Enrollment No. 2210 2177

Jaypee Institute of Information Technology, Noida
End Term Examination, 2024
B.Tech, V^th Semester

Course Title: Electromagnetic Field Theory
Course Code: 18B11EC312

Maximum Time: 2 Hr.
Maximum Marks: 35

CO 1	Recall concepts of vector calculus and different coordinate systems.
CO 2	Understand the basic principles of electrostatics and magnetostatics and relate the electric and magnetic fields using Maxwell's Equations.
CO 3	Apply the concepts of electrostatics and magnetostatics to study the propagation characteristics of electromagnetic waves in different mediums.
CO 4	Analyze the parameters and propagation characteristics of transmission lines and waveguides.
CO 5	Evaluate the different parameters associated with the antenna and also interpret the radiation mechanism.

Note: Attempt all questions

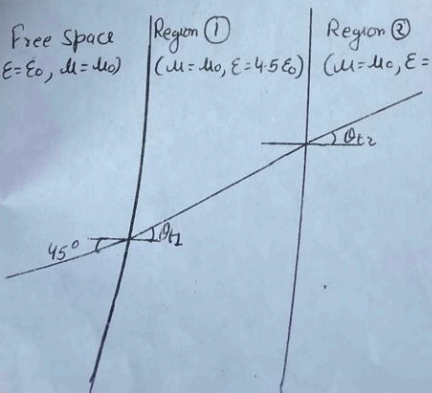
Q. 1 A vector field is given by $\vec{E} = -5\widehat{a_\rho} + 10\widehat{a_\phi} + 3\widehat{a_z}$ V/m. Calculate (a) Vector component of $\vec{E}$ perpendicular to z = 0 plane. (b) The vector component of $\vec{E}$ at P $(5, \frac{\pi}{2}, 3)$ parallel to line $x = 2, z = 3$. **[CO1, 3 Marks, (Remembering Level)]**

Q. 2 (a) The interface between two dielectrics is defined by x = 0 plane. For dielectric 1, x > 0, $\varepsilon_{r1} = 3$ while for dielectric 2, x < 0, $\varepsilon_{r2} = 4$. If the electric flux density in region 1 is given by $\vec{D}_1 = 4\widehat{a_x} + 6\widehat{a_y} + 8\widehat{a_z}$ C/m^2. Determine $\vec{D}_2$.

(b) In a free space, the magnetic flux density $\vec{B} = y^2\widehat{a_x} + z^2\widehat{a_y} + x^2\widehat{a_z}\ Wb/m^2$. (i) Find the magnetic flux through x = 1, 0 < y < 1, 1 < z < 4. (ii) Calculate $\vec{J}$.
[CO2, 3 + 2 Marks, (Understanding Level)]

Q. 3 (a) In free space $E(x,t) = 50cos(\omega t - \beta x)\widehat{a_y}$ V/m. Find the average power crossing area of radius 5m in the x = constant plane.

(b) A uniform plane wave is incident at an angle $\theta_i = 45^o$ on a pair of dielectric slabs joined together as shown in figure 1. Determine the angle of transmission θ_{t1} and θ_{t2} in the slabs. **[CO3, 3 + 3 Marks, (Applying Level)]**



Q. 4 (a) A 60-ohm transmission line has a capacitance of 0.15 nF/m. The attenuation on the line is 0.01 dB/m. Calculate (i) The line parameters: resistance, inductance and conductance per meter of the line. (ii) The velocity of the wave propagation.

(b) A 5 m long lossless transmission line having a characteristic impedance of 50 ohm is fed from a generator of internal resistance 1 ohm and open circuit voltage $V_g = 0.5\cos(10^8 \times \pi t)\ V$. The velocity of propagation on the line is 1.25×10^8m/s. For a matched load, find (a) input impedance (b) the voltage and current at input terminals (c) the instantaneous voltage and current at load (d) the average power transmitted to the load.

