

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA
April, 2026 Examinations

Programme: **Common**

Subject: **Engineering Materials (GC205)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

- Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Explain briefly the following physical properties of materials:
i) Melting point ii) Boiling point or freezing point
iii) Coefficient of linear expansion
- Enlist any five differences between ferrous and non ferrous metals.
- List the properties of aluminium that makes it a useful engineering metal. Also mention the various alloys of aluminium.
- What is cement? Give the main ingredients of cement.
- Give the various functions of lubricants. What are the types of lubricants?
- Give characteristics of solid insulating materials.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain any four mechanical properties of the engineering materials.
- List the types of cast iron and give their properties and uses.
- What is meant by chemical properties of engineering materials? Elaborate.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- What are tool steels? Give its composition, properties and uses.
- State classification and properties of bricks.
- What are the desirable properties of refractories? Give their applications.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Discuss the important characteristics of clay. List down the products of clay.
- Write short note on: i) Fibre glass ii) Glass wool iii) Abrasives
- Explain the various constituents of paints.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following:
i) Dielectric strength ii) Electrical resistivity iii) Permeability
- State and explain properties and applications of any three high conductivity materials.
- State the specifications and uses of the following semiconductor materials: i) Silicon ii) Germanium

Q.No.6. Write short note on any three:

3 x 4 = 12

- Lead and its hazard to the environment
- Oil based and polymer based paints
- Diamagnetic, paramagnetic and ferromagnetic materials
- Common building stones and their applications
- Insulating materials

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Computer Organization (CM301)**

Max. Marks: **75**

Time Duration: **3 Hrs.**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q. No. 1. Answer any five of the following Questions:

5 x 3 = 15

- Differentiate between Data bus, Address bus and Control bus.
- List key characteristics of CISC architecture and how they differ from RISC.
- Distinguish between (i) Sequential and Random Access Memory (ii) Volatile and non Volatile memory
- What are the requirements of Input Output (I/O) systems?
- What do you understand by: (i) Interrupt Priority (ii) Vectored interrupts
- Define Von Neumann Bottleneck.
- Differentiate Static RAM and Dynamic RAM.

Q. No. 2. Answer any two of the following Questions:

2 x 6 = 12

- Explain any three bus design parameters.
- Explain the different steps involved in executing a program.
- Draw the diagram of a multiple bus structure and explain.

Q. No. 3. Answer any two of the following Questions:

2 x 6 = 12

- Discuss accumulator based CPU organisation.
- Write a note on Instruction Cycle.
- Write a note on hard-wired and micro programmed control units. How do they differ?

Q. No. 4. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following read only memories:
(i) PROM (ii) EPROM (iii) EEPROM
- What is cache memory? Explain in brief the following terms:
(i) Hit Rate (ii) Cache Miss
- Describe any three cache replacement algorithms.

Q. No. 5. Answer any two of the following Questions:

2 x 6 = 12

- Explain in brief the following data transfer techniques:
(i) Program controlled I/O or polling control
(ii) I/O control by handshake signals
- Explain (i) Memory mapped I/O (ii) I/O Mapped I/O
- Compare Programmed I/O and Interrupt Driven I/O

Q. No. 6. Answer any two of the following Questions:

2 x 6 = 12

- Explain DMA operation with flowchart showing CPU and DMA interaction.
- Define bus arbitration. Explain in detail any one approach of bus arbitration.
- Discuss the features and functions of IOP.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Computer Programming (CM303)**

Max. Marks: **75**

Time Duration: **3 Hrs.**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Explain the purpose of printf () and scanf () functions.
- What is dangling else problems? How can it be resolved?
- What is an array? How is it represented in C?
- Explain an array of structures.
- What is the difference between local and global scope.
- What are constants in C? Give examples.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain the structure of a C program with an example.
- Explain the different assignment operators used in C.
- Write a C program to swap two numbers.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain the if-else statement with syntax and an example.
- What is a nested loop? Explain with an example.
- Explain break and continue with examples.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Write a program to input and print elements of an array.
- Explain any four string handling functions in C with examples.
- Write a program to check if a given string is a palindrome.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- With an example explain how a variable can be accessed using a pointer.
- What is file management in C? Explain with example.
- Write a program in C to take student details and print the same using structures.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Explain different type of return statements with examples.
- Write a program to print fibonacci series using recursion.
- Explain the different types of standard library functions in C.

