Software? Give example of a secondary memory device.
  - c) What are auto, external and static variables? Explain their uses with suitable examples
- 5+5+5



9. a) What is a pointer? Explain how the pointer variable is declared and initialized? Which operator is used to access a structure member variable?  
b) Write your own c function that will act as strlen() function .  
c) Mention the library function used for dynamic memory allocation. Explain the functionalities of any two of them.

5+5+5

- 10 a) Write a program to read and display the information of all the students in the class. Then edit the details of the i<sup>th</sup> (input: a specific index) student and redisplay the entire information.  
b) Write down the differences between structure and union with examples.

10+5

- 11 a) Write C programs to interchange two integer numbers using call by address and call by value.  
b) Write a C program to take two strings as input and display the concatenated string without using strcat() function. Explain the functionality of strcmp() function.

6+(7+2)

- 12 a) Write down the differences between recursion and iteration. Write down the criteria of a recursive function.  
b) Write a recursive function to generate the following series: 0,1,1,2,3,5,..... upto n<sup>th</sup> term. Draw the recursion tree.  
c) Write a C program to copy the content of a file into a new file.

(3+2)+(4+1)+5

REMARKS

AMAR  
u  
Gopra  
g