[CO4, 2 + 5 Marks, (Analyzing Level)]

Q. 5 (a) A rectangular waveguide has $a = 15$mm, $b = 8$mm, $\sigma = 0, \mu_r = 1, \varepsilon_r = 4$. The z component of electric field in the waveguide is given by $\vec{E}_z = 4sin\left(\frac{\pi}{a}x\right)sin\left(\frac{\pi}{b}y\right)cos(\pi \times 10^{10}t - \beta_g z)$V/m and $H_z = 0$. Calculate: (i) mode of propagation (ii) cut off frequency (iii) phase constant (iv) wave intrinsic impedance.

(b) A z cm by 3 cm waveguide is filled with $\sigma = 0, \mu_r = 1, \varepsilon_r = 4$. If waveguide operate at 20 GHz with TE mode. For the dominant mode, calculate (i) cut off frequency (ii) phase constant (iii) phase velocity (iv) wave intrinsic impedance of the waveguide.

[CO4, 3 + 5 Marks, (Analyzing Level)]

Q. 6 (a) Explain the following terms with respect to antenna: (i) Half Power Beamwidth (ii) Gain (iii) Radiation Intensity

(b) The maximum radiation intensity of a 90% efficient antenna is 200 mW/Sr. Find the directivity in dB when (i) input power is 125.66 mW (ii) radiated power is 125.66 mW.

[CO5, 3 + 3 Marks, (Evaluating Level)]

POSSESSION O...

Enrollment No. .....

ame .....Smith.....

Jaypee Institute of Information Technology, Noida
End-Semester Examination, Odd Sem 2024
B. Tech, Vth Semester

Course Title: Microprocessors and Microcontrollers
Course Code: 15B11EC313

Max Time: 02 Hrs
Max Marks: 35

Course Outcomes: At the end of the course, students will be able to:

CO1	Remember the basics of digital integrated circuits, data processing, memory organization, and microprocessors systems.
CO	Understand the basics, internal organizatio n, and instruction set of 8085 microprocessor, and its interfacing with memory and the input/output devices.
	Apply the knowledge of different instructions of 8085 microprocessor/8051 microcontroller to write the various assembly language program.
	Evaluate the performance of 8085 microprocessor/8051 microcontroller on the basis of delay analysis using timing diagram.
CO5	Analyze the interface of 8051 microcontroller with different input/output devices such as LED, LCD, Keyboard, motor and sensors.

Note: Attempt all the questions.

Q1. Explain the difference between interrupts and polling in 8085 microprocessor. How the status of maskable interrupts can be read in 8085 processor? **[CO1 (Remembering), 4 Marks]**

Q2. Write a delay routine in 8085 microprocessor to produce a time delay of 0.5 second in 8085 processor-based system whose internal clock frequency is 3 MHz. **[CO2 (Understanding), 4 Marks]**

Q3. Write an assembly language program to add two numbers of 2-digit (8-bit) BCD data stored in memory location 4200 H and 4201 H. Store the result in 4202 H and 4203 H.

[CO3 (Applying), 4 Marks]

Q4. Explain TMOD register. How the TMOD register is modified to make each of the timer to operate as counter? Write a program to generate a frequency of 100 KHz on pin 2.3. Use timer 1, mode 1, and crystal frequency of 22 MHz. **[CO4 (Analyzing), 5 Marks]**

Q5. Draw and Explain the pin diagram of RS 232 serial input/output interface. Write a program to transfer a letter 'X' serially at 4800 baud rate continuously and also to send a letter 'N' through port 2 which is connected to display devices. **[CO4 (Analyzing), 5 Marks]**

Explain the 8051 interrupts and mention their addresses in the ROM location. Write a program to generate two square waves, one of 5 KHz at pin 1.3 and other of 25 KHz at pin 2.3. Assume crystal frequency 22 MHz and mode 2 of timer 0 and 1. **[CO3 (Applying), 5 Marks]**

Write a program using MOVC instruction to send data and command to the LCD from 805 microcontroller. **[CO5 (Evaluating), 3 Marks]**

Explain the working of stepper motor. Write a program to rotate a motor by 64^0 in the clockwis direction. The motor has a step angle of 2^0 and rotate as a 4-step sequence.

