

GANDHI INSTITUTE FOR TECHNOLOGY (GIFT)
(An Autonomous Institution)

Registration No.:

2 2 0 1 2 9 8 5 2 7

B.Tech

Total Number of Pages: 03

Sub Code: BTES-T-ES-203

2nd Semester End Semester Examination: 2022-23

Programming Using Data Structure

Branch(s): AGE, Civil, CSE, CSE (AI), CSE (IOT), EEE, ECE, MECH

Time: 3 Hours

Max Marks: 100

Q. Code: B203

*Answer question No. 1 (Part I) which is compulsory, any eight from Part II and any two from Part-III
 The figures in the right hand margin indicate marks*

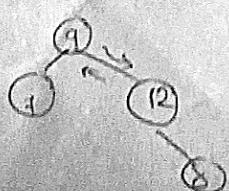
| Part - I | | Marks | |
|----------|---|-----------|----|
| 01 | Answer the following Questions | (02 x 10) | CO |
| a) | Explain the term ADT? | 1 | |
| b) | Find the address of A[7][8] while base address is given as 2173 using row major and column major address calculation. | 1 | |
| c) | What are differences between static memory allocation and dynamic memory allocation? | 1 | |
| d) | How many minimum number of queues needed to implement the priority queue explain with example? | 2 | |
| e) | What do you mean by queue underflow and queue overflow: mention their conditions? | 3 | |
| f) | 2 3 * 4 5 + * Evaluate the above mentioned post fix expression. | 3 | |
| g) | Represent the above graph in adjacency matrix form. | 5 | |
| h) | Differentiate between a complete binary tree and almost complete binary tree with proper example. | 4 | |
| i) | What is best case time complexity of quick sort and linear search? | 5 | |
| j) | Name the different techniques being used for collision resolution in hashing. | 6 | |

| Part - II | | Marks (6 x 8) | CO |
|-----------|--|------------------|----|
| 02 | Short answer type Questions (Answer any Eight out of Twelve) | | |
| a) | What do you mean by asymptotic notation explain with suitable example? | 1 | |
| b) | Write an algorithm for inserting and deleting an element from single linked list after a specified position? | 1 | |
| c) | List out the applications of stack. Write the algorithms for PUSH & POP operations done using stacks. | 2 | |
| d) | Simulate the insertion sort using sorting algorithm and show the step by step of the given values: 23, 11, 37, 28, 15, 19, 55, 9, 17, 23. | 3 | |
| e) | Convert the following infix expression to postfix notation E: $(A+B*C*(M*N^P+T)-G+H)$ | 3 | |
| f) | Enlist the advantage of circular queue over ordinary queue. Write an algorithm for QINSERT for static implementation of circular queue. | 3 | |
| g) | f) Construct a binary tree from the following traversal In order: 4 2 5 1 6 7 3 8 Post order: 4 5 2 6 7 8 3 1 | 3 | |
| h) | Explain algorithm for searching operation using binary searching technique and search an item 77 from following list. 11,22,33,44,55,66,77,88,99,105,108 and mention its time complexity. | 3 | |
| i) | Write an algorithm for bubble sort and find out its time complexity. | 4 | |
| j) | Write short notes on B+-TREE with suitable example. | 4 | |
| k) | Traverse the following graph using Breadth First Search and Depth first search Technique- | 4 | |
| | | | |
| l) | Find the number of different topological orderings possible for the given graph. | 5 | |
| | | | |

| Part-III | | | |
|----------|---|-------|----|
| | Long Answer type Questions (Answer any two out of four) | Marks | CO |
| 03 | <p>a) What is difference between single linked list and doubly linked list explain with example, and write an algorithm to delete a item from beginning of the double linked list?</p> <p>b) Write an algorithm for insert and delete an item into and from a queue respectively.</p> | 8 | 1 |
| 04 | <p>a) Find the minimal spanning tree for the above mentioned graph using prims algorithm.</p> | 8 | 1 |
| | <p>b) Draw an AVL tree whose elements are inserted in the following order: mar, may, nov, aug, apr, jan, dec, jul, feb, jun, oct, sep .</p> | 8 | 2 |
| 05 | <p>a) Find the shortest path of the above mentioned graph using Dijkstra algorithm</p> <p>b) Specify the heapify algorithm and design the tree with the elements : 21, 9, 15, 19, 12, 14, 8, 7, 25, 35, 12, 17</p> | 8 | 3 |
| 06 | What do you mean by Hashing explain with suitable example and mention its different characteristics and elaborate different techniques to resolve collision occurs with suitable example? | 16 | 5 |

