

IT3EPHC550

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St Aloysius (Deemed to be University), Mangaluru
School of Information Science and Technology (PG Programme)
Semester II-PG Examination- MCA

April-2026

Web Technologies and .NET Framework

Time: 2½ Hours

Max Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

SECTION - A

Answer any **FIVE** of the following.

(5x2=10)

1. Define conventional routing in ASP.NET Core.
2. What is ViewState state management?
3. Explain inheritance with an example.
4. Explain client-side state management?
5. What is a DataAdapter in ADO.NET?
6. What is LINQ to Objects? Explain with an example.
7. How does MVC improve separation of concerns?

SECTION - B

Answer any **SIX** of the following.

(6x5=30)

8. Describe the role of the Razor View Engine in ASP.NET MVC and explain its major benefits.
9. Explain looping statements in C#
10. Explain value types and reference types in C# with examples.
11. Explain the ASP.NET architecture with a neat diagram.
12. What is a hidden field? How is data stored and retrieved using it? Explain with an example.
13. Differentiate between connected and disconnected architectures in ADO.NET.
14. Explain the DataReader object in ADO.NET and its working with an example.
15. Write a detailed note on Razor syntax. Demonstrate the use of variables, iteration statements with examples.

SECTION-C

Answer any **TWO** of the following.

(2x10=20)

16. Describe how data flows between Model, Controller, and View in ASP.NET MVC. Create an application where: • The Model stores Product data (ProductName and Price). • The Controller sends the product details to the View. • The View displays "Expensive" if Price ≥ 1000, otherwise "Affordable". Write the necessary code.
17. Explain how static files are handled in ASP.NET Core and Create a CSS file inside wwwroot and configure the application to serve static files.
18. Explain single and Hierarchical inheritance in C# with examples.

Mapping of Questions with Bloom's Level and Course Outcomes (COs)

SECTION	A							B							C			
Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Blooms Level	1	2	2	2	2	2	2	2	2	2	4	3	4	2	2	4	3	3
Mapped CO(s)	5	2	1	2	3	3	4	4	1	1	2	2	3	3	4	4	5	1

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St Aloysius (Deemed to be University), Mangaluru
School of Information Science and Technology (PG Programme)
Semester II-PG Examination- MCA

April-2026

Object-Oriented Software Engineering

Time: 2½ Hours

Max Marks: 60

- Note: i) Answer all the questions**
ii) Draw diagrams wherever necessary

SECTION - A

Answer any FIVE of the following.

(5x2=10)

1. Define Software Engineering.
2. Identify the five generic activities of a software process framework.
3. List any two attributes of a good SRS.
4. What is multiplicity? Name its types.
5. What is Unit Testing? Give example.
6. What is the purpose of Use Case Diagram?
7. What are Cohesion Principles? (Any two examples)

SECTION - B

Answer any SIX of the following.

(6x5=30)

8. Explain the role of Testing in various phases of SDLC.
9. Evaluate the benefits of Agile methodology in modern software development projects
10. Construct a Class Diagram for Train Ticket Booking System by identifying appropriate classes, attributes, methods, and relationships.
11. Explain State Chart Diagram with example.
12. Explain the characteristics of a good SRS and analyze why they are important?
13. Explain the concept of an Activity Diagram and analyze its components such as initial node, activity, decision node, fork, join, and final node.
14. Explain the Deployment Diagram and analyze how it represents the physical architecture of a system?
15. Compare Decision Trees and Decision Tables with suitable examples.

SECTION-C

Answer any TWO of the following.

(2x10=20)

16. Explain Input Design and Output Design in detail and analyze their importance in developing efficient information systems.
17. Compare traditional software metrics with object-oriented metrics and analyze their effectiveness in measuring software quality.
18. Compare and evaluate the Waterfall and Incremental models with suitable diagrams and examples.

Mapping of Questions with Bloom's Level and Course Outcomes (COs)

SECTION	A							B							C			
Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Blooms Level	2	2	2	1	2	3	3	3	4	4	3	3	4	3	4	3	4	4
Mapped CO(s)	1	2	2	4	3	4	5	4	4	5	5	2	3	5	5	3	5	1

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St Aloysius (Deemed to be University), Mangaluru
School of Information Science and Technology (PG Programme)
Semester II-PG Examination- MCA

April-2026

Mobile Application Development using Android

Time: 2½ Hours

Max Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

SECTION - A

Answer any FIVE of the following.

(5x2=10)

1. What are the prerequisites for installing Android SDK?
2. Define ADT (Android Development Tools)
3. What is the role of XML layout files?
4. What is the purpose of an Intent Filter?
5. How does Android manage multiple activities?
6. When is a Service preferred over an Activity?
7. Define Cursor in Android.

SECTION - B

Answer any SIX of the following.

(6x5=30)

8. Explain the role of primary keys and indexes in SQLite.
9. Explain the Android architecture with a neat diagram.
10. Describe the use of Services with background processing.
11. Describe dialogs and their types in Android.
12. Discuss how Android handles activity state changes.
13. Differentiate between static and dynamic broadcast receivers.
14. Describe Content Resolver and its role.
15. Explain Shared Preferences and their usage.

