



NATIONAL INSTITUTE OF TECHNOLOGY PATNA
MID SEMESTER EXAMINATION, May 2023

Program: B. Tech (CSE & DD)
Course Code: PH24101
Full Marks: 30

Semester: 2 **Department:** Physics
Course Name: Engineering Physics
Duration of Examination: 2 hours

Answer any Three questions.

- Q1.** Write the geometrical interpretation of $\vec{\nabla} \cdot \vec{A}$ and $\vec{\nabla} \times \vec{A}$, where \vec{A} is a vector field. [5+3+2]
Establish the relationship between displacement vector (D) and electric vector (E) fields.
In a dielectric material, $E_y = 10 \text{ V/m}$, and $P = \frac{1}{10\pi} (3\vec{i} - \vec{j} + 4\vec{k}) \text{ nC/m}^2$. Calculate displacement vector D.
- Q2.** Discuss Poynting theorem and its significance. [7+3]
Assuming that all the energy from a 1000 W lamp is radiated uniformly, calculate the average value of the intensity of electric field of radiation at a distance of 2 m from the lamp.
- Q3.** Distinguish between the conduction current and displacement current. Discuss the significance of Maxwell's equations in detail. [6+4]
- Q4.** Derive an equation of motion of a damped harmonic oscillator and obtain its general solution. [6+4]
Discuss the condition under which the oscillations are overdamped.



NATIONAL INSTITUTE OF TECHNOLOGY PATNA
Department of Computer Science and Engineering
MID SEMESTER EXAMINATION, May-2023

B.Tech.: CSE, 2nd Semester

Course Name: Computer Organization

DOE: 12/05/2023

Course Code: CS24108

Max. Marks: 30

Maximum Time: 2 hours

Instruction:

1. Attempt all questions.
2. Assume any suitable data, if necessary.
3. Answer all the questions in order as appeared in the question paper and write all the sub-parts of a question in one place.
4. The Marks, CO (Course Outcome) and BL (Bloom's Level) related to questions are mentioned on the right-hand side margin.

S.N.	Questions	Marks	CO	BL
1	<p>a) Define the term computer architecture and computer organization. Differentiate between these two with suitable examples.</p> <p>b) Discuss Two's complement representation. Let the initial two's complement representation have n bits and the expansion of this representation have m bits where $m > n$. Prove that the expended bits from a_{n-1} to a_{m-2} will be 1.</p> <p>c) Solve the followings:</p> <ul style="list-style-type: none"> i. Perform the addition using 2's complement with the help of an 8-bit register: $13+12$ ii. Determine the value of P in the given expression: $(215)_P = (12P)_4$ iii. Find the possible values of a and b in the expression: $(42)_9 = (a3)_b$ iv. Convert the number $(25.625)_{10}$ into Hexadecimal form (base 16). 	3 3 4	CO1 CO1 CO3	Remember Remember Apply
2	<p>a) What is Booth's algorithm? Explain with a dataflow diagram. Apply Booth's Algorithm to compute the value of $(5 * (-6))$ and show the state of all the registers involved in the process.</p> <p>b) Discuss the structural and functional view of computer systems</p>	7 3	CO3 CO1	Apply Remember
3	<p>a) Let's consider 32-bit single precision form as per IEEE 754 standard. Compute the value in the decimal form of the following. All values are represented in hexadecimal form.</p> <ul style="list-style-type: none"> i. $41CC0000$ ii. $7F800000$ <p>b) Perform the floating-point calculation of $(6.25*102) + (1.45*100)$ using 32 bit registers. Show the results in the normalized form.</p> <p>c) Express the following numbers in IEEE 32-bit floating-point format</p> <ul style="list-style-type: none"> i. -1.5 ii. 384 	3 4 3	CO2 CO2 CO2	Understand Understand Understand

B.Tech: 2nd Semester (CSE)
Course Name: Web Technology
DCE: 17/05/2023
Maximum Time: 02 hours

Exam Time: 2:00PM-4:00PM
Course Code: CS24107
Max. Marks: 30

Instruction: All sub-questions must be answered sequentially in one place. Assume missing data if any.