[CO5 (Evaluating), 5 Marks

POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

Name Smart Enrollment No.

Jaypee Institute of Information Technology, Noida
End Term Examination, 2024
B.Tech, V Semester (Odd 2024)

Course Title: Laser Technology and Applications
Course Code: 16B1NPH533

Maximum Time: 2 Hrs
Maximum Marks: 35

01	Defining the properties and principle of lasers
	Understanding of various applications of lasers
	Ability to apply the concepts of standard techniques for the pulsed operation of laser and stability of laser resonator
	Analysis of types of lasers

Note: Attempt all the questions.

Q1. What is the chemical formula of YAG? Show the energy level diagram of Nd:YAG laser and mention the wavelength(s).

[CO2 (Understanding), 5 Marks]

Q2. Which active medium is used in Excimer laser? Plot the variation of potential energy of rare gas halide molecule with distance between atoms in excited and ground states. Also, write the emission wavelength(s).

[CO2 (Understanding), 5 Marks]

Q3. Discuss the phenomenon of writing and reading the information on the CD using a laser by showing appropriate diagram(s).

[CO2 (Understanding), 5 Marks]

Q4. For a semiconductor laser, the excess carrier density is 2.02×10^{18} cm^{-3}, and the time taken in spontaneous recombination is 4 ns. Determine the threshold current density for (i) GaAs homojunction laser with thickness of gain region = 0.1 mm, and (ii) GaAs heterostructure laser with thickness of gain region = 0.1 μm.

[CO3 (Applying), 5 Marks]

Q5. (i) The half-width of the gain profile of a He-Ne laser material is about 2×10^{-3} nm. If the length of the cavity is 30 cm, how many longitudinal modes can be excited? The emission wavelength of He-Ne laser is 632.8 nm.
(ii) For indium phosphide laser diode, the wavelength of light emission is 1.55 μm. What is its bandgap in eV?

[CO4 (Analyzing), 3+2 = 5 Marks]

Q6. What are quantum size effects in quantum well lasers? For GaAs material, effective mass of electron in conduction band is 0.067 m_0, effective mass of hole in valence band is 0.46 m_0 and $(E_g)_{Bulk} = 1.424$ eV, where $m_o = 9.1 \times 10^{-31}$ kg is the mass of free electron. Determine the effective bandgap and emission wavelength for quantum well laser of width 10 nm.

[CO4 (Analyzing), 5 Marks]

Q7. Analyze whether or not the following mirror arrangements lead to stability:
(i) Two mirrors with radii of curvature of 1.8 m, separated by a distance of 2 m.
(ii) One mirror with radius of curvature of 2 m and the other with radius 3 m, separated by a distance of 2.3 m.
(iii) Two mirrors with radius of curvature of 0.5 m, separated by a distance of 0.5 m.

[CO4 (Analyzing), 2+2+1 = 5 Marks]

POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name Smrti **Enrollment No.** 22102178

Jaypee Institute of Information Technology, Noida

End Semester Examination, ODD 2024-25

B.Tech / Dual ECE, V Semester

Course Title: Data Structures & Algorithms **Maximum Time: 2 Hours**

Course Code: 15B11CI518 **Maximum Marks: 35**

CO1	Explain the complexity of different algorithms.	Level 2
CO2	Develop various linear data structures and their related operations.	Level 3
CO3	Develop various non-linear data structures and their related operations.	Level 3
	Apply appropriate data structure / algorithmic design technique to solve a given problem.	Level 3
5	Analyze relevant data structure and algorithm for a given problem with respect to its performance.	Level 4

(Attempt all the questions)

Q1. Perform a comparative analysis of greedy, divide and conquer and dynamic programming algorithmic techniques. **[CO1 (Understanding), 2 Marks]**

