b.	Analyze the difference between external and internal time synchronization and illustrate atleast one concrete example for each type of synchronization.	10	4	2	2,3
28. a.	Outline the approach of S-MAC protocol and infer the method used to reduce collisions, duty cycles and address hidden terminal problem. Name atleast three disadvantages of the S-MAC protocol.	10	4	2	1
	(OR)				
b.	Analyze the problem with the energy-ware cluster head election policy in LEACH protocol and state how it considers the available energy on each node in the election process. Further, LEACH uses TDMA within a cluster, outline the advantages and disadvantages of this approach.	10	4	2	2,4
29. a.	Examine the three challenges faced by flooding method and show the solution provided by the SPIN family of protocols. Determine the disadvantages of a negotiation based protocol such as SPIN.	10	3	3	1,2
	(OR)				
b.	Determine the classifications of routing protocols based on the network structure, route discovery and protocol operations. What is the difference between a proactive and reactive routing protocol and provide examples for each category.	10	3	3	1,2
30. a.	Outline the principles of WSN middle ware and categorize the middle ware approaches based on the programming models.	10	4	4	1,2
	(OR)				
b.	Analyze the challenges of security in wireless sensor networks and outline the attacks against the security mechanisms in wireless sensor networks.	10	4	4	2,3

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Reg. No.														

B.Tech. DEGREE EXAMINATION, MAY 2022
Sixth & Seventh Semester

18CSE451T – WIRELESS SENSOR NETWORKS
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

		Marks	BL	CO	PO

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

1. An architecture that provides a single memory space for storing program instructions and data. — 1 2 1 1
   (A) Harvard architecture (B) Von Neumann architecture
   (C) SHARC architecture (D) Analog architecture

2. Example for a protocol that has been designed specifically for short range communications. — 1 1 1 1
   (A) IEEE 801.3 (B) IEEE 802.2
   (C) IEEE 802.15.4 (D) IEEE 802.11a

3. A type of deployment of sensors that are done without any particular design. — 1 2 1 2
   (A) On-demand mesh deployment (B) Table-driven deployment
   (C) Ad-hoc deployment (D) Star deployment

4. Which of the following is the ability to adapt configuration parameters based on system and environment state? — 1 1 1 1
   (A) Self-healing (B) Self-optimization
   (C) Self-protection (D) Self-organization

5. Name the prototype that defines tasks, commands and events as the fundamental building block in runtime environment. — 1 1 1 1
   (A) Lite FS (B) Contiki MAC
   (C) System-On-board (D) Tiny OS

6. A node that is aware of its location either through GPS and manual preprogramming during deployment — 1 2 2 2
   (A) Range based node (B) Proximity node
   (C) Anchor node (D) Unknown node

7. Which of the following method provide more accurate distance measurements? — 1 1 2 2
   (A) Range free localization (B) Hop count localization
   (C) Traffic based localization (D) Range based localization

8. A phenomenon that occurs when the radio path between transmitter and receiver is obstructed by surface that has sharp edges. 1 2 2 3
   (A) Diffraction (B) Scattering
   (C) Reflection (D) Diffusion

9. The parameter that defines the difference between the local times of two nodes. 1 1 2 1
   (A) Phase rate (B) Clock rate
   (C) Clock skew (D) Clock offset

10. Which of the range based localization technique has high accuracy? 1 1 2 2
   (A) Time of arrival (B) Time difference of arrival
   (C) Angle of arrival (D) Received signal strength indicator

11. IEEE 802 reference model divides data link layer into two layers. 1 1 2 1
   (A) Network and transport layer (B) Logical link control and MAC layer
   (C) Network control and MAC layer (D) Physical layer and MAC layer

12. Which one of the following is a contention-based MAC protocol? 1 1 2 1
   (A) ALOHA (B) FDMA
   (C) Token passing (D) Polling

13. In which mode does devices communicate directly with each other? 1 2 2 3
   (A) Point coordination function mode (B) Token passing mode
   (C) Power saving mode (D) Distributed coordination function mode

14. Name the mechanism that build schedules that adapt to amount of traffic in neighbourhood. 1 2 2 1
   (A) Pattern MAC (B) Sensor MAC
   (C) Timeout MAC (D) Y-MAC

15. Identify the two types of MAC protocols in contiki OS. 1 1 2 1
   (A) Duty cycle and FDMA (B) Null MAC and CSMA
   (C) Wakeup and phase lock (D) Sense MAC and two phase

16. A class of routing protocol that adopts an architecture where all nodes are considered as peers. 1 1 3 2
   (A) Location based (B) Hierarchical based
   (C) Data based (D) Flat based

17. A routing protocol that balance between data quality and energy consumption. 1 2 3 2
   (A) Multipath routing (B) Negotiation based routing
   (C) QoS based routing (D) Query based routing

18. Which of the following approach addresses the short comings of flooding? 1 1 3 1
   (A) Diffusion (B) Negotiation
   (C) Gossiping (D) Resource blindness

19. Identify the odd one out of the following routing protocol? 1 2 3 1
   (A) Directed diffusion (B) TEEN
   (C) LEACH (D) PEGASIS

20. The routing strategy that establishes routes to a limited set of destinations on demand. 1 2 3 3
   (A) Reactive (B) Table-driven
   (C) Pro-active (D) Hyper-active

21. A software infrastructure that glues together hardware, operating system, network stacks and applications. 1 1 4 3
   (A) Security (B) Malware
   (C) Middleware (D) Data centre

22. Name the method that proves that a person and device has performed a transaction or transmission. 1 2 4 2
   (A) Denial of service (B) Non repudiation
   (C) Sybil (D) Encryption

23. _____ refers to the reception of a message by an unauthorized individual. 1 2 4 3
   (A) Eavesdropping (B) Digital signatures
   (C) Analysis (D) Crypto technique

24. Which of the middleware approach provides concepts and abstractions of sensor nodes and sensor data? 1 1 4 4
   (A) Programming abstraction (B) Programming support
   (C) Data aggregation (D) Data dissemination

25. An attempt of an adversary to stop a network from functioning or to disrupt the services a network provides. 1 1 4 1
   (A) Denial-of-service attack (B) Privacy attack
   (C) Key establishment attack (D) Spoofing

PART – B (5 × 10 = 50 Marks) Marks BL CO PO

Answer **ALL** Questions

26. a. Show the different subsystems of a wireless sensor node and illustrate the integration techniques on the design and implementation of a node. 10 3 1 3

(OR)

b. Examine the unique challenges and constraints of wireless sensor networks that impact its design leading to protocols and algorithms that differ from other distributed systems. 10 3 1 2

27. a. Categorize the various localization techniques and infer the pros and cons of each method based on its distinct feature. 10 4 2 2,3

(OR)