PART A [for section 2 and 3]

S.N.	Questions	Marks	CO	BL
1. a)	How non-persistent differs from persistent HTTP connection?	1	CO1	Rememb
b)	Why elements of domain name space are required? What is the difference between FQDN and PQDN?	2		
c)	What are main components of HTML form? How to validate password length in HTML form?	4		
d)	How many number of networks and host IDs are required in three subclasses including A, B and C of IP addressing?	3 [1+2+4+3=10]		
2. a)	Write HTML codes to illustrate the use of following jQuery event methods. on() this() click() hover()	4	CO3	App
b)	Write HTML codes to <u>hide</u> button, <u>image</u> and <u>text</u> using JQuery selectors.	3 [4+3= 7]		
3. a)	Write a HTML code to change “NITP” into “Department of Computer Science & Engineering, National Institute of Technology Patna” in the paragraph content?	2 2	CO3	App
b)	How to create a drawing object on HTML canvas?	[2+2 = 4]		
4.	Mention four methods of non-primitive datatype of JavaScript using suitable examples.	4	CO1	Rem
5. a)	What image object does and how to access it?	3	CO2	Und
b)	Which properties define the window location object?	2		

PART B [for section I]

1. [1x5 Marks]
 - a) Given that classless IP addresses are presented in form a.b.c.d/n, explain how class A, B, and C IP addresses will be represented under this notation.[BL3,CO2]
 - b) Unicast, Multicast, and Broadcast are three types of communications based on the number of senders and receivers; explain the communication category between a Web Server and a Web Client.[BL2,CO2]
 - c) Name any two web clients and one web server.[BL1,CO2]
 - d) How a compiled programming language is different from interpreted programming language? Which type JavaScript belongs to?[BL1,CO2]
 - e) Consider Domain Name Server of a website is not working, explain if users will be able to access the website or not.[BL2,CO2]
2. [2x4 = 8 Marks]
 - a) From the list of the following IP addresses, determine which ones are valid and invalid. Provide a reason if your answer is invalid. [BL3,CO2]
 - i) 0.0.0.5
 - ii) 1.2.3.4.0
 - iii) 255.255.255.255
 - iv) 100.200.300.400
 - b) Consider NIT Patna network has a total number of 6000 users. Further, the router which connects NIT Patna to the internet has a pool of 8 public IP addresses. What maximum number of simultaneous NAT mappings/connections can it support?[BL3,CO2]
 - c) How do routers decide if the two IP addresses belong to the same or different network? Explain with an example.[BL2,CO2]
 - d) Consider a network that has a computer with IP address 10.10.10.10/13; answer the following:[BL3,CO2]
 1. What is the first address of the network?
 2. What is the total number of possible hosts in the network?
3. [1x2 = 2 Marks] Will the following code snippets compile/interpreted successfully? If yes, what explain the output, if no reason why. [BL3,CO2,3]

<p>a) <code>function test(a,b) {console.log(a+" "+b); test(5)</code></p>	<p>a) <code>function test(a) {console.log(a+" "+b); test(5,5)</code></p>
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4. [2 Marks] Explain the functioning of a website, starting from the user entering the website domain name in the web browser till he gets the data back from the server with the help of an illustrative diagram highlighting the function of each component.[BL2,CO2]
5. [1 Marks] What are the different ways in which JavaScript code can be embedded into a web page? Does the placement of JavaScript code make a difference? If so, explain.[BL2,CO3]
6. [2 Marks] Consider an object `student` defined in JavaScript by `var student = {fname:"Amit", lname:"Kumar", age:25, rollnumber:12345 ...}`, however number of attributes are not known. Write javascript code to print value of all attributes of the person object.[BL6]
7. [5 Marks] Consider an array in javascript similar to `var str = ["N","I","T","P","A","T","N",A]`. Write JavaScript code which will search the array for first occurrence of the given substring and its length. It should return/print the first and last index of substring in array. For ex: for given substring "TPA" and its length 3, in array above, it should return 2 and 4. If it could not find the substring it should return -1.[BL6,CO2,3]
8. [5 Marks] Write / Design a javascript function to implement a calculator program which supports up to 5 operands and four operators which can be from `{+,-,*,/}` only. For example, it should be able to compute expression like `2+3+4*7/5` (it has five operands and four operators), also the same function should be able to calculate just `3-4`. It must take care of operator precedence.[BL6,CO2,3]