SECTION-C

Answer any TWO of the following.

(2x10=20)

16. Evaluate the advantages and limitations of internal storage for application data management.
17. Analyse how sensor events are processed and evaluate their role in real-time applications.
18. Evaluate the effectiveness of Android Emulator compared with real device testing in application development.

Mapping of Questions with Bloom's Level and Course Outcomes (COs)

Mapping of Questions with Bloom's Level and Course Outcomes (COs)																		
SECTION	A							B							C			
Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Blooms Level	1	1	2	3	2	3	4	4	1	3	2	2	3	3	4	4	5	1
Mapped CO(s)	1	1	2	2	4	3	1	2	2	3	2	4	4	2	2	5	4	5

IT3EPSC571d

Reg. No.:

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St Aloysius (Deemed to be University), Mangaluru
School of Information Science and Technology (PG Programme)
Semester II-PG Examination- MCA

April-2026

Operations Research

Time: 2½ Hours

Max Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

SECTION - A

Answer any FIVE of the following.

(5x2=10)

1. Write the standard form of LPP.
2. Define feasible region.
3. What is meant by transportation cost?
4. How do you convert an unbalanced TP into a balanced one?
5. What is the objective of an Assignment Problem?
6. When is an Assignment Problem said to have a unique solution?
7. What is a predecessor activity?

SECTION - B

Answer any SIX of the following.

(6x5=30)

8. Explain the algorithm for processing 'n' jobs through two and three machines.
9. In a hospital emergency room, patients arrive at a rate of 3 per hour and are served by a doctor at a rate of 5 per hour.
 - (i) Compute Average number of patients in the system (L)
 - (ii) Compute Average time a patient spends in the queue (Wq)
10. Discuss briefly goals, limitations and tools of Operations Research in various fields.
11. Solve the transportation problem using Vogel's approximation method..

SOURCE	DESTINATION				SUPPLY
		A	B	C	
	1	5	1	7	
	2	6	4	6	
	3	3	2	5	
DEMAND		75	20	50	

Contd...2

12. There are five jobs to be assigned, one each to 5 machines and the associated cost matrix is as follows. Solve the problem to maximise the profit.

	MACHINE					
		1	2	3	4	5
JOBS	A	40	40	35	25	50
	B	42	30	16	25	27
	C	50	48	40	60	50
	D	20	19	20	18	25
	E	58	60	59	55	53

13. Tasks A, B, ... H, I constitute a project. The notation $X < Y$ means that the task X must be completed before Y is started. With the notation, $A < D, A < E, B < F, D < F, C < G, C < H, F < I, G < I$ Draw a graph to represent the sequence of tasks and find the minimum time of completion of the project, when the time (in days) of completion of each task is as follows. The above constraints can be given as in the following table:

Task	A	B	C	D	E	F	G	H	I
Time in days	8	10	8	10	16	17	18	14	9

14. Write the steps involved in forward pass and backward pass calculation.
 15. Explain in detail Components of a Queuing System

SECTION-C

Answer any TWO of the following.

(2x10=20)

16. Using Simplex method, solve the LPP.

$$\text{Maximize } Z = 5x + 4y$$

Subject to the constraints:

$$4x + 5y \leq 10$$

$$3x + 2y \leq 9$$

$$8x + 3y \leq 12$$

where $x \geq 0, y \geq 0$.

17. Solve the following Transportation Problem and MODI method to test its optimality.

	DESTINATION					
		A	B	C	D	SUPPLY
SOURCE	1	4	3	1	2	80
	2	5	2	3	4	60
	3	3	5	6	3	40
	DEMAND	50	60	20	50	

Contd...3

18. The following table shows the jobs of a network along with their time estimates.

Activity	1-2	1-3	2-4	2-5	3-5	4-6	5-6
a (weeks)	1	1	2	1	2	2	3
m (weeks)	1	4	2	1	5	5	6
b (weeks)	7	7	8	1	14	8	15

You are required to:

- i. Draw the project network.
- ii. Calculate the earliest and latest occurrence for each event and the expected project length

Mapping of Questions with Bloom’s Level and Course Outcomes (COs)

SECTION	A							B							C			
Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Blooms Level	1	1	1	2	1	2	1	2	3	2	3	3	3	2	2	3	3	3
Mapped CO(s)	1	1	2	2	3	3	4	5	5	1	2	3	4	4	5	1	2	4

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St Aloysius (Deemed to be University), Mangaluru

School of Information Science and Technology (PG Programme)

Semester II-PG Examination- MCA

April-2026

Optimization Techniques

Time: 2½ Hours

Max Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

SECTION - A

Answer any FIVE of the following.

(5x2=10)

1. Define random numbers.
2. What is First Come First Served (FCFS) discipline?
3. Explain why simulation may not always be cost-effective.
4. Define deterministic model
5. What are the fundamentals of network construction?
6. What is an event (node) in a network?
7. Define the Maximin principle.

SECTION - B

Answer any SIX of the following.