BOARD OF TECHNICAL EDUCATION
PORVORIM-GOA
April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Operating Systems (CM302)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- a) Write a short note on batch processing operating system.
- b) Explain context switching.
- c) Write a short note on deadlock recovery.
- d) Explain what do you mean by page fault.
- e) Write short note on biometric authentication.
- f) What is segmentation?
- g) Explain any two process scheduling philosophies.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- a) What is an Operating System? Explain its various functions.
- b) With a suitable diagram explain Microkernel Operating System.
- c) Write short note on the following:
i) Compiler ii) Loader iii) Assembler

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- a) What is PCB? Explain the various fields of PCB.
- b) With a suitable diagram explain process scheduling levels.
- c) Explain the following scheduling algorithms:
i) First Come First Serve ii) Round Robin

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- a) What is a deadlock? Explain the pre-requisites for a deadlock.
- b) List and explain six file attributes.
- c) What is DRAG? Explain in detail with a suitable diagram.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- a) Explain the following memory management techniques:
i) Variable partitioned ii) Fixed partitioned
- b) Explain the software method to implement Page Map Table (PMT).
- c) Explain any two page replacement policies with a suitable example.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- a) List and explain the major threats to security in a computing environment.
- b) Explain the following with respect to computer worm:
i) Mode of operation ii) Safeguard against worm
- c) Discuss any four Security design principles.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Web Designing(CM304)**

Max. Marks: **75**

Time Duration: **3 Hrs.**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Write a short note on World Wide Web.
- Explain email address format.
- Explain embed tag and its attributes with a suitable example.
- Write a short note on CSS gradient properties.
- State the advantages of Javascript.
- Explain any three document structure tags in HTML.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain the concept of one tier and two tier application.
- Discuss the advantages and disadvantages of dynamic web pages.
- Write short note on: i) Applications of internet ii) Web Browser

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Discuss FTP process model.
- Explain the following email services protocols:
i) Post office protocol ii) Internet message access protocol
- Explain the working of domain name system.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Explain the importance of frames in HTML. With suitable examples explain the use of <FRAMESET> and <FRAME> tag.
- Explain any six text formatting tags in HTML with examples.
- With suitable examples explain the following HTML tags and their attributes: i) Hyperlink ii) Image

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Explain any three font properties in CSS with suitable examples.
- Explain the following CSS selectors:
i) Type selector ii) Class selector iii) Id selector
- Write short note on:
i) CSS border properties ii) CSS text shadow properties

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Write a note on events and event handlers in Javascript.
- Explain any three methods of Javascript math object.
- Explain the different types of Javascript operators.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Microprocessors (CM401)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Explain general purpose register of 8086 Microprocessor.
- Discuss Register addressing mode of 8086 Microprocessor.
- Differential between CALL-NEAR and CALL FAR.
- Define interrupts due to error conditions.
- List and explain architectural feature of Pentium processor.
- Explain JZ and JNZ conditional instructions.
- Explain salient features of 8086 Microprocessor.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain Bus Interface unit of 8086 Microprocessor.
- Explain pointer, base and index register of execution unit of 8086.
- Explain how 20-bit physical address is generated in memory organization of 8086.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain any four bit manipulation instructions. Give example of each.
- Explain memory addressing modes of 8086.
- With suitable example explain string prefix- REP and REPE/REPZ instructions.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following with suitable examples:
i) If - then ii) If - then - else iii) Repeat until
- What is Procedure? Explain different types of procedure in 8086.
- Briefly explain assembly language program development tools.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- With the help of a neat diagram explain interrupt pointer table.
- Explain 8086 timing diagram of read machine cycle.
- Explain the following: i) Hardware Interrupt ii) Software Interrupt

Q.No.6. Answer any three of the following Questions:

3 x 4 = 12

- Explain the salient feature of: i) i386 ii) i586, processor.
- Differentiate between microprocessor and microcontroller.
- List and explain the feature of microcontroller.
- Explain any four applications of microcontroller.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Introduction to Database Management Systems (CM402)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- What are the advantages of using a database?
- State any three characteristics of relational database.
- Explain functional dependency.
- List and state any three aggregate functions in SQL.
- Explain commit and rollback in transactions.
- Briefly explain relational calculus.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain the various services provided by DBMS.
- Using suitable diagram explain the three level architecture for a database system.
- Explain the advantages and disadvantages of relational model.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain attribute constraint and instance constraint.
- Explain the following relational algebra operations with examples: i) Project ii) Product iii) Difference
- Using example explain candidate key, primary key and foreign key.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Using suitable examples of each, explain the different mapping cardinalities in E-R diagram.
- Draw E-R diagram for online food ordering system that maintains the record of orders for various food items placed by customers and also the payments made against these orders. Assume necessary attributes.
- What is normalization? Define first normal form, second normal form and third normal form.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- List and explain the various SQL operators.
- Explain the various DML commands using suitable example of each.
- Explain the following set operations using suitable examples: i) Union ii) Intersect

