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## TMC-101/TMI-104

### M. C. A./M. Sc. (IT) (First Semester) Mid Semester EXAMINATION, 2017

#### PROGRAMMING METHODOLOGY AND PROGRAMMING IN C

Time : 1:30 Hours ] [ Maximum Marks : 50

Note : (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

#### Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)
  - (a) The standard mathematical functions are included in the ..... header file.
  - (b) In a call to printf( ) function the format specifier %b can be used to print binary equivalent of an integer. (True/False)
  - (c) Scanf( ) is used for formatted output.  
(True/False)
  - (d) C identifier can't start with the symbol ‘-’.  
(True/False)

- (e) A printf ( ) function generates only one line of output. (True/False)
2. Attempt any five parts : (3×5=15 Marks)

- (a) What will be the output of the following program ? Explain your answer.

```
#include < stdio.h >

int main( ) {
    static char a;
    static long b;
    in c;
    printf("%d, %d, %d", a, b, c);
    return 0;
}
```

- (b) What will be the output of the following program ?

```
#include < stdio.h >

int main( )
{
    int a = 23;
    ;
    ; printf("%d", a)
    ;
    return 0;
}
```

- (c) Which statement does not require semicolon ?
- goto xyz
  - int x = 20
  - #define MAX 1000
  - do{....}while (count<=100)
- (d) Define associativity of operators with example.
- (e) Define compiler and interpreter.
- (f) Define algorithms and also discuss its characteristics.

### Section—B

3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)

- (a) What do you understand by storage classes ? Discuss the various storage classes of C language.
- (b) Write an algorithm to print reverse of a number.
- (c) What is variable initialization and why is it important ? What is the difference between the = symbol and == symbol ?

4. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Discuss the structure programming and its constructs.
- (b) Explain any *five* of the following key terms :
- (i) keyword
  - (ii) data type
  - (iii) conditional statement
  - (iv) constant
  - (v) variable
  - (vi) operator precedence

- (c) Write a program to print Fibonacci series up to  $n$  terms.

5. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Write an algorithm and also draw flowchart to find factorial of a number.
- (b) Explain the various types of errors.
- (c) Explain the structure of a C program.

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## TMC-102

**M. C. A. (First Semester)**

**Mid Semester EXAMINATION, 2017**

COMPUTER ORGANIZATION AND  
ARCHITECTURE

*Time : 1:30 Hours ] [ Maximum Marks : 50*

**Note :** (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

### Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)
  - (a) The basic circuit for storing one bit of information is called flip-flop.
  - (b) Multiplexer is a many to one device.
  - (c) 2's complement of  $(0000)_2$  is  $(0000)_2$ .
  - (d) XOR is a universal gate.
  - (e) Full adder is used to add 2 binary bits.
2. Attempt any five parts : (3×5=15 Marks)
  - (a) Explain 2's complement with example.
  - (b) Explain the concept of three state buffer.

- (c) Differentiate between combinational and sequential circuits.
- (d) Draw  $3 \times 8$  decoder with the help of two  $2 \times 4$  decoders.
- (e) Explain JK flip-flop.
- (f) Convert binary code  $(10011011)_2$  into gray code.
- (g) Draw and explain full adder.

### Section—B

- 3. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$ 
  - (a) Convert the following number system :
    - (i) Decimal 256 into binary
    - (ii) Hexadecimal B9FA into octal
    - (iii) Octal 4532 into hexadecimal
  - (b) What is Karnaugh Map ? What do you understand by don't care condition in K-Map ? Explain with example.
  - (c) Write a detailed note on computer generation.
- 4. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$ 
  - (a) State and prove the De Morgan's law for three variables.

- (b) Define multiplexer. Design a  $8 \times 1$  multiplexer using two  $4 \times 1$  multiplexers.
  - (c) Prove that NAND and NOR gates are universal gates.
5. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$
- (a) Consider a four variable Boolean function :  

$$F(A, B, C, D) = \Sigma(0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)$$
minimize the function using K-map.
  - (b) Explain r's complement with example.
  - (c) Multiply  $5 \times 5$  using Booth's algorithm.