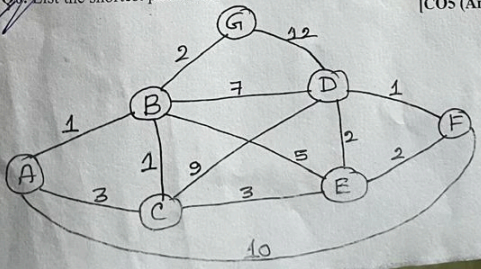
Q2. Given a single linked list containing n nodes, write a pseudo code to remove duplicate nodes while preserving the order of the elements in the original list in O(n) time and space. **[CO2 (Applying), 4 Marks]**

Q3. The roll numbers of the students of a class are to be stored in a non-linear data structure that guarantees O(log n) search time. Insert the following roll numbers in the given sequence: 21, 26, 30, 9, 4, 14, 28, 18, 15, 10, 2, 3, 7 by depicting all the steps in the construction of the desired data structure. **[CO4 (Applying), 5 Marks]**

Q4. Given an array of non-negative integers, develop a time efficient pseudo code to find out three elements from the array that forms a triangle of maximum perimeter. **[CO4 (Applying), 4 Marks]**

Q5. A ternary min-heap is a special min-heap where each node has upto three children instead of two, and it is a complete ternary tree. Construct a ternary min-heap by inserting the following numbers in the given sequence: 25, 50, 30, 27, 5, 20, 10, 11, 37, 16, 7, 3, 1, 2. **[CO3 (Applying), 4 Marks]**

Q6. List the shortest paths from source 'A' to all other nodes in the following graph: **[CO5 (Analysing), 5 Marks]**

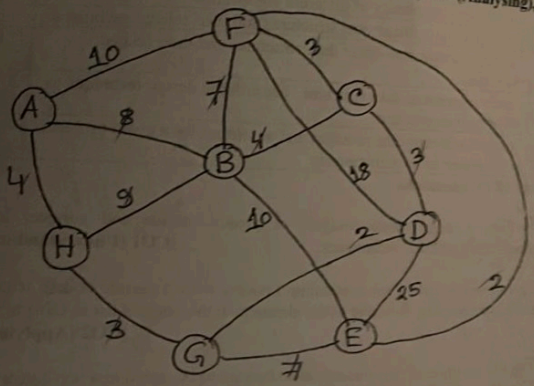


Q7. When double hashing is preferred over linear probing and quadratic probing? Analyze the number of probes that takes place to insert the sequence of numbers: 14, 17, 25, 37, 34, 16, 26 into a hash table of size 11 using double hashing, where $h_1(x) = x \bmod 11$ and $h_2(x) = x \bmod 7 + 1$.

[CO5 (Analysing), 3 Marks]

Q8. The following graph represents the cost of connecting multiple cities using high speed railway lines (cost in million $). Calculate the minimum cost of connecting all the cities using a suitable algorithm. Analyze the performance of the algorithm applied to deduce the solution and also depict the resultant connected network of railway lines proposed by you.

[CO5 (Analysing), 5 Marks]



Q9. Find the longest common subsequence amongst the following two strings S1: MZJAWXU and S2: XMJYAUZ by tabulating the steps involved in your solution.

[CO4 (Applying), 3 Marks]

POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name.....Smriti..... Enrollment No.....22102178.....

Jaypee Institute of Information Technology, Noida
End Term Examination, 2024
B.Tech, Vth Semester

Course Title: Indian Constitution & Traditional Knowledge **Maximum Time: 2 hrs**
Course Code: 20B13HS311 **Maximum Marks: 40**

CO1	Develop an understanding of the historical background of the Constitution its salient features, fundamental rights, fundamental duties and directive principles of the state policy.
CO2	Apply the traditional theories of Indian traditional political thought to the contemporary working of the state and its governance structures.
CO3	Analyze the working of Indian Federalism with reference to centre-state relations and cooperative federalism.
CO4	Evaluate nature and working of the different organs of the government.

Note: Attempt all questions.