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Explain the concept of transaction processing monitor.
- Explain system recovery and its types in detail.
- Explain the two phase commit.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Object Oriented Programming (CM403)**

Max. Marks: **75**

Time Duration: **3 Hrs.**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Explain any three JAVA tokens.
- What is a constructor? What are its special properties?
- Briefly explain abstract methods and abstract classes.
- Write a note on thread creation and synchronization.
- Explain the attributes of applet tag.
- Explain the various relational operators in JAVA.
- What do you mean by method overriding?
- Discuss on various types of errors in JAVA.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- List and explain the various advantages and applications of JAVA.
- Using suitable syntax explain the different decision making statements in JAVA.
- Write a JAVA program to find the area and perimeter of a circle.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- What is an array? Explain with a suitable example how two dimensional array is created and initialized.
- Write short notes on: i)String methods in JAVA ii)Nesting of methods
- With a suitable JAVA program explain method overloading.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- What is an interface? Explain how to create and implement an interface.
- Write a JAVA program to demonstrate single inheritance.
- What is a package? Explain how to create a package with a suitable example.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- What are exceptions in JAVA? With a suitable example explain how JAVA handles exceptions.
- Write short note on: i)Thread priority ii)Thread exceptions
- Write a JAVA program to implement catch statements.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- What is an applet? Explain how to build an applet code.
- Draw an applet state transition diagram and explain the different states.
- Explain how to draw a polygon using a graphic class. Use a suitable code to support your answer.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA
April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Internet Technologies (CM404)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- List any three feature of PHP.
- With an example explain ternary operator in PHP.
- Briefly explain how to delete array elements.
- Briefly explain the difference between the two form methods: get and post.
- What is the difference between cookie and session?
- Explain any three types of comments in PHP.
- Explain the syntax of switch case statement in PHP.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- What are constants? Using suitable examples explain how to create constants in PHP.
- Explain relationship between Apache and PHP. Also explain how to create a PHP page.
- Using a suitable code, explain the difference between ECHO and PRINT in PHP.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain logical and string operators in PHP. Give examples.
- Write syntax, flowchart and sample code to illustrate use of for loop.
- Write a PHP script to find the largest of three numbers.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- List any five PHP array functions and specify their use.
- Explain the use of the following string functions and illustrate with suitable example code:
i) Strcmp() ii) Strtoupper() iii) Strpos()
- Explain the following with suitable code:
i) Call by value ii) Call by reference

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Create HTML form to enter data in check boxes and submit. Also write PHP script to read the data from the form on clicking submit button and display it in the browser.
- Explain main data types used in MySQL.
- List the various form elements used to read data into web pages using PHP.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- What is session? Write suitable example code to illustrate how sessions are created and destroyed.
- Explain the use of the following file functions:
i) fwrite ii) fopen iii) fclose
- Explain how to set cookie expiration. Also explain how to read a cookie.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Data Communication & Comp. Networks (CM405)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Differentiate between Half Duplex and Full Duplex communication modes.
- Explain the following terms:
i) Modulation ii) Demodulation
- Differentiate between connection oriented network and connectionless network.
- Explain the need for layered solution in communication process.
- What is an IP address?
- Write a note on cell switching.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- With a suitable diagram explain the different components of basic communication model
- Explain the different components of fiber optics cable. State any three advantages of fiber optics.
- Write short note on: i) Radio waves ii) Microwaves

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- With a diagram explain Pulse Code Modulation. (PCM)
- Explain the following modulation techniques:
i) Amplitude shift keying ii) Frequency shift keying
- Explain the concept of modem. What do you understand by half duplex and full duplex modem?

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- With a diagram explain packet switching techniques.
- Explain the following network topologies:
i) Ring ii) Mesh
- What do you understand by computer network? List and explain any five uses of computer network.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Write short note on: i) Data encapsulation ii) Data routing
- Explain High Level Data Link Control Protocol. (HDLC)
- Explain the functions of the following layers of OSI:
i) Physical ii) Transport iii) Application

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- List and explain the limitations of IP version 4. (IPv4)
- Differentiate between TCP and UDP.
- Write note on Address Resolution Protocol. (ARP)

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA
April, 2026 Examinations

Programme: **Common**

Subject: **Industrial Organisation & Management (CC601)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- List the advantages of partnership organization.
- Explain the packing and forwarding function in the industry.
- What do you understand by economic order quantity?
- Explain the term arbitration.
- Write down any three points of difference between PERT and CPM.
- Differentiate between incentive and wage.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Write down the salient features of a public limited company.
- Explain line organization with the help of a sketch.
- Why management is called an art as well as science?