NB : CO – Course Outcome

7, 8, 9, 12, 12, 15, 17, 21, 25, 35



GANDHI INSTITUTE FOR TECHNOLOGY (GIFT)
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Registration No.:

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B.Tech

Sub Code: BTBS-T-BS-201

Total Number of Pages: 02

2nd Semester End Semester Examination: 2022-23

Introduction to Mathematics II

Time: 3 Hours

Max Marks: 100

Q. Code: B221

*Answer question No. 1 (Part I) which is compulsory, any eight from Part II and any two from Part-III
 The figures in the right hand margin indicate marks*

| Part - I | | Marks | CO | | | | | | | | | | |
|-----------------|---|--------------|-----------|------|-----|-----|------|------|------|------|------|--|--|
| 01 | Answer the following Questions | | | | | | | | | | | | |
| a) | Write the order of convergence of bisection method and Newton Raphson method. | 2 | 1 | | | | | | | | | | |
| b) | Given $u = x^2 - y^2, v = 2xy$, calculate the Jacobian $J = \frac{\partial(x, y)}{\partial(u, v)}$. | 2 | 2 | | | | | | | | | | |
| c) | Evaluate $\int_{-1}^1 \frac{x}{x+2} dx$ by Gauss-Legendre 2-point formula. | 2 | 3 | | | | | | | | | | |
| d) | Calculate $\int_C \vec{F}(\vec{r}) \cdot d\vec{r}$ where $\vec{F} = [3x^2, -2y]$ and $C: \vec{r}(t) = (3 - 2t, 6 - 7t)$ | 2 | 4 | | | | | | | | | | |
| e) | Evaluate $\iiint_0^5 e^{-x-y-z} dx dy dz$. | 2 | 1 | | | | | | | | | | |
| f) | Find how many roots lie between $(-1, 4)$ in the equation $x^3 - 8x + 6 = 0$. | 2 | 3 | | | | | | | | | | |
| g) | Find $\Delta^2 f(0.2)$ from the data given below | 2 | 3 | | | | | | | | | | |
| | <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td><td>0.1</td><td>0.2</td><td>0.3</td><td>0.4</td></tr> <tr> <td>f(x)</td><td>0.65</td><td>1.25</td><td>2.66</td><td>3.85</td></tr> </table> | x | 0.1 | 0.2 | 0.3 | 0.4 | f(x) | 0.65 | 1.25 | 2.66 | 3.85 | | |
| x | 0.1 | 0.2 | 0.3 | 0.4 | | | | | | | | | |
| f(x) | 0.65 | 1.25 | 2.66 | 3.85 | | | | | | | | | |
| h) | Write error formula for Simpson's 1/3 rule | 2 | 4 | | | | | | | | | | |
| i) | Write the iterative formula to find the value of a function by Newton-Raphson method. | 2 | 1 | | | | | | | | | | |
| j) | State Green's theorem | 2 | 3 | | | | | | | | | | |

Part - II

| 02 | Short answer type Questions (Answer any Eight out of Twelve) | Marks | CO | | | | | | | | |
|-----------|---|--------------|-----------|---|---|------|---|---|---|---|---|
| a) | Find a root of the equation $x^3 - 8x + 5 = 0$, by Newton Raphson method, correct up to 3-decimal places. | 6 | 1 | | | | | | | | |
| b) | Determine the polynomial approximating the function with given values in the following table using Lagrange interpolation formula. | 6 | 3 | | | | | | | | |
| c) | <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td><td>1</td><td>3</td><td>4</td></tr> <tr> <td>f(x)</td><td>2</td><td>5</td><td>8</td></tr> </table> | x | 1 | 3 | 4 | f(x) | 2 | 5 | 8 | 6 | 3 |
| x | 1 | 3 | 4 | | | | | | | | |
| f(x) | 2 | 5 | 8 | | | | | | | | |