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## TMC-103/TMI-106

M. C. A./M. Sc. (IT) (First Semester)

Mid Semester EXAMINATION, 2017

UNIX AND SHELL PROGRAMMING

Time : 1:30 Hours ] [ Maximum Marks : 50

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

### Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)
  - (a) UNIX is multiuser, multiprogramming operating system. (True/False)
  - (b) There is not command in Vi Editor to undo last change. (True/False)
  - (c) ..... command is used to know the system time.
  - (d) Every path that starts from ..... is absolute path.
  - (e) ..... command creates a new line for text entry below the cursor location, in Vi Editor.

2. Attempt any *five* parts : (3×5=15 Marks)
- cal command and its variation
  - Types of files in UNIX
  - who command
  - Open Source Software
  - System calls
  - .exrc. buffers

### Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- What are the different services provided by an Operating System ?
  - Discuss the concept of Absolute and Relative pathnames. Explain with the help of an example.
  - Give synopsis of any *two* of the following commands :
    - ls
    - cd
    - rm
4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Explain the UNIX Architecture.

- (b) Discuss the complete structure of inode in UNIX. Give the diagram to support your answer.
- (c) Write a note on command chmod. Elaborate its using suitable examples.
5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- What are the *three* different modes of Vi editor ? Also mention the commands that are used to traverse among them.
  - Name the different commands used in Vi editor to accomplish following tasks :
    - Text deletion
    - Pattern search and substitution
  - Discuss all the input mode commands, used with Vi editor. Where would text get inserted according to position of cursor in all the cases ?

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## TMC-104

### M. C. A. (First Semester) Mid Semester EXAMINATION, 2017

#### DISCRETE MATHEMATICS

Time : 1 : 30 Hours ] [ Maximum Marks : 50

Note : (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

#### Section—A

1. Write True/False : (1×5=5 Marks)
  - (a) The set of all integers is countable.
  - (b) On the set of real numbers the relation “ $<$ ” is inverse of the relation “ $>$ ”.
  - (c) Let  $R = \{(1, 2), (1, 3), (2, 1), (2, 3)\}$  on  $A = \{1, 2, 3\}$ . Then  $R$  is an irreflexive relation.
  - (d) If  $f(x) = 3x - 1$ , then  $f$  is many-one function.
  - (e)  $(x+y) > 1$  is a statement.
2. Attempt any five parts : (3×5=15 Marks)
  - (a) Let  $R$  and  $S$  be relations from  $A$  to  $B$ . Then prove that :

$$(R \cap S)^{-1} = R^{-1} \cap S^{-1}.$$

- (b) Show that the relation “  $>$  ” is a partially ordering on the set of integers.
- (c) Define one-to-one and onto functions with suitable examples.
- (d) Show that the functions  $f(x) = x^3$  and  $g(x) = x^{1/3} \forall x \in \mathbb{R}$  are inverse of one another.
- (e) Construct a truth table for compound proposition :

$$p \wedge (\sim q \vee q)$$

- (f) Write converse, contra-positive and inverse of  $p \Rightarrow q$ .

### Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$
- (a) Show that the set of real numbers in  $[0, 1]$  is uncountable.
  - (b) Define reflexive, irreflexive, non-reflexive, symmetric and asymmetric relations on a set.
  - (c) Let  $f: A \rightarrow B$ ,  $g: B \rightarrow C$  and  $h: C \rightarrow D$ , then prove that :

$$h.(g.f) = (h.g).f$$

4. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  be defined by :

$$f(x) = \begin{cases} 3x - 1 & \text{for } x > 3 \\ 2x^2 + 3 & \text{for } -2 < x \leq 3 \\ 3x^2 - 7 & \text{for } x \leq -2 \end{cases}$$

Then find  $f^{-1}(5)$ .

- (b) Let  $g$  be a recursive function from  $\mathbb{Z}^+$  to  $\mathbb{Z}$  for all integers  $n \geq 1$  defined by :

$$g(n) = \begin{cases} 1 & \text{if } n = 1 \\ 1 + g(n/2) & \text{if } n \text{ is even} \\ g(3n-1) & \text{if } n \text{ is odd and } n > 1 \end{cases}$$

Then show that  $g$  is not well defined.

- (c) Prove that :

$$p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$$

5. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Prove that  $\sim(p \wedge q) \vee q$  is a tautology and  $p \wedge (q \wedge \sim p)$  is contradiction.
- (b) Obtain the conjunctive normal form of  $p \wedge q$ .
- (c) Write a short note on predicates and quantifiers.