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following functions of management:
i) Forecasting ii) Controlling
- Write a note on marketing and sales promotion function in the industry.
- Explain ABC analysis in materials management with a neat sketch.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Explain the elements of cost.
- Explain the importance of break-even chart with a neat sketch.
- A machine was purchased for Rs.91,000. The estimated life of machine is 14 years and scrap value is Rs.20,000. If the rate of interest is charged at 5%, calculate the rate of depreciation by sinking fund method. What will be depreciation amount after 3 years?

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Differentiate between selection and recruitment.
- Write the characteristics of a good incentive plan.
- Write a note on the Workmen Compensation Act 1923.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Explain in brief grievance handling mechanism.
- i) Write a note on GST.
ii) Define the following terms with respect to network analysis: i) Critical path ii) Most likely time iii) Pessimistic time
- The activity details and their predecessor are given below along with their activity times:

Activity	Predecessor	Activity time (days)
A	-	11
B	A	09
C	B	08
D	B	10
E	B	07
F	C, D, E	14

Draw network diagram. Determine the critical path and project duration.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Computer Security (CM501)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Define the following:
i) Active attacks ii) Passive attacks
- Describe Caesar Cipher encryption technique.
- Compare substitution and transposition encryption techniques.
- What is a message digest? List the requirements of a message digest.
- Explain the problems with symmetric key exchange.
- Write short note on closing and resuming SSL connections.
- State limitations of firewall.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following principles of security with neat diagrams: i) Confidentiality ii) Integrity iii) Authentication
- Explain biometric authentication techniques.
- Explain the following attacks on security: i) Interruption
ii) Sniffing iii) Pharming

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain Rail Fence encryption technique with suitable algorithm. Also encrypt the plain text 'Security Principles' using rail fence method.
- Discuss the encryption and decryption process in electronic code book mode with neat diagrams.
- Write short note on: i) Chosen plain text attack ii) Chosen cipher text attack iii) Known plain text attack

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Differentiate between symmetric key and asymmetric key cryptography.
- Explain the stepwise working of RSA algorithm with suitable example.
- Write short note on: i) Digital signature ii) Digital certificate

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Briefly discuss the protocols used for email security.
- Describe in detail the purpose of SET protocol. Also explain the key participants of SET system.
- Explain the working of SSL record protocol and alert protocol.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Explain the various intrusion detection techniques.
- Explain in detail the various types of firewalls.
- Describe the concept of demilitarized zone networks with a suitable diagram.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA
April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **E-Commerce (CM512)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- What do you understand by information superhighway?
- Explain the different innovations that help to simplify consumer payments.
- List and explain the different types of consumers.
- What do you understand by interactive user groups?
- What do you understand by performance measurement systems?
- List and explain any three issues that need to be considered in developing a business model.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Write a note on brief history of E-commerce.
- Explain inter and intra organizational applications of E-commerce.
- Explain the following: i)Convergence of content
ii)Convergence of transmission

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- State the advantages and disadvantages of credit card.
- What is E-cheque? Explain its benefits.
- Explain how E-cash is purchased from currency servers and how it is used.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Explain any three factors that affect retail industry dynamics.
- Explain the different phases of consumer merchantile model.
- Explain the following management challenges is online retailing: i)Manage channel conflict ii) Delivering satisfying shopping experience iii)Manage brands iv)Creating incentives

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- State any three ways of attracting visitors to your site.
- With respect to web design explain the following:
i)Feedback and online surveys ii)Corporate design rules
iii)Navigational aids iv)File size
- Write short note on: i)Spam ii)Banner exchange

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Compare push based supply chain and pull based supply chain.
- What is customer asset management? Explain any two challenges in implementing customer asset management.
- Explain any six elements of online sales automation.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA
April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Software Engineering & Testing (CM602)/(CO602) [Rat/Rev]**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Differentiate between application software and system software.
- Define stakeholder.
- Differentiate between waterfall model and 'V'-model.
- What is record review?
- Explain object oriented maintenance.
- Differentiate between validation and verification.
- Write short note on where -box -testing.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Define software engineering. Explain the need of software engineering.
- Write a neat diagram explain the prototyping model of software engineering.
- Explain the advantages and disadvantages of spiral model.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain different types of software requirements.
- Explain requirement elaboration of software requirements.
- Explain the different problems faced during requirement elicitation.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- Explain the models and tools associated with SSAD.
- Explain the rules for drawing DFD.
- Differentiate between OOAD and SSAD.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Explain software reverse engineering.
- Explain internal and external documentation.
- Explain the following: i) Code walk through ii) Code inspection