| | | | | | | | | | | | | | | |
|-------------------|--|---|-----|--------------|-----------|-----|-----|----------|---|-----|-----|-----|---|---|
| | d) | Evaluate $\iint_S \vec{F} \cdot \hat{n} dA$ where $\vec{F} = [x^2, e^y, 1], S = x + y + z = 1, x \geq 0, y \geq 0, z \geq 0$ | 6 | 4 | | | | | | | | | | |
| | e) | Verify Green's theorem for $\vec{F} = [y^2 - 7y, 2xy + 2x]$ and C the circle $x^2 + y^2 = 1$. | 6 | 5 | | | | | | | | | | |
| | f) | Using Divide difference formula find $f(x)$ using the table: <table border="1"> <tr> <td>x</td> <td>-1</td> <td>1</td> <td>4</td> <td>6</td> </tr> <tr> <td>$Y=f(x)$</td> <td>1</td> <td>-3</td> <td>21</td> <td>127</td> </tr> </table> | x | -1 | 1 | 4 | 6 | $Y=f(x)$ | 1 | -3 | 21 | 127 | 6 | 3 |
| x | -1 | 1 | 4 | 6 | | | | | | | | | | |
| $Y=f(x)$ | 1 | -3 | 21 | 127 | | | | | | | | | | |
| | g) | Using Euler's method find $y(0.4)$, where $\frac{dy}{dx} = \sqrt{y}, y(0) = 1$. | 6 | 3 | | | | | | | | | | |
| | h) | Evaluate $\int_0^1 \frac{x}{1+x} dx$ using Simpson's 1/3 rd rule taking six intervals. | 6 | 3 | | | | | | | | | | |
| | i) | Calculate $\int_C F(r).dr$ where $F = [xy, x^2 y^2]$, C: the quarter circle from (2,0) to (0,2) with center (0,0). | 6 | 3 | | | | | | | | | | |
| | j) | Apply Green's theorem for evaluate the integral $\oint xy dx + x^2 dy$ over the closed curve $x = \pm 1 & y = \pm 1$ | 6 | 2 | | | | | | | | | | |
| | k) | Find the integral $\oint_S (x+y+z^2) \cdot \hat{n} ds$, where S is a rectangular box $0 \leq x \leq 2, 1 \leq y \leq 4 & 2 \leq z \leq 5$ | 6 | 3 | | | | | | | | | | |
| | l) | Find $f(1.4)$ from the data table by Newton-Forward interpolation. <table border="1"> <tr> <td>x</td> <td>1</td> <td>1.3</td> <td>1.6</td> <td>1.9</td> </tr> <tr> <td>$f(x)$</td> <td>1</td> <td>3.5</td> <td>6.2</td> <td>9.6</td> </tr> </table> | x | 1 | 1.3 | 1.6 | 1.9 | $f(x)$ | 1 | 3.5 | 6.2 | 9.6 | 6 | 5 |
| x | 1 | 1.3 | 1.6 | 1.9 | | | | | | | | | | |
| $f(x)$ | 1 | 3.5 | 6.2 | 9.6 | | | | | | | | | | |
| Part - III | | | | | | | | | | | | | | |
| | Long Answer type Questions (Answer any two out of four) | | | Marks | CO | | | | | | | | | |
| 03 | a) | Evaluate $\int_0^1 xe^{-x} dx$ by 3-point Gauss-Legendre rule. | 8 | 3 | | | | | | | | | | |
| | b) | Find the square root of 3 using Regula falsi method correct upto 7 decimal places. | 8 | 4 | | | | | | | | | | |
| 04 | a) | Using Gauss divergence theorem evaluate $\iint_S F \cdot n dA$, where $F = [x^2, 0, z^2], S$: the surface of the box $ x \leq 1, y \leq 3, z \leq 2$. | 8 | 1 | | | | | | | | | | |
| | b) | Find the Flux integral $\iint_S F \cdot n dA$, where $F = [3x^2, y^2, 0]$, $S: r = [u, v, 2u+3v], 0 \leq u \leq 2, -1 \leq v \leq 1$ | 8 | 1 | | | | | | | | | | |
| 05 | a) | Evaluate the integral $\int_1^3 \frac{e^{2x}}{x+2} dx$ by Gauss integral 3-node point's method. | 8 | 4 | | | | | | | | | | |
| | b) | Evaluate the integral $\oint_C x^2 y dx + xy dy$, where C is $y = x^2, y = 0 & x + y = 2$ | 8 | 1 | | | | | | | | | | |
| 06 | | Find $y(0.2)$ from the IVP $y' = x + y^2, y(0) = 1$ by Rungr-Kutta 4 th order with step length $h = 0.1$ | 16 | 5 | | | | | | | | | | |