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## TMC-105/TMI-101

M. C. A. (First Semester)/M. Sc. (IT)  
(First Semester)

Mid Semester EXAMINATION, 2017

FUNDAMENTAL OF INFORMATION  
TECHNOLOGY

Time : 1:30 Hours ] [ Maximum Marks : 50

Note : (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

### Section—A

1. Fill in the blanks/True-False/Multiple Choice :

(1×5=5 Marks)

- (a) The protocol suit for the current internet is :
- (i) TCP/IP
  - (ii) NCP
  - (iii) UNIX
  - (iv) ACM
- (b) Cache memory is placed between .....

- (c) The access method used for magnetic tape is :
- Direct
  - Random
  - Sequential
  - None of the above
- (d) Typical data transfer rates in LAN are ..... per sec.
- (e) The binary code of  $(21.125)_{10}$  is : 10100.001.  
(True/False)

2. Attempt any five parts : (3×5=15 Marks)

(Define/Short Numerical/Short Programming Draw)

- Cache Memory
- PROM
- EPROM
- System Software
- Interpreter
- Flash memory

### Section—B

3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)

- Write in detail about "Booting Process". Explain the concept of Soft Boot and Hard Boot.
- What do you understand by hardware ? Explain the anatomy of hardware in detail.

- (c) Classify computer network according to their Geography. Also explain LAN Topologies.
4. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- What do you mean by Object Oriented Programming ? Also explain an Algorithm and Flowchart with example.
  - Explain the following terms/techniques :
    - Bridges
    - Routers
    - Gateways
  - What is Database Management System (DBSM) ? Differentiate Database System and File System.
5. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- What do you understand by guided media ? Explain coaxial cable, fiber optics and twisted pair wires.
  - What do you understand by Operating System ? What are its functions ? Also differentiate single user operating system and multi user operating system.
  - Explain the following terms/techniques :
    - Process
    - Process State
    - PCB

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## TMC-106

**M. C. A. (First Semester)**

**Mid Semester EXAMINATION, 2017**

**PROFESSIONAL COMMUNICATION—I**

*Time : 1.30 Hours ] [ Maximum Marks : 50*

**Note :** (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

### **Section—A**

1. Fill in the blanks with suitable articles :  
 $(1 \times 5 = 5 \text{ Marks})$ 
  - (a) On Monday, ..... unarmed man stole \$ 1,000 from the bank.
  - (b) Our house is across from ..... Italian restaurant.
  - (c) ..... man who wrote this book is famous.
  - (d) This is ..... third time I have called you today.
  - (e) I had ..... lunch at 2 p.m.
2. Attempt any five parts :  $(3 \times 5 = 15 \text{ Marks})$ 
  - (a) Differentiate between Homophones and Homonyms with *one* example of each.

- (b) Give *one* example each of any *three* parts of speech.
- (c) Define conjunction with the help of suitable examples.
- (d) Write any *three* sentences in passive voice. (Each of a different tense).
- (e) Explain parallelism with the help of suitable examples.
- (f) Give an example of each tense: Present Continuous, Past Perfect and Future Perfect Continuous.

### Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

- (a) Discuss the importance of etymology in learning any language.
- (b) What is the importance of functional grammar in communication ?
- (c) Write a detailed note on Contextual Vocabulary. How is it different from pure vocabulary ?

4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

- (a) Write the equivalent homophone of the given words :
- (i) alms .....

- (ii) bale .....
  - (iii) coarse .....
  - (iv) damn .....
  - (v) lessen .....
  - (b) Use the given homonyms in sentences of your own to bring out the difference in their meaning :
    - (i) (fair, fair)
    - (ii) (lie, lie)
    - (iii) (tear, tear)
    - (iv) (bow, bow)
    - (v) (lead, lead)
  - (c) Define an adverb and an interjection with *two* examples of each.
5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) We can omit articles at some places. Justify the given statement with the help of *five* different examples.
  - (b) Choose the appropriate verb to fill in the blanks :
    - (i) Bread and butter ..... our daily food.  
• (is/are)
    - (ii) The famous singer and composer ..... arrived. (have/has)

