Birla Institute of Technology & Science, Pilani
Work Integrated Learning Programmes Division
Second Semester 2022-2023

Comprehensive Examination
(EC-3 Make-up)

Course No.	:	**AEL ZG519**
Course Title	:	**AUTOMOTIVE SECURITY**
Nature of Exam	:	Open Book
Weightage	:	40%
Duration	:	2 ½ Hours
Date of Exam	:	27/05/2023 (Evening)

No. of Pages = 4
No. of Questions = 6

Note to Students:
1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Q.1. SET (A)
Please explain about the role of intrusion detection systems(IDS) in Automotive and classify IDS types based on deployment strategy and detection approach
[6 Marks]

Q 1 SET (B)
Please provide an overview of SIEM product and security operations center in detail.
[6 Marks]

Q 1 SET (C)
Please provide an overview of different types of Automotive firewalls and secure gateways.
[6 Marks]

Q.2. SET (A)
Virat prepares an overview of STRIDE categories. Management wants to have atleast two attacks in any ECU, two tactics and four technologies for repudiation. Please share your input on this requirement. [10 Marks]

Q2 SET (B)
Virat prepares an overview of STRIDE categories. Management wants to have atleast two attacks in any ECU, two tactics and four technologies for denial of service. Please share your input on this requirement. [10 Marks]

Q2 SET (C)
Virat prepares an overview of STRIDE categories. Management wants to have atleast two attacks in any ECU, two tactics and four technologies for Spoofing. Please share your input on this requirement. [10 Marks]

Q.3. SET (A)

a) Abhishek used a crypto library in his code. One of the functions in the library returns more data from memory than it was supposed to return. Is it a cause of concern?
Please share your comments with respect to secure coding.

b) As per AUTOSAR guidelines for static code analysis what is the difference between Automated and Non –automated clauses?

c) How many static code requirements are there in total "Partially Automated" clause?

[2+3+1 = 6 Marks]

Q 3 SET (B)

a) Jayan used a text processing library in his code. One of the functions in the library returns more data from memory than it was supposed to return. Is it a cause of concern?
Please share your comments with respect to secure coding.

b) As per AUTOSAR guidelines for static code analysis what is the difference between Partially Automated and Non –automated clauses?

c) How many static code requirements are there in total "Automated" clause?

[2+3+1 = 6 Marks]

Q 3 SET (C)

a) Kunal used a maths library in his code. One of the functions in the library returns more data from memory than it was supposed to return. Is it a cause of concern?
Please share your comments with respect to secure coding.

b) As per AUTOSAR guidelines for static code analysis what is the difference between Partially Automated and Automated clauses?

c) How many static code requirements are there in total "Non-Automated" clause?

[2+3+1 = 6 Marks]

Q.4. SET (A)

Please explain threat level parameters in HEAVENS security model.
[6 marks]

Q4 SET (B)

Please explain impact level parameters in HEAVENS security model.
. [6 marks]

Q4 SET (C)

Please explain attack potential factors defined by EVITA project.
[6 marks]

Q.5. SET (A)

a)Please provide atleast two attacks for LiDAR and ultrasonic sensors. [4 marks]

b) Please explain one of the attack class for Robots where it causes damages to Robots.
[2 marks]

[4+2=6 marks]

Q5. SET (B)

a) Please provide atleast two attacks for Inertial sensors and Tire Pressure Monitoring Systems. [4 marks]

b) Please explain one of the attack class for Robots where it causes operator injuries . [2 marks]

[4+2=6 marks]

Q5 SET (C)

- a)Please provide atleast two attacks for camera sensors and Global Positioning System (GPS). [4 marks]

b) Please explain one of the attack class for Robots where it causes production of defective products. [2 marks]

[4+2=6 marks]

Q6. SET(A)

a) Please mention at least four applications and four attack vectors from Roadway reporting category in Intelligent Transport systems.

b) In the given Permuted Table what would be output bits for highlighted four entries (7,9,1,3) in the table?

PC-1

7	9	1	3	25	17	9
1	58	50	42	34	26	18
10	2	59	51	43	35	27
19	11	3	60	52	44	36
63	55	47	39	31	23	15
7	62	54	46	38	30	22
14	6	61	53	45	37	29
21	13	5	28	20	12	4

K = 00010011 00110100 01010111 01111001 10011011 10111100 11011111 11110001

[4+2=6 marks]

Q6. SET(B)

a) Please mention at least four applications and four attack vectors from Payment A&S category in Intelligent Transport systems.

b) In the given Permuted Table what would be output bits for highlighted four entries (9,1,3,5) in the table?

PC–1

7	9	1	3	5	17	9
1	58	50	42	34	26	18
10	2	59	51	43	35	27
19	11	3	60	52	44	36
63	55	47	39	31	23	15
7	62	54	46	38	30	22
14	6	61	53	45	37	29
21	13	5	28	20	12	4

K = 00010011 00110100 01010111 01111001 10011011 10111100 11011111 11110001

[4+2=6 marks]

Q6. SET(C)

a) Please mention at least four applications and four attack vectors from Management A&S category in Intelligent Transport systems.

b) In the given Permuted Table what would be output bits for highlighted four entries (1,3,5,7) in the table?

PC–1

7	9	1	3	5	7	9
1	58	50	42	34	26	18
10	2	59	51	43	35	27
19	11	3	60	52	44	36
63	55	47	39	31	23	15
7	62	54	46	38	30	22
14	6	61	53	45	37	29
21	13	5	28	20	12	4

K = 00010011 00110100 01010111 01111001 10011011 10111100 11011111 11110001

[4+2=6 marks]

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