NB : CO – Course Outcome

GANDHI INSTITUTE FOR TECHNOLOGY (GIFT)
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Registration No.:

2 2 0 1 2 9 8 5 2 7

B.Tech

Total Number of Pages: 02

Sub Code: BTBS-T-HS-201

2nd Semester End Semester Examination: 2022-23

Communicative English - II

Branch(s): AGE, Civil, CSE, CSE (AI), CSE (IOT), EEE, ECE, MECH

Time: 3 Hours

Max Marks: 100

Q. Code: B202

The figures in the right hand margin indicate marks

Part – I

| 01 | Answer the following Questions | Marks | CO |
|----|---|-------|----|
| a) | Define Interpersonal Communication. | 2 | 1 |
| b) | Write any four don'ts of Power Point Presentation. | 2 | 1 |
| c) | The communication that takes place between professional peer groups is communication. | 2 | 1 |
| d) | What are the stages of Negotiation Skills? | 2 | 2 |
| e) | Why should you practice and rehearse a presentation? | 2 | 3 |
| f) | What do you mean by Controversial GD? | 2 | 3 |
| g) | Explain Combinational Resume. | 2 | 2 |
| h) | Market Research Report is an example of _____ type of report. | 2 | 4 |
| i) | Job Application Letter is also known as _____ letter. | 2 | 5 |
| j) | What is etiquette? Define with example. | 2 | 4 |

Part – II

| 02 | Short answer type Questions (Answer any Eight out of Twelve) | Marks | CO |
|----|--|-------|----|
| a) | Grapevine communication helps to reduce stress among employees in an organization. Justify. | 6 | 1 |
| b) | Differentiate between Upward and Downward Communication. | 6 | 1 |
| c) | Success in an organisation requires professional etiquettes. Justify. | 6 | 2 |
| d) | Write down the do's and don'ts of Group Discussion. | 6 | 3 |
| e) | How GD is different from debate? Write the Do's and Don'ts of GD? | 6 | 3 |
| f) | Differentiate between Chronological CV and Functional CV. | 6 | 3 |
| g) | Elaborate the 5 C's of negotiation skills. | 6 | 3 |
| h) | What is BANTA? Discuss with suitable example. | 6 | 3 |
| i) | What is the difference between Resume and Cover Letter? Explain the different types of resume used for applying Job. | 6 | 4 |
| j) | Soft Skills plays an important role at workplace. Justify. | 6 | 4 |

| | | | |
|--|--|---|---|
| <input checked="" type="checkbox"/> k) | What is Adjourning? What is its importance? | 6 | 3 |
| <input checked="" type="checkbox"/> l) | What is etiquette? How is it different from manner? Write some etiquette which is used in Job Interview. | 6 | 5 |

Part – III

| Long Answer type Questions (Answer any two out of four) | | Marks | CO |
|---|--|-------|----|
| 03 | a) What are the tips need to be followed for win-win negotiation? | 6 | 1 |
| | b) Jack & Jones is planning to launch a new range of casual garments for the youth in Odisha. As a Regional Manager write a Report to your CEO narrating the prospects of the new product. | 6 | 1 |
| 04 | a) Non-Verbal communication has stronger impact than verbal Communication . Justify citing examples. | 6 | 1 |
| | b) What are the important steps in preparing an effective oral presentation? Discuss in detail. | 6 | 2 |
| 05 | a) The present corporate success mantra is “ Teamwork”. One may be individually brilliant but working as a Team yields better results. Explain with example. | 6 | 3 |
| | b) A post of IT developer is advertised in The Times of India on 19 th January, 2023. You are an eligible candidate for the same. Write a cover letter to apply for the same. | 6 | 4 |
| 06 | Mention the different types of professional etiquettes and how it helps one in sustaining their professional career. | 12 | 5 |

NB : CO – Course Outcome

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B.Tech.