- (iii) Collecting match-boxes ..... one of  
his favourite pastimes. (are/is)
- (iv) The quality of the candies ..... poor.  
(are/is)
- (v) Neither his father nor his mother  
..... mahjong. (play/plays)
- (c) Change the tense as directed :
- (i) I know it is not the right thing to do.  
(Past indefinite)
- (ii) He walked out of the room without  
looking at anybody. (Simple future)
- (iii) He is crying at the top of his voice.  
(Past Perfect)
- (iv) I will not allow this to happen.  
(Simple Present indefinite)
- (v) I will never have betrayed my country.  
(Simple future)

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## TMI-102

**M. Sc. (IT) (First Semester)**

**Mid Semester EXAMINATION, 2017**

**MATHEMATICAL FOUNDATION OF  
COMPUTER SCIENCE**

*Time : 1:30 Hours ] [ Maximum Marks : 50*

**Note :** (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

### Section—A

1. Write True/False : (1×5=5 Marks)
  - (a) Every relation is a function.
  - (b) The relation  $R = \{(1, 2), (2, 3), (3, 1)\}$  on  $A = \{1, 2, 3\}$  is asymmetric.
  - (c) Let  $f(x) = 3x - 1 \forall x \in R$ . Then  $f$  is an injective function.
  - (d) Inverse of  $p \Rightarrow q$  is  $q \Rightarrow p$ .
  - (e) The proposition “The professor is either a woman or a man” is tautology.
2. Attempt any five parts : (3×5=15 Marks)
  - (a) Let  $A = \{2, 3, 4\}$  and  $B = \{3, 4, 5\}$ . Then list the elements of  $R : A \rightarrow B$  such that  $aRb$  iff  $a$  and  $b$  are both odd numbers. Also write domain and range of  $R$ .

- (b) Give an example of a relation on  $A = \{1, 2, 3\}$  which is reflexive and transitive but not symmetric ?
- (c) Let  $A = \{1, 3, 9, 27, 81\}$ , then draw the Hasse diagram of the poset  $(A, /)$ .
- (d) Prove that  $(z, \geq)$  is a poset, where  $z$  is set of integers.
- (e) Show that :  

$$(\sim q \Rightarrow \sim p) \equiv (p \Rightarrow q)$$
- (f) Obtain the principle disjunctive normal form of  $p \Rightarrow q$ .

### Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$
- (a) Define Reflexive, Irreflexive, Non-reflexive, symmetric and Symmetric relations on a set A.
- (b) Define equivalence and partial ordering relations on a Set A.
- (c) Let R and S be relations from A to B. Then prove that :

$$(R \cup S)^{-1} = R^{-1} \cup S^{-1}$$

4. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Let  $x$  and  $y$  be two integers and suppose  $g(x, y)$  is defined recursively by :

$$g(x, y) = \begin{cases} 5 & \text{if } x < y \\ g(x-y, y+2) + x & \text{if } x \geq y \end{cases}$$

Then find  $g(2, 7)$ ,  $g(5, 3)$  and  $g(15, 2)$ .

- (b) Define injective, surjective and bijective functions with suitable examples.
- (c) Prove that  $\sim(p \wedge q) \vee q$  is a tautology and  $p \wedge (q \wedge \sim p)$  is a contradiction.
5. Attempt any *two* parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Represent the argument.

If I study hard, then I get A's

I study hard

.....

I get A's

symbolically and verify that the argument is valid.

- (b) Rewrite the following argument using quantifiers, variables and predicate symbols. Prove that validity of the argument.

All healthy people eat an apple a day.

Ram does not eat an apple a day.

Ram is not a healthy person.

- (c) Let  $t$  denote tautology and  $p$  be any statement. Then prove that :

(i)  $p \wedge t \equiv p$

(ii)  $p \vee t \equiv t$

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## TMI-103

**M. Sc. (IT) (First Semester)**

**Mid Semester EXAMINATION, 2017**

DIGITAL ELECTRONICS AND COMPUTER  
SYSTEM ARCHITECTURE

*Time : 1:30 Hours ] [ Maximum Marks : 50*

**Note :** (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

### Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)

- (a) 1 KB equals to 1024 bytes.
- (b) Complement of 10110001 is 01001111.
- (c)  $A'B + AB'$  is the function of XOR.
- (d) 2' complement of 0000 is 1111.
- (e) OR is a universal gate.