(6x5=30)

8. Find the optimal strategy and value of the game.

	B1	B2
A1	2	7
A2	5	3

9. Based on runs up and runs down, determine whether the following sequence of 40 numbers is such that the hypothesis of independence can be rejected at $\alpha = 0.05$ level of significance.

0.90 0.36 0.90 0.49 0.04 0.95 0.65 0.02 0.36 0.77
 0.89 0.72 0.75 0.08 0.14 0.82 0.01 0.06 0.16 0.88
 0.78 0.81 0.95 0.69 0.08 0.77 0.23 0.82 0.82 0.93
 0.61 0.32 0.73 0.04 0.03 0.25 0.13 0.17 0.63 0.19

10. Based on runs above and below mean, determine whether the following sequence of 40 numbers is such that the hypothesis of independence can be rejected at $\alpha = 0.05$ level of significance.

0.10 0.26 0.30 0.09 0.74 0.05 0.65 0.72 0.26 0.47
 0.78 0.31 0.95 0.69 0.28 0.77 0.23 0.32 0.32 0.93
 0.39 0.22 0.75 0.08 0.04 0.82 0.01 0.46 0.76 0.88
 0.11 0.22 0.73 0.04 0.23 0.25 0.13 0.97 0.23 0.19

11. Define Simulation and Explain its disadvantages in detail

Contd...2

12. Vehicles arrive at a toll booth randomly between 1 to 5 minutes apart with equal probability. The processing times vary from 2 to 6 minutes with probabilities 0.1, 0.2, 0.3, 0.25, 0.15. Using 10 vehicle arrivals, compute i) The average time spent by a vehicle in the system ii) The average idle time of the toll booth operator. Take the random members for IAT and ST from the 10 customers as 100, 200, 300, 400, 500, 600, 700, 750, 800, 900.
13. A project schedule has the following characteristics. Draw the network diagram and find the critical path.

Activity	1-2	1-3	2-4	3-4	3-5	4-5	4-6	5-6
Time in Days	6	5	10	3	4	6	2	9

14. Distinguish between PERT and CPM.
15. Find the saddle point and value of the game using Maximin and Minimax principles.

	B1	B2	B3
A1	2	4	3
A2	5	7	6
A3	1	3	2

SECTION-C

Answer any TWO of the following.

(2x10=20)

16. Solve the following 2 × 3 game using graphical method.

	B1	B2	B3
A1	2	4	6
A2	5	3	1

17. Describe the structure and characteristics of a queuing system.
18. Explain Chi-square test and Use Linear Congruential method to generate a sequence of Ten two digit random numbers with $X_0=22$, $a=12$, $c=25$ and $m=100$ & Use Chi-square test with $\alpha=0.05$ to determine the uniformity of the generated random numbers

Mapping of Questions with Bloom’s Level and Course Outcomes (COs)

SECTION	A							B							C			
Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Blooms Level	2	1	2	2	2	2	2	3	3	3	2	4	3	2	2	3	2	3
Mapped CO(s)	1	5	2	2	3	3	4	4	1	1	2	2	3	3	4	5	4	1

IT3EPSC572b

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St Aloysius (Deemed to be University), Mangaluru
School of Information Science and Technology (PG Programme)
Semester II-PG Examination- MCA
April-2026
Marketing Analytics

Time: 2¹/₂ Hours

Max Marks: 60

Note: i) Answer all the questions**ii) Draw diagrams wherever necessary****SECTION - A****Answer any FIVE of the following.****(5x2=10)**

1. What is meant by new product sales forecasting?
2. What is meant by the tipping point?
3. What is sales lift measurement?
4. What is a promotion effect?
5. Define Media Mix.
6. Define Adstock and its purpose.
7. Define One-way ANOVA.

SECTION - B**Answer any SIX of the following.****(6x5=30)**

8. Explain the working of Naïve Bayes classifier for customer response prediction.
9. Differentiate between innovation and imitation effects.
10. Compare S-curve forecasting and Bass Model forecasting.
11. Explain the steps involved in RFM analysis.
12. Discuss the advantages of Market Basket Analysis.
13. Describe the application of Monte Carlo Simulation in media planning.
14. Describe Google Ads auction process.
15. Discuss the advantages and limitations of PCA in marketing decision-making.

SECTION-C**Answer any TWO of the following.****(2x10=20)**

16. Two random samples were drawn from two normal populations and their values are: A: 66 67 75 76 82 84 88 90 92 B: 64 66 74 78 82 85 87 92 93 95 97 Test whether the two populations have the same variance at 10% level of significance.
17. Write a short note on viral marketing.
18. Explain the diffusion process of innovation and how analytical models support marketing strategy decisions.

Mapping of Questions with Bloom's Level and Course Outcomes (COs)

Part	A							B								C		
Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Blooms Level	L2	L2	L2	L2	L2	L3	L2	L3	L3	L3	L2	L2	L2	L2	L2	L3	L2	L2
Mapped CO(s)	2	5	2	3	3	3	3	4	3	1	4	3	3	3	3	3	5	5