

PURBANCHAL UNIVERSITY

2016

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT176CO: Object Oriented Programming in C++ (New course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) **What is operator overloading? What are the benefits of operator overloading?** 4
- (b) **Write a program to overload '-' operator to find difference of two complex object.** 8
- 2(a) **What is static member and static member function? How can we overload a function?** 3+2
- (b) **Write a program, using class, to add two objects of class named "Time", passing objects as argument. The "Time" class contains hour minute and second as its private data members. Construct appropriate member functions. Input should be interactive.** 7
- 3(a) **What is inheritance? Describe different type of Inheritance.** 6
- (b) **Write a program to create a class EMP with data member (id, Name, Address). Derive a Class SALARY with data member (basicosal, post) and again derive class RECORD with Data member (month, absent, total) and display employ complete information where total is calculated by deducing total "absent" days from "basicosal".** 8

(2)

Group B

Answer SEVEN questions.

$$7 \times 8 = 56$$

4. Discuss automatic conversion and casting with examples.
Differentiate POP and OCP paradigm. 4+4
5. What is function overloading? Explain it with its benefit and example. 2+6
6. Why we need constructor and destructor in the class? Explain different type of constructor. 3+5
7. Write a program to demonstrate conversion between object and basic type. 3
8. What is polymorphism? Explain early binding and Late binding concept with a program. 1+7
9. How can we work with file in C++? Explain different file opening modes, with examples. 3+5
10. Mention importance of template. Write a program to swap contents of two variables of type int, float and double, using function template. 2+6
11. What is Exception? How can we handle the exception? Explain with an example. 2+6
12. Write short notes on any TWO:
(a) Virtual function and Pure Virtual Function
(b) Class template
(c) New and Delete operator. 2+4=8

PURBANCHAL UNIVERSITY

2015

Bachelor in Information Technology (B.I.T.) / Second Semester / Final

Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

BIT176CO: Object Oriented Programming in C++ (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) Compare procedural programming and object-oriented programming. 4
- (b) Write a program in C++ to enter name and salary of a number of employees, sort them and store in a file named "employee.dat", and display them again in appropriate format. 8
- 2(a) What is template? How does it support generic programming? Write a program using class template to determine the greater number among two integer inputs and two floating point inputs. 3+6
- (b) Write down the significance of 'new' and 'delete' operator in C++. 3
- 3(a) What is overloading? Explain operator overloading with syntax and example. 1+5
- (b) Write a program in C++ to overload + operator for concatenation of two strings. 6

Group B

Answer SEVEN questions.

$7 \times 8 = 56$

4. What are Constructor and Destructor? Explain Dynamic initialization of constructor with suitable example. 3+5
5. Why friend function is useful? Write a program to find the largest number of two class using friend function. 2+6

(2)

- 6(a) Write about reusability and encapsulation features of OOP. 4
- (b) What is enumeration? Give example. 4
7. What are the differences between Runtime polymorphism and