Total Number of Pages: 02

S. Code: BTBS-T-ES-103

2nd Semester End Semester Examination: 2022-23

Basic Mechanical and Civil Engineering

Branch(s): AGE, Civil, CSE, CSE (AI), CSE (IOT), EEE, ECE, MECH

Time: 3 Hours

Max Marks: 100

Q. Code: B205

Answer question No. 1 (Part I) which is compulsory, any eight from Part II and any two from Part-III

The figures in the right hand margin indicate marks

| | | Part – I | Marks | CO |
|-----------|--|-----------------|--------------|-----------|
| 01 | Answer the following Questions | | | |
| | a) What is a refrigerant? Write two important properties of it. | 2 | 1 | |
| | b) State Bernoulli's theorem. | 2 | 1 | |
| | c) Differentiate Dry ice and Liquid Nitrogen. | 2 | 1 | |
| | d) List different type of fuel used for Aircrafts. | 2 | 2 | |
| | e) Define Pascal's law. | 2 | 3 | |
| | f) What is the difference between sub structure and super structure. | 2 | 3 | |
| | g) Classify the soil based on transporting agent. | 2 | 2 | |
| | h) What is surveying? And explain the WCB and QB. | 2 | 4 | |
| | i) Write 2 lines on runway and taxiway. | 2 | 5 | |
| | j) What is BIS and IRC code? | 2 | 4 | |
| | | | | |

Part – II

| 02 | Short answer type Questions (Answer any Eight out of Twelve) | Marks | CO |
|-----------|--|--------------|-----------|
| | a) Differentiate hydraulic and pneumatic system with schematic diagram. | 6 | 1 |
| | b) Describe Briefly the working principle of Steam Power Plant with neat sketch. | 6 | 1 |
| | c) Define pressure. Write about the construction and working principle of simple U tube manometer. | 6 | 2 |
| | d) Differentiate between 4 stroke and 2 stroke engine. | 6 | 3 |
| | e) What is power transmission? Write the working principle of drum brake. | 6 | 3 |

| | | | |
|--|--|---|---|
| | f) Describe Briefly the working principle of IC Engine with neat sketch. | 6 | 3 |
| | g) Compare Deep and Shallow foundation. | 6 | 3 |
| | h) Explain difference between GIS & GPS. | 6 | 3 |
| | i) Classify the soil according to their transporting agent? | 6 | 4 |
| | j) What is irrigation and explain in detail its type? | 6 | 4 |
| | k) What is hydrological cycle, discuss with neat sketch. | 6 | 3 |
| | l) What is tunnel engineering? Narrate the advantage and disadvantages. | 6 | 5 |

Part - III

| Long Answer type Questions (Answer any two out of four) | | Marks | CO |
|---|---|-------|----|
| 03 | a) What do you mean Hydraulic machines? Layout different types of Turbines and pumps with neat sketch. | 8 | 1 |
| | b) Elaborate Power transmission devices. How a Gear is different from Belt and Rope. Analyze the terminology of Gear. | 8 | 1 |
| 04 | a) Define clutch. What are the different types of clutches? Write about centrifugal clutch. | 8 | 1 |
| | b) Derive the expression for flow rate in venturi meter with neat sketch. | 8 | 2 |
| 05 | a) Describe concept of smart building. | 8 | 3 |
| | b) Write down the water treatment procedure? | 8 | 4 |
| 06 | a) Write short notes on the following. i) levelling , ii) Flyash , iii) Concrete | 8 | 5 |
| | b) What are the various types of signal used in transportation engineering, explain with suitable example. | 8 | 3 |

NB : CO – Course Outcome

GANDHI INSTITUTE FOR TECHNOLOGY (GIFT)

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Registration No.: **2 2 0 1 2 9 8 5 2 7**

B.Tech.

Total Number of Pages: 02

S. Code: BTBS-T-BS-102

2nd Semester End Semester Examination: 2022-23

Elements of Engineering Physics

Branch(s): AGE, Civil, CSE, CSE (AI), CSE (IOT), EEE, ECE, MECH

Time: 3 Hours

Max Marks: 100

Q. Code: B207

Answer question No. 1 (Part I) which is compulsory, any eight from Part II and any two from Part-III