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following: i) Mutation Testing ii) Regression testing
- What is manual testing? State its limitations.
- Differentiate between top down v/s bottom-up approach.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA
April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Network Management(CM601)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- State the five function of Network Management.
- Define LAN, WAN, MAN.
- What is structured cabling?
- State the role of a Network Administrator.
- State the principle of operation of a Time Domain Reflectometer. (TDR)
- State three factors to be considered for back up.
- List three active and three passive network components.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain the goals of Network Management.
- List the four challenges of Network Management and explain any two.
- List the four OSI Network Management models and explain any two.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain the four factors to be considered while planning a Network.
- Explain any three commonly used Network topologies.
- Explain the different equipments used to build Networks.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- List and explain any six features of Windows Network Operating System.
- What is drive mapping? Explain the purpose and procedure used to create map drives.
- Explain the steps for installing Windows Server Operating System.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- State the five common Network faults and explain any three.
- Explain any four TCP/IP utilities.
- W.r.t SNMP, explain the following commands:
i) GET ii) SET iii) RESPONSE iv) TRAP

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Explain back up granularity.
- List the sequence of steps in backup and restore operation.
- Compare different RAID levels.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Internet of Things(CM613)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Briefly explain any three applications of IOT.
- What is IOT ecosystem?
- Briefly explain thermal actuators and mechanical actuators.
- Explain any three features of Arduino.
- What are smart cities?
- Differentiate between IOT and M₂M.
- Give pros and cons of digital sensors.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- What is IOT? Explain the characteristics of IOT.
- Explain: i) Industrial IOT ii) Consumer IOT
- Explain the different IOT functional blocks in detail.

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- With the help of a neat diagram explain M₂M ecosystem.
- Explain the following technologies used in IOT:
i)Sensors ii) Wireless sensor networks iii) Cloud computing
- Briefly explain IOT level-1 and IOT level- 2 with the help of suitable examples.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- What are sensors? Explain different types of sensors with the help of suitable examples.
- With the help of neat diagram explain the architecture of wireless sensor network.
- Write a short note on security in wireless sensor networks.

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following IOT connectivity technologies:
i)IEEE 802.15.4 ii) RFID
- With the help of a suitable example briefly explain the steps in IOT design methodology.
- Explain blinking of LED using Raspberry Pi with the help of a suitable program.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- With the help of a neat diagram explain home area networks.
- What are smart grids? Give benefits of smart grids.
- Write short note on:
i)Applications of industrial IOT ii)Benefits of industrial IOT

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA
April, 2026 Examinations

Programme: **Computer Engg.**

Subject: **Mobile Application Development (CM615)**

Time Duration: **3 Hrs.**

Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions:

5 x 3 = 15

- Give comparison between resolution and aspect ratio of a mobile device.
- Write a short note on wireless application protocol.
- What is MIT app inventor?
- Why Android is said to be open platform?
- Explain any three types of activities available in Android studio.
- What do you understand by geolocation feature in mobile phone?
- Explain bootstrap in brief.

Q.No.2. Answer any two of the following Questions:

2 x 6 = 12

- Explain the different input methods used in mobile device.
- Write short note on: i)Android OS ii) iOS
- With the help of suitable examples explain the following mobile device categories: i)Mobile phones ii)Low-end mobile devices iii)High-end mobile devices

Q.No.3. Answer any two of the following Questions:

2 x 6 = 12

- Explain with the help of suitable examples:
i)Curser navigation ii) Touch navigation
- Explain the various factors involved in mobile website architecture.
- Differentiate between mobile web and desktop web.

Q.No.4. Answer any two of the following Questions:

2 x 6 = 12

- What is jQuery mobile? With the help of HTML code, explain how to add jQuery mobile to a webpage.
- Explain web apps and native apps with the help of suitable examples.
- Explain the following cross platform mobile application development tools: i)Xamarin ii)Phone Gap

Q.No.5. Answer any two of the following Questions:

2 x 6 = 12

- Explain the following with respect to Android programming:
i)Activities ii)Intents c)Asynchronous calls
- Explain the need for developing mobile applications using Android.
- Explain the various important software tools used for Android app development.

Q.No.6. Answer any two of the following Questions:

2 x 6 = 12

- Explain the various methods involved in the life cycle of an Android activity.
- What are intents? Explain how to link activities using intents.
- Write short note on: i)Android studio ii)Android SDK