MID SEMESTER EXAMINATION May' 2023

Department of Mathematics, NIT Patna

Course code: MA2401+MA2402; Engg. Maths-II (Probability & Statistics)

Batch: 2nd Sem(CSE Gr-C; Cyber Security; Data Sc)

Full Marks: 30

Time: 2 Hrs

Answer any Five questions

- ✓ 1(a) The Probability that a regular scheduled flight departs on time is 0.90, the probability that it arrives on time is 0.85, and the probability that it departs and arrive on time is 0.80. Find the probability that a plane : (a) Arrive on time given that it depend on time.
 (b) Departed on time given that it has arrived on time

- (b) The probability that a college student being male is $\frac{1}{8}$ and that of being female is $\frac{7}{8}$. The probability that a male student completes the course is $\frac{2}{3}$ and that a female student does it is $\frac{1}{3}$. A student is selected at random and is found to have completed the course what is the probability that the student is (i) Male (ii) Female

- 2(a) Find the probability distribution (or Probability function or pmf) of the number of head when a fair coin is tossed repeatedly until the first tail appears.

$$(b) \text{If } p(x) = \begin{cases} xe^{\frac{-x^2}{2}} & x \geq 0 \\ 0 & x < 0 \end{cases}$$

- (a) Show that $p(x)$ is a pdf (of a continuous RV X)
 (b) Find its distribution function $p(x)$

- ✓ 3(a) A defective die is thrown ten times independently. The probability that an even number will appear 5 times is twice the probability that an even number 4 times. What is the probability that odd face appear in each of the ten throws.

- ✓ (b) In a certain factory turning razor blades, there is a small chance, 1/500 for any blade to be defective. The blades are in a packets of 10. Use Poisson distribution to calculate the approximate number of packets containing (i) no defective (ii) one defective (iii) two defective blades respectively in one consignment of 10000 packets. (Given $e^{-0.02} = 0.9802$)

- ✓ 4(a) The mean and standard deviation of a binomial are respectively 4 and $\sqrt{\frac{8}{3}}$.

Find the value of n and p . Hence evaluate $p(X=0)$

- (b) The probability of a man hitting a target is $\frac{1}{3}$, if he fires 5 times, what is the probability of hitting the target at least twice.

- ✓ 5(a) For a poisson variate if $P(X=2)=P(X=1)$, Find $P(X=1 \text{ or } 0)$.

- (b) A radio active source emits on the average 2.5 particles per second. Calculate the probability that 2 or more particles will be emitted in an interval of 4 seconds.

- ✓ 6(a) A consignment of 8 similar micro-computers to a retail out-let contains 3 that are defective. If a firm makes a random purchase of 2 of these computers, find the probability distribution for the number of defectives.

- (b) Suppose that the error in the reaction temperature (${}^{\circ}\text{C}$), for a controlled laboratory experiment is a continuous random variable X having the probability density functions:

$$F[X = x] = f(x) = \begin{cases} \frac{x^2}{3}, & -1 < x < 2 \\ 0, & \text{otherwise} \end{cases}; \quad (i) \text{Verify that total probability is unity} \\ (ii) P(0 \leq X < 1)$$

NATIONAL INSTITUTE OF TECHNOLOGY PATNA

Department of Humanities and Social Sciences
Ashok Rajpath, Patna-800 005

MID-SEMESTER EXAMINATION MAY 2023

Course Name: Communicative English
Group: B.Tech (CSE 1, CSE 2, CSE 3, CSE DD)

Course Code: HS24101
Full Marks: 22.5
Time: 2 Hours

Instructions: Answer all the questions in your own words.

