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## ***B.Tech. Degree II Semester Regular/Supplementary Examination in Naval Architecture and Ship Building April 2023***

### **20-215-0202 COMPUTER PROGRAMMING (2020 Scheme)**

Time: 3 Hours

Maximum Marks: 100

**Course Outcome**

On successful completion of the course, the students will be able to:

- CO1: Define the key hardware components in a modern computer system and how software is mapped to the Hardware.
- CO2: Use a computer to solve problems by developing simple algorithms and then implement them using a specific programming language.
- CO3: Write computer programs using conditional and iterative structures, using C programming language.
- CO4: Analyse and select an appropriate basic data structure (e.g. arrays) for problem solving using C programming.
- CO5: Implement an appropriate access methods (e.g. pointers) for problem solving using C programming.

Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 – Analyze, L5 – Evaluate, L6 – Create

PO – Programme Outcome

#### **PART A (Answer ALL questions)**

		(5 × 4 = 20)	Marks	BL	CO	PO
I.	(a) Distinguish between Windows based and Linux based operating systems.		4	L1	1	5
	(b) Distinguish between entry controlled and exit controlled loops in programming.		4	L1	3	5
	(c) Distinguish between algorithm and flowchart with an appropriate example.		4	L1	2	5
	(d) Distinguish between multi-dimensional arrays and structures with specific applications.		4	L1	4	5
	(e) What is meant by pointer in C programming language? What are the advantages of using pointers?		4	L1	5	5

#### **PART B**

		(5 × 16 = 80)				
II.	Distinguish between RAM and ROM. Also distinguish between KB, MB, GB and TB along with their relationships. Further distinguish between magnetic and optical storage devices with specific examples.	16	L2	1	1	
<b>OR</b>						
III.	Explain the following terms pertinent to computers along with relevance (i) workstation and supercomputers (ii) CRT and LCD monitors (iii) ink jet and laser printers (iv) ASCII and Unicode.	16	L2	1	1	

(P.T.O.)

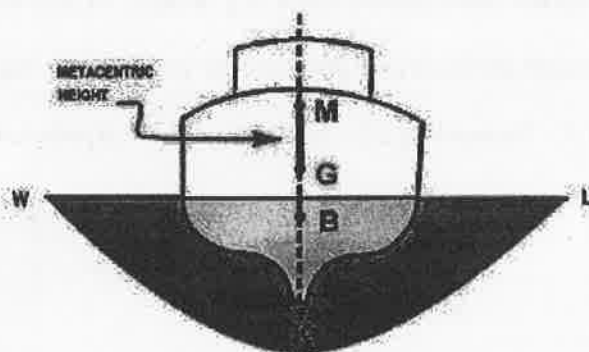
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		Marks	BL	CO	PO
IV.	Explain what is meant by each of the following terms with reference to problem solving using computers.	16	L2	2	5
	(i) Machine language.				
	(ii) Compiler.				
	(iii) Interpreter.				
	(iv) Algorithm.				
	(v) Flowchart.				
	(vi) Pseudocode.				
	(vii) Executable file.				
	(viii) Data structure.				

OR

V.	Develop an algorithm, draw a flow chart, and write a pseudocode for converting speed of ship from km/hr to knots, Length Overall (LOA) from feet and inches to metres, engine capacity from imperial horsepower to kW and Dead Weight Tonnage (DWT) from pounds to kilogram.	16	L2	2	5
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VI.		16	L3	3	5
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The metacentric height of a vessel is usually taken as the distance between the centre of gravity  $G$  and the metacentre  $M$  and is referred to as  $GM$ . A stable vessel will have a positive value of  $GM$ , i.e.,  $G$  is always located below  $M$ . The calculation of the distance  $GM$  is usually obtained from the following formula:  $GM = KB + BM - KG$  where  $K$  denotes the location of the bottom most point of the vessel, making  $KB$  the vertical location of the centre of buoyancy ( $B$ ) with reference to  $K$ ,  $KG$  the vertical location of the centre of gravity ( $G$ ) with reference to  $K$  and  $BM$  the location of the metacentre ( $M$ ) from the centre of buoyancy ( $B$ ). Further,  $GM$  greater than zero means the ship is stable,  $GM$  equal to zero means the ship is neutrally stable and  $GM$  less than zero means the ship is unstable. Write a C program that would have provisions for estimating metacentric height  $GM$  by inputting the values of  $KB$ ,  $BM$  and  $KG$ . Further, the program should have provisions to indicate the stability criterion of the ship based on the value of  $GM$ .

OR

(Continued)

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		Marks	BL	CO	PO
VII.	<p>The formulae for evaluating the different efficiencies of a marine engine are given below:</p> <p>(i) Mechanical efficiency = <math>(\text{Brake power} / \text{Indicated power}) * 100\%</math></p> <p>(ii) Indicated thermal efficiency = <math>[(\text{Indicated power}) / (\text{Fuel used per sec} * \text{Calorific value})] * 100\%</math></p> <p>(iii) Brake thermal efficiency = <math>[(\text{Brake power}) / (\text{Fuel used per sec} * \text{Calorific value})] * 100\%</math></p> <p>Write a C program to evaluate the aforesaid efficiencies of a marine engine provided that the values of terms on right hand side of the above three equations are known. Further, the program shall have a provision to find which of the three efficiencies have a highest numerical value and which has the lowest numerical value. Further, the program should have a provision to estimate the Specific Fuel Consumption (SFC) in kg/kWhr provided that the mathematical expression for SFC is as given below:</p> <p>Specific Fuel Consumption (SFC) = <math>(\text{Fuel used/hr}) / \text{Brake Power}</math>.</p>	16	L3	3	5
VIII.	<p>Write a C program that accepts roll number and marks of the six theory subjects (mathematics, computer programming, professional ethics, electrical engineering, machine drawing and introduction to naval architecture) from the keyboard. Assume that all marks are awarded out of 100 marks. The program should print the total mark and percentage of each student. Further, the program should work in loop so that it works for as many students as required.</p>	16	L3	4	5
	OR				
IX.	<p>Write a C program to input two matrices A and B and to evaluate the following:</p> <p>(i) <math>A + B</math></p> <p>(ii) <math>A - B</math></p>	16	L3	4	5
X.	<p>Write a C program to create a structure with specifications of ships such as type of ship, IMO number, speed in knots, Length Overall (LOA) in metres, Draft in metres, Wetted surface area in square metres, Dead Weight Tonnage (DWT) in metric tons, engine type, engine speed in rpm and engine capacity in kW. The program should also have a provision to print LOA and DWT of any ship.</p>	16	L2	5	5
	OR				
XI.	<p>A computer program needs to be developed to keep track of savings done by 250 employees of university. For this the following records must be maintained – employee number, name, earnings and expenditure. Write a C program that accepts the data of all the employees and prints saving amount for them.</p>	16	L2	5	5

Bloom's Taxonomy Levels

L1-20%, L2-48%, L3-32%.

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