Q1. Outline the fundamental features of the Indian Constitution as adopted from the British and the American Constitution. **[CO1 (Understanding) 4 Marks]**

Q2. Explain the relevance of article 19 of the Indian Constitution for protecting the freedom and rights of citizens. **[CO1 (Understanding) 4 Marks]**

Q3. Construct the Mandala theory of foreign policy as suggested by Kautilya in Arthashastra. Do you think that Mandala theory holds relevance in contemporary foreign of India.
[CO2 (Applying) 4 Marks]

Q4. Develop the organically interdependent and interlinked constituents of the state as presented in the Saptanga theory by Kautilya. **[CO2 (Applying) 6 Marks]**

Q5. The Indian federation is known as an unitarian federations, keeping this in consideration, critically analyse the extraordinary circumstances in which the Indian Parliament can legislate on the subjects mentioned in the state list. **[CO3 (Analysing) 4 Marks]**

Q6. *"The Supreme Court of India is a multi-jurisdictional court which exercises various jurisdictions. It is the highest and final court of appeal under the Constitution of India".* Comment on the different types of jurisdictions exercised by the Supreme Court of India as the final interpreter of the Constitution. **[CO4 (Evaluating) 6 Marks]**

Q7. Assess the different motions used in the Parliament to raise critical issues of public importance and to ensure democratic functioning of legislative systems.
[CO4 (Evaluating) 5 Marks]

Q8. Evaluate the key differences between Proportional Representation (PR) and First Past the Post System (FPTP) in the electoral process. **[CO4 (Evaluating) 3 Marks]**

Q9. Comment on how the value of vote of members of the Electoral College is calculated in the Election of the President of India. **[CO4 (Evaluating) 4 Marks]**

POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

Name Smriti Enrollment No. 22102178

Jaypee Institute of Information Technology, Noida
End Semester Examination, 2024
B.Tech, V Semester

Course Title: Introduction to Contemporary Form of Literature
Course Code: 16B1NHS434

Maximum Time: 2 Hrs
Maximum Marks: 35

CO1	Interpret & relate with the genres, periods and conventional as well as experimental forms of literature.
CO2	Apply literary and linguistic theories on the texts to identify them as cultural constructs.
CO3	Analyze select representative texts of different cultures thematically and stylistically.
CO4	Evaluate literature as reflection of society through a research-based paper/poster presentation individually and/or in a team.
CO5	Create literary, non-literary write-up with proper applied grammar usage.

Note: Attempt all the questions.

Q1. Summarize the most important features of cyberpunk literature that make it different from the other genres of science fiction. **[CO1(Understanding), 4 Marks]**

Q2. Outline the types of non-fiction as per marketability. **[CO1(Understanding), 3 Marks]**

Q3. Construct sentences using the following syntactic patterning:
a) SVOO b) SVOOCC c) SVOCAAA **[CO2(Applying), 3 Marks]**

Q4. 'Cindrella' by Roald Dahl is a deconstruction of the original story from the modern perspective. Identify four changed themes(from the original story) and their corresponding episodes as shown by Dahl applying the concepts of Reader-Response theory on the poem. **[CO2(Applying), 5 Marks]**

Q5. Examine the text of 'Neuromancer' as the mirror of the future of the world, using the concepts of Psychoanalysis, showing the characters as parts of universal human consciousness and desires. **[CO3(Analyzing), 4 Marks]**

Q6. Compare the role of Chorus as depicted by Margaret Atwood and Girish Karnad in 'The Penelopiad' and 'Hayavadana' respectively, listing two major differences in their representation. **[CO3(Analyzing), 2 Marks]**

Q7. 'Eat, Pray, Love' by Elizabeth Gilbert represents human aspiration of fulfillment. Assess the essence of 'Eat, Pray, Love' in the light of the given statement with the help of Structuralism, giving examples from contemporary society. **[CO4(Evaluating), 8 Marks]**

8. Imagine yourself 20 years from now. Then from the point of future, compose a memoir about your life at JIIT, and how experiences of those four years had shaped your success. Keep in mind the necessary elements required in memoir writing and compile them, as used in your memoir, at the end in points. **[CO5(Creating), 6 Marks]**