- It is not just the body language but other paralinguistic features also which determine the effectiveness of a professional speech or presentation.' Comment on this statement and support your views with proper examples. (7.5 marks) CO1
- Prepare a précis of the passage given below (7.5 marks) CO7

No student of a foreign language needs to be told that grammar is complex. By changing word sequences and by adding a range of auxiliary verbs and suffixes, we are able to communicate tiny variations in meaning. We can turn a statement into a question, state whether an action has taken place or is soon to take place, and perform many other word tricks to convey subtle differences in meaning. Nor is this complexity inherent to the English language. All languages, even those of so-called 'primitive' tribes have clever grammatical components. The Cherokee pronoun system, for example, can distinguish between 'you and I', 'several other people and I' and 'you, another person and I'. In English, all these meanings are summed up in the one, crude pronoun 'we'. Grammar is universal and plays a part in every language, no matter how widespread it is. So, the question which has baffled many linguists is - who created grammar?

At first, it would appear that this question is impossible to answer. To find out how grammar is created, someone needs to be present at the time of a language's creation, documenting its emergence. Many historical linguists are able to trace modern complex languages back to earlier languages, but in order to answer the question of how complex languages are actually *formed*, the researcher needs to observe how languages are started from scratch. Amazingly, however, this is possible. Some of the most recent languages evolved due to the Atlantic slave trade. At that time, slaves from a number of different ethnicities were forced to work together under colonizer's rule. Since they had no opportunity to learn each other's languages, they developed a make-shift language called a *pidgin*. Pidgins are strings of words copied from the language of the landowner. They have little in the way of grammar, and in many cases, it is difficult for a listener to deduce when an event happened, and who did what to whom. Speakers need to use circumlocution in order to make their meaning understood. Interestingly, however, all it takes for a pidgin to become a complex language is for a group of children to be exposed to it at the time when they learn their mother tongue. Slave children did not simply copy the strings of words uttered by their elders; they adapted their words to create a new, expressive language. Complex grammar systems which emerge from pidgins are termed creoles, and they are invented by children.

Further evidence of this can be seen in studying sign languages for the deaf. Sign languages are not simply a series of gestures; they utilise the same grammatical machinery that is found in spoken languages. Moreover, there are many different languages used worldwide. The creation of one such language was documented quite recently in Nicaragua. Previously, all deaf people were isolated from each other, but in 1979 a new government introduced schools for the deaf. Although children were taught speech and lip reading in the classroom, in the playgrounds they began to invent their own sign system, using the gestures that they used at home. It was basically a pidgin. Each child used the signs differently, and there was no consistent grammar. However, children who joined the school later, when this inventive sign system was already around, developed a quite different sign language. Although it was based on the signs of the older children, the younger children's language was more fluid and compact, and it utilised a large range of grammatical devices to clarify meaning. What is more, all the children used the signs in the same way. A new creole was born.

Some linguists believe that many of the world's most established languages were creoles at first. The English past tense -ed ending may have evolved from the verb 'do'. 'It ended' may once have been 'It end-did'. Therefore, it would appear that even the most widespread languages were partly created by children. Children appear to have innate grammatical machinery in their brains, which springs to life when they are first trying to make sense of the world around them. Their minds can serve to create logical, complex structures, even when there is no grammar present for them to copy.

[Note: In your précis you must take care of all possible steps that you have learned]

- What do you mean by a group discussion? Also, discuss the personality traits of participants that are evaluated in a GD. (7.5 marks) CO8

END SEMESTER EXAM. July'2023

DEPARTMENT OF MATHEMATICS

Course Name: Engineering Maths-II (Probability & Statistics) (Code: MA2401;MA2402)
 Branch: B.Tech(CSE(Gr. C)/Cyber Security/Data Sc.)
 Semester: IInd sem.

Time: 3hrs
F.M.: 60

Answer any five questions

- 1(a) The contents of urns I, II, and III are as follows:

1 white, 2 red and 3 black balls,

2 white, 3 red and 1 black balls and

3 white, 1 red and 2 black balls

One urn is chosen at random and balls drawn. The happen to be white and red. What is the probability that they come from urns I,II or III ?

- (b) The amount of bread (in hundreds of pounds) X that a certain bakery is able to sell in a day is found to be a numerical valued random phenomenon, with a probability function specified by the probability density $f(x)$, given by

$$\begin{aligned} f(x) &= Ax, & \text{for } 0 \leq x \leq 5 \\ &= A(10 - x), & \text{for } 5 \leq x < 10 \\ &= 0, & \text{otherwise} \end{aligned}$$

Find the value of A such that $f(x)$ is a probability density function.

- 2(a) Consider the p.d.f $f(x) = ae^{-bx|x|}$, where x is a random variable whose allowable range of value are from $x = -\infty$ to ∞ .

Find (i) cumulative distribution function

(ii) the relation between a and b

(iii) $p(1 < x \leq 2)$

- (b) The demand for new product of a company is assumed to be a random variable with p.d.f

$$\begin{aligned} f(x) &= \frac{x}{e^2} e^{-\frac{x^2}{2\lambda^2}}, x \geq 0 \\ &= 0, \quad x < 0 \end{aligned}$$

- 3(a) A manufacturer of cotter pins knows that 5% of his product is defective. If he sells cotter pins in boxes of 100 and guarantees that not more than 10 pins will be defective, what is the approximate probability that a box will fall to meet the guaranteed quality?

- (b) In a normal distribution 32% of the items are under 45 and 8% are above 64.

Find the mean and standard deviation.

[Given $p(0 < Z < 1.405) = 0.42$, $p(-0.496 < Z < 0) = 0.19$]

- 4(a) Twenty people were attacked by a disease and only 18 survived. Will you rejected the hypothesis that the survived rate, if attacked by this disease, is 85% in favour of the hypothesis that it is more at 5% level.(use Large sample test) [Given $Z=+1.645$ at 5%]

- (b) 500 articles from a factory are examined and found to be 2% defective, 800 similar articles from a second factory are found to have only 1.5% defective. Can it reasonably be concluded that the product of the first factory that the product of the first factory are inferior to those of second? [Given $Z=+1.645$ at 5%]

[PTO]

5(a) For sample I, $n_1 = 1000$, $\sum x = 4900$, $\sum(x - \bar{x})^2 = 78400$;
 For sample II, $n_2 = 1500$, $\sum x = 70500$, $\sum(x - \bar{x})^2 = 2400000$.
 Discuss the significance of the difference of the sample means. [Given $|Z| = 1.96$ at 5%]

(b) Random samples drawn from two State gave the following data relating to the heights of adult males.

	State A	State B
Number of samples	1200	1500
Mean height (in inches)	67.42	2.50
Standard deviation	2.58	2.50

Is the difference between the standard deviations significant? [Given $|Z| = 1.96$ at 5%]

✓ 6(a) A sample of 20 items has mean 42 units and S.D. 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units. [Given t at 5% level for 19 d.f is 2.09]

(b) Test, if the two diets differ significantly as regards their effect on increase in weight for the following given data the gain in weight (in lbs.) of pigs fed on two diets A and B.

GAIN in WEIGHT													
Diet A:	25	32	30	34	24	14	32	24	30	31	35	25	
Diet B:	44	34	22	10	47	31	40	30	32	35	18	21	35

(Given Tabulated value $t_{0.05}$ for 25 d.f is 2.06)

7(a) Two independent sample of sizes 7 and 6 had the following values:

Sample A	28	30	32	33	31	29	34
Sample B	29	30	30	24	27	28	

Examination whether the samples have been drawn from normal populations having the same variance. (Given Tabulated value $F_{0.05} = 4.39$ at d.f $v_1 = 5$ and $v_2 = 6$ for 5% LOS)

(b) The following table gives the number of aircraft accidents that occurred during the various days of the week. Test whether the accidents are uniformly distributed over the week.
 Test whether the accidents are uniformly distributed over the week.

Days:	Mon	Tue	Wed	Thurs	Fri	Sat
No. of accidents:	11	14	12	14	15	18

(Given $\chi^2 = 11.07$ at $v = 5$, $\chi^2 = 12.59$ at $v = 5$, $\chi^2 = 14.07$ at $v = 7$ at 5% level of significance)

NATIONAL INSTITUTE OF TECHNOLOGY PATNA
 Department of Computer Science and Engineering
 END SEMESTER EXAMINATION, Jan-June 2023

B.Tech: 2nd Semester (CSE)

Course Name: Web Technology

DOE: 18/07/2023

Maximum Time: 03 hours

Exam Time: 10:00AM-1:00AM

Course Code: CS24107

Max. Marks: 60

Instruction: All questions are compulsory and sub-questions must be answered sequentially in one place.

SECTION 2 AND 3 Students Only.

S.N.	Questions	Marks	CO	BL
1. a) b) c)	<p>Write three methods to add new content in JQuery? Explain each method with an example.</p> <p>How to include JavaScript into HTML page?</p> <p>What XMLHttpRequest object does in AJAX? Illustrate it using suitable diagram.</p>	6 2 2 [6+2+2=10]	CO1	Remember
2. a) b) c)	<p>Which methods can be used in Servlet lifecycle? Specify significance of each method.</p> <p>Why Servlet is used over CGI? Illustrate the concept of multithreading in Servlet architecture.</p> <p>Write a code to print the value of the variable using JSP.</p>	5 5 5 [5+5+5=15]	CO1 CO1 CO3	Remember Remember Apply
3. a) b)	<p>Using JavaScript, write a program to access all elements of an array as given below:</p> <p>arr = ["NIT", "Patna", "Bihar"]</p> <p>How to change the value of an attribute using Document Object Model (DOM) method? Give an example.</p>	5 5 [5+5= 10]	CO3	Apply
4. a) b) c)	<p>Write a Java code to demonstrate the concept of single inheritance.</p> <p>Why jQuery selectors are used? How to use element and class selectors?</p> <p>How event delegation model works?</p>	2 3 5 [2+3+5 = 10]	CO3 CO2	Apply Understand
5. a) b)	<p>Mention basic steps to connect Java API to database along with their syntax.</p> <p>Write a java code to create a frame and add button into the frame.</p>	5 2 [5+2 = 7]	CO1 CO3	Remember Apply
6. a) b) c)	<p>Why socket is used in Java programming?</p> <p>How to create client and server in socket programming?</p> <p>How TCP differs from UDP protocol in socket communication?</p>	2 3 3 [2+3+3=08]	CO1 CO3 CO2	Remember Apply Understand

For Section 1 Student only

Q1. [6 Points, BL3, CO3] Consider a web page with an unknown number of following HTML components.

```
<input type="text" name="data"></input>  
<input type="text" name="data"></input>  
..
```

Write JavaScript code to populate the above input boxes with even number sequences viz. The first input box should have 2, second 4, third 6, and so on.

Q2. [7+3 = 10 Points, BL3,2, CO1, 2]

- a. Implement a TCP Server and TCP Client such that when a client provides the Day Name, Server will return the Day Number (Consider Sunday as the 0th Day and Saturday as the 7th Day). For ex: If the client provides Monday, Server should return 1 to the client.
- b. Explain with reason what will happen in the following scenarios
 - i. A TCP client is trying to connect to a TCP Server when the TCP server is in a powered-off state.
 - ii. A UDP client is trying to connect to a UDP Server when UDP Server is in a powered-off state.

Q3. [5 Points, BL3, CO3] Create an HTML form that has an input field, a password field, a radio group button with four options (second radio button should be selected by default), a checkbox group with four options (second checkbox should be selected by default), a drop-down box with values from one to ten (three should be selected by default) and a submit button.

