

**B.E. COMPUTER SCIENCE & ENGINEERING 3rd YEAR 2nd SEMESTER
SUPPLEMENTARY EXAMINATION - 2023**

INTERNET TECHNOLOGIES

Time: 3 hours

Full Marks: 100

Group A (Total Marks: 20) [CO1 and CO2]**Answer ANY TWO questions.**

1.	a) Decompress and show the complete unabbreviated IPv6 address: FF01:F::FF:12 b) Give an example of IPv4 address embedded in an IPv6 address c) Differentiate between unicast, multicast, anycast and broadcast address types. d) What are unique local unicast addresses in IPv6?	2+2+4+2=10
2.	a) Explain with an example how ICMP redirection messages can be useful. b) In which cases the ICMP destination unreachable error messages are generated? c) Identify two scenarios when ICMP time exceeded error messages are generated. d) Explain the usages of ICMP router advertisement and router solicitation messages.	2+2+3+3=10
3.	a) Explain with suitable examples use of push and urgent flag in TCP header. b) What is use of window size field in TCP header? c) Consider an instance of TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm where the window size at the start of slow start phase is 2 MSS and the threshold at the start of first transmission is 8 MSS. Assume that a time out occurs during the fifth transmission. Find the congestion window size at the end of tenth transmission.	2+2+6=10

[Turn over

Group B (Total Marks: 10) [CO3]

Answer ANY ONE question.

4.	a) Differentiate between SSL session and SSL connection. b) Explain briefly the SSL record protocol. c) Briefly state the objectives of the SSL Handshake protocol. d) Give examples of two cases when SSL alert protocol messages are generated.	3+3+2+2 =10
5.	a) State the essential components of a web application framework. b) Write the code snippet for implementing a simple HTTP server running on port 8888 using Node.JS. c) Explain the importance of callbacks w.r.t Node.JS for web application development.	3+4+3=10

Group C (Total Marks: 30) [CO4]

Answer ANY TWO questions.

6.	a) Write appropriate code snippets to send a message from the client side and receive that message at the server side through socket.io. How could you broadcast a message to all the clients? b) Write a Node.js application to push a static advertisement page to the client after the client has connected to the server.	9+6=15
7.	a) State the pros and cons of Websocket protocol. b) State the main features provided by the Express framework. c) What is Event Emitter design pattern? How is it applied in Node.js?	5+5+5=15
8.	a) There are two currency classes-INR and GBP. For an online retail store that handles international customers, how can you calculate the total price of a cart with respective indirect taxes (based on respective countries regulations)? Write the basic components of dependency injection for this application and the structure of the Spring Controller class. b) What is the significance of the DispatcherServlet in the Spring framework? c) Mention two design patterns apart from dependency injection that are utilized by the Spring framework.	8+5+2=15

Group D (Total Marks: 40) [CO5]
Answer ANY FOUR questions.

9.	<p>a) What is authorization?</p> <p>b) How can you enable authorization check for a URL in Spring? Only write the filter chain part.</p> <p>c) How could you store/extract user details in/from memory?</p>	2+5+3=10
10.	<p>a) Discuss how does Spring framework handle session-fixation attack.</p> <p>b) How to enable HTTP Basic authentication facility in Spring framework?</p>	5+5=10
11.	<p>a) Discuss Cross-site request forgery based vulnerability and how can it be prevented.</p> <p>b) Write appropriate code snippets to insert username and password pairs at the backend.</p>	6+4=10
12.	<p>a) Differentiate between active and passive attacks.</p> <p>b) Explain the four types of attacks: Four types of attack: Interruption, Interception, Modification, Fabrication</p> <p>c) Explain how authentication and confidentiality can be achieved using public key cryptography.</p>	2+4+4=10
13.	<p>a) State the requirements of public key cryptography.</p> <p>b) What is a secure hash function? What are the properties that a secure hash function must satisfy?</p> <p>c) What are the usages of digital certificates? Explain the role of a certification authority (CA).</p>	3+3+4=10
14.	<p>a) Assume that you can only use a hash function H and a symmetric-key encryption algorithm that takes a secret key K. Show how would you transmit a message M from user A to user B so that message authentication, integrity and confidentiality is achieved.</p> <p>b) Assume you can only use a hash function H and a secret S. Show how would you transmit a message M from user A to user B so that message authentication achieved. You should not use any encryption.</p>	6+4=10