2. Attempt any five parts : (3×5=15 Marks)

- (a) Differentiate between combinational and sequential circuit.

- (b) Draw and explain D flip-flop.
- (c) Explain any two logic gates.
- (d) Describe BCD Number.
- (e) Draw logic diagram for function :

$$F = A'BC + AB' + AC$$

- (f) Convert binary code  $(10000111)_2$  into gray code.

### Section—B

3. Attempt any two parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) State and prove the De Morgan's law for three variables.
- (b) Explain r's complement.
- (c) Describe master slave flip-flop.

4. Attempt any two parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Multiply  $7 \times 3$  using Booth's algorithm.
- (b) Define Multiplexer. Draw  $8 \times 1$  multiplexer using two  $4 \times 1$  multiplexer.
- (c) Minimize the function F using don't care condition d :

$$F(A, B, C, D) = \Sigma(0, 2, 3, 6, 7)$$

$$d(A, B, C, D) = \Sigma(5, 8, 10, 11, 15)$$

5. Attempt any two parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$

- (a) Subtract 750 from 1000 using 10's complement, write the steps also.
- (b) Prove that NAND and NOT gates are universal gates.
- (c) Convert the following number system :
  - (i) Decimal 555 into binary
  - (ii) Hexadecimal C8FB into octal
  - (iii) Octal 6542 into hexadecimal
  - (iv) Binary 010110101110 into hexadecimal

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## TMI-105

**M. Sc. (IT) (First Semester)**  
**Mid Semester EXAMINATION, 2017**  
ACCOUNTING AND FINANCIAL  
MANAGEMENT

*Time : 1:30 Hours ] [ Maximum Marks : 50*

**Note :** (i) This question paper contains two Sections.  
(ii) Both Sections are compulsory.

### Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)
  - (a) Asset – liability = capital. (True/False)
  - (b) Income and gains are debited. (True/False)
  - (c) Time value of money takes into consideration value of money with respect to time. (True/False)
  - (d) Accounts receivables are liabilities. (True/False)
  - (e) Correct sequence is Journal → Trial balance → Ledger → Final Accounts. (True/False)

2. Attempt any *five* parts : (3×5=15 Marks)  
 (Define/Short Numerical/Short Programming/Draw)
- Write a short note on Journal.
  - Limitations of accounting .
  - What is going concern concept ?
  - What is the format of Trial Balance ?
  - What are golden rules of accounting ?
  - What is the importance of income statement ?

### Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Discuss the term financial management. What is the importance of financial management in business management ?
  - Journalise the following transactions :
    - Rohan started business with cash ₹ 1,00,000.
    - He bought goods worth ₹ 20,000 on cash.
    - He bought goods worth ₹ 15,000 from Gopal.
    - He sold goods worth ₹ 15,000 on cash.
    - He sold goods worth ₹ 20,000 on Harish.
  - What are accounting principles ? Discuss with examples.

4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Discuss the process of preparation of final accounts with proper formats.
  - Prepare accounting equation for the following :
    - Amar started business with cash ₹ 5,000.
    - Bought furniture ₹ 1,000.
    - Bought goods from Rohit ₹ 20,000.
    - Sold goods costing ₹ 500 for ₹ 1,000.
    - Withdrew cash for personal use ₹ 700.
  - Discuss the various long-term sources of finance with examples.
5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- From the following particulars, prepare a Balance Sheet as on 31st December, 2002 :

	₹
Capital	50,000
Business premises	55,000
Furniture and fixtures	2,500
Bills receivables	3,500
Bills payable	2,500
Sundry debtors	20,000
Sundry creditors	15,800

Packing machinery	4,500
Loan to Sumathi	5,000
Investments	3,000
Cash in hand	200
Cash at bank	3,500
Owner's withdrawal	3,000
Net profit	38,900
Closing stock	7,000

- (b) Discuss the various classifications of accounts with proper example.
- (c) Journalise the following transactions and post them in the ledger and balance the accounts as on 31st December, 2001 :
- (i) Robert started business with a capital of ₹ 50,000.
  - (ii) He purchased furniture for ₹ 5,000.
  - (iii) Bought goods on credit from Vicky for ₹ 8,000.
  - (iv) Sold goods to Simon for ₹ 5,000.
  - (v) Received cash from Simon ₹ 3,000.

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