Q4. [10 Points, BL3, CO1,2] Consider a remote method int add(int x,int y) of a remote interface Calculator. Write a RMI application code for implementing the remote method.

Q5. [1x5 = 5 Points, BL3, CO3] Write the CSS code for the following:

- a. Set the background color of <input> elements that are in focus (clicked or active), to "lightblue".
- b. Change the background color, when a user hovers over p elements, with the class "highlight", to "lightblue".
- c. Set the background color of <p> elements, that are the first child of any element, to "lightblue".
- d. Insert an image before, and after <p> elements
- e. The animation of the <div> element should alternate between running forwards and backwards.

Q6. [1x5 = 5 Points, BL3, CO3] Write jQuery code for the following:

- a. Use a jQuery method to insert the text "YES!" at the beginning of a <p> element.
- b. Use a jQuery method to remove all <div> elements with class="test" and class="demo".
- c. Use proper jQuery method to set the following styles for <p>: Green background color, white text color, 25 pixels font size and a padding of 15 pixels.
- d. Use the correct selector to hide all even table rows in a table.
- e. Use a jQuery method to toggle between adding and removing the "important" class from the <p> element on click.

Q6. [2+2+2 = 6 Points, BL3, CO3] Write Regular Expressions for following input validations:

- a. Field should accept alphabet from a to d and numbers from 1 to 5.
- b. Filed should accept all email address of NIT Patna-domain.
- c. Filed should accept alphanumeric values and special characters @,#,\$,% with total length in between 8 to 16

Q7. [3 + 4 + 1 = 8 Points, BL3,2, CO3]

- a. Write an AJAX script to send HTML form data (say First name and Last name) to the server.
- b. Consider a website has a cookie "username=; expires=Thu, 3 March 2015 12:00:00 UTC; path=/". Write JavaScript code to read this cookie and print property name and its values.
- c. Explain working of Prompt Box

Q8. [5 Points, BL3, CO3] Write JavaScript code to find all instance (index) of a given substring in a given string without using any inbuilt functions. For ex: In given string "cocomelon", for given substring "co", it should return index of two instances as 0 and 2.



NATIONAL INSTITUTE OF TECHNOLOGY PATNA
Department of Computer Science and Engineering
END SEMESTER EXAMINATION - 2023

11:30

B.Tech.: CSE, 2nd Semester
Course Name: Computer Organization
DOE: 14th August 2023

Course Code: CS24108
Max. Marks: 60
Maximum Time: 3 hours

Instruction:

1. Attempt all questions.
2. Assume any suitable data, if necessary.
3. Answer all the questions in order as appeared in the question paper and **write all the sub-parts of a question in one place.**
4. The Marks, CO (Course Outcome) and BL (Bloom's Level) related to questions are mentioned on the right-hand side margin.

S.N.	Questions	Marks	CO	BL
1	a) What are the major structural components of CPU? Explain the term datapath with suitable example. b) Perform the division of 5 by 2 by applying simple division process and show the state of all the registers involved in the process.	2+3 5	CO1 CO2	Remember Understand
2	a) What is control unit? Explain control unit organization with block diagram. Discuss the working as well as advantages and disadvantages of microprogrammed control unit design.	2+4+4 5	CO2	Understand
3	a) Define the term instruction. A processor has 54 distinct instructions and 30 general-purpose registers. The processor supports a 32-bit length instruction that has 1 opcode, 2 register operands, and 1 immediate operand. Define the bits for the following: i) Opcode ii) Register Operand iii) Immediate operand b) An address field in an instruction contains decimal value 14. Where is the corresponding operand located for i) immediate addressing? ii) direct addressing? iii) indirect addressing? iv) register addressing? v) register indirect addressing?	5	CO4	Apply
4	a) What do you mean by pipeline hazard? Explain all the types of pipeline hazards and their remedies. b) Consider two pipeline A and B. The pipeline A has 8 stages with uniform stage delay 3ns. While pipeline B has 4 stages with stages delay 2.5ns, 0.1ns, 3.9ns and 4 ns. How much time is saved for 100 instructions in pipeline A is used instead of pipeline B? OR What is memory interfacing? Explain the memory hierarchy with respect to different parameter such as access time, cost, size and frequency.	6 4	CO6 CO6	Analyze Analyze
5	a) Discuss the following with suitable examples. i) Spatial Vs Temporal Locality ii) Direct Vs Associative mapping b) Write short note on the following i) DMA ii) CISC Vs RISC	5	CO3 CO1	Apply Remember
6	a) Consider a system with 2 level cache. The access time of L ₁ cache, L ₂ cache and main memory are 1ns, 10ns and 500ns. The hit rate of L ₁ and L ₂ cache are 0.8 and 0.9. What is the average access time of the system ignoring the search time within the cache. b) A block set associative cache memory consists of 128 blocks divided into four block sets. The main memory consists of 16,384 blocks and each block contains 256 eight-bit words. i) How many bits are required for addressing the main memory? ii) How many bits are needed to represent the TAG, SET and WORD	5 5 5	CO3 CO2	Apply Understand