Part - I

| 01 | Answer the following Questions | Marks | CO |
|----|---|-------|----|
| a) | Draw the time-displacement graphs for an under-damped, over-damped and critically-damped oscillator. | 2 | 1 |
| b) | Distinguish between O-ray and E-ray. | 2 | 1 |
| c) | Two coherent beams reaching a point individually produce intensities 1.44 units and 4 units. If they reach together, the intensity is 0.9 units. Calculate the lowest phase difference with which they reach the point. | 2 | 1 |
| d) | Differentiate between Fresnel's and Fraunhofer's diffraction. | 2 | 2 |
| e) | Evaluate the divergence and curl of vector a vector field $A = yzi + xzj + xyk$. Check whether its irrotational or solenoidal? | 2 | 3 |
| f) | Young's double slit experiment was performed in a laboratory by taking monochromatic blue, orange and red light and fringe widths were obtained as $\beta_B, \beta_O, \beta_R$ respectively. Other variables had been kept constants. Write down the fringe widths in decreasing order. | 2 | 3 |
| g) | What is LASER? Mention its 4 applications. | 2 | 2 |
| h) | State Gauss divergence theorem and give its mathematical form. | 2 | 4 |
| i) | For which angle of scattering is the Compton shift maximum? Explain with appropriate formula. | 2 | 5 |
| j) | Show graphically the intensity distribution in interference with phases referring to maxima and minima. | 2 | 4 |

Part - II

| 02 | Short answer type Questions (Answer any Eight out of Twelve) | Marks | CO |
|----|---|-------|----|
| a) | What is damping? Set up the differential equation for damped harmonic oscillator. Explain the condition for critical damping. | 6 | 1 |
| b) | State and explain Brewster's law. Use the law to find the angle of incidence for a surface with refractive index 1.5. | 6 | 1 |
| c) | The time period of simple harmonic oscillator is 2s. It is subjected to a damping force proportional to speed with damping coefficient $\beta = 1 \text{ sec}^{-1}$. Find the time period and logarithmic decrement. What should be the value of β for the motion to be critically damped? | 6 | 2 |

| | | | |
|----|---|---|---|
| d) | State Ampere's circuital law. Develop its differential form. | 6 | 3 |
| e) | State Malus Law? What should be the angle between the polarizer and analyzer so that the intensity of light coming out will be less than 25% of the incident intensity. | 6 | 3 |
| f) | Normalize the wave function $\psi(x) = A \sin \frac{n\pi x}{L}$ | 6 | 3 |
| g) | What is Compton effect? Discuss the variation of Compton shift with angle of scattering. | 6 | 3 |
| h) | Explain the working of 3-level LASER. | 6 | 3 |
| i) | Write Maxwell's equations in integral and differential form for vacuum and name the terms used. | 6 | 4 |
| j) | Distinguish between monomode and multimode optical fibres. | 6 | 4 |
| k) | Write short notes on Optical pumping and population inversion. | 6 | 3 |
| l) | What is Meissner's effect? How does it explain the diamagnetic behavior of superconductors? Mention 2 uses of superconductors. | 6 | 5 |

Part - III

| | Long Answer type Questions (Answer any two out of four) | Marks | CO |
|----|---|-------|----|
| 03 | a) Derive the differential equation of a forced harmonic oscillator. Explain resonance with amplitude-frequency plot. | 8 | 1 |
| | b) What is numerical aperture in an optical fibre? Derive an expression for it. | 5 | 3 |
| | c) Differentiate between conduction current and displacement current. | 3 | 2 |
| 04 | a) Give the theory of Newton's ring and how from their study the wavelength of monochromatic light can be determined? Explain the condition for dark central fringe. | 10 | 1 |
| | b) Explain the formation of diffraction pattern in Fraunhofer's diffraction due to single slit. Obtain the expression for its resultant intensity. | 6 | 2 |
| 05 | a) Derive Einstein's photo-electric equation. Show the plot for the variation of photo-current with Intensity and Frequency of incident light. | 8 | 3 |
| | b) Discuss the construction and working of He-Ne LASER with energy level diagram | 8 | 4 |
| 06 | a) Solve the Schrodinger's time independent equation for an electron inside 1D box of length L with potential energy $V=\infty$ for $x \leq 0$ and $x \geq L$ $V=0$ for $0 < x < L$ Find the eigen states and energy eigen values. | 10 | 5 |
| | b) Write Plank's radiation formula for black body radiation, derive Rayleigh-Jean's formula and Wein's formula from it. | 6 | 5 |

NB : CO - Course Outcome