All the best



NATIONAL INSTITUTE OF TECHNOLOGY PATNA
END SEMESTER EXAMINATION, July 2023

Program: B. Tech. (CSE & DD)
Course Code: PH24101
Full Marks: 60

Semester: 2

Department: Physics

Course Name: Engineering Physics
Duration of Examination: 3 hours

Answer all questions. Assume missing data suitably, if any.

- Q1.** a) Define damped harmonic oscillations. Find the expression for displacement and discuss when we get oscillatory damped motion. [15]
b) Derive an expression for the intensity distribution due to single slit diffraction and discuss the conditions for maxima and minima.
c) Find the angular separation between the first-order minima on either side of central maxima when slit is $6 \times 10^{-4} \text{ cm}$ wide. Given wavelength of light $\lambda = 6000 \text{ \AA}$.
- Q2.** a) A dielectric cube of side L and center at the origin has a polarization vector given as $P = ix + jy + kz$. Find the volume and surface bound charge densities, and show that total bound charge vanishes. [15]
b) State Maxwell's equations. From these equations derive the wave equations for an electromagnetic wave in dielectric medium. Estimate the velocity of this wave.
- Q3.** a) What are Einstein's coefficients? Find the relation between Einstein coefficients. Show that at thermal equilibrium the ratio of spontaneous to stimulated emissions is given by $e^{\frac{\hbar\omega}{(k_B T)}} - 1$. [15]
b) Explain the construction and working principle of Ruby laser.
- Q4.** a) Calculate the ratio of deBroglie waves associated with a proton and an electron each having the kinetic energy as 20 MeV; Given $m_p = 1.67 \times 10^{-27} \text{ kg}$ and $m_e = 9.1 \times 10^{-31} \text{ kg}$. [15]
b) Explain Heisenberg uncertainty principle. Show that electron cannot reside inside the nucleus.
c) Discuss and derive the Schrödinger equation for matter wave.

NATIONAL INSTITUTE OF TECHNOLOGY PATNA

Department of Humanities and Social Sciences

Ashok Rajpath, Patna-800 005

END-SEMESTER EXAMINATION JULY 2023

Course Name: Communicative English

Group: B.Tech (CSE 1, CSE 2, CSE 3, CSE DD)

Course Code: HS24101

Full Marks: 45

Time: 3 Hours

Instructions: Answer all the questions in your own words.

1. ✓ Do you agree with the statement, "Lack of effective listening skills results in loss of time, lowering of productivity, and missed opportunities?" Substantiate your answer with appropriate examples. (7.5 marks) CO4
2. ✓ 'Human voice is an extremely valuable resource and contributes significantly to the effectiveness of speaking.' Discuss. (7.5 marks) CO5
3. ✓ Explain the different types of reading with examples. Differentiate between efficient and inefficient reader with examples. (15 marks) CO6
4. ✓ Your placements are going to commence next month. What preparations will you make to get through the interview? Explain with examples. (15 marks) CO8

[Note: In your answers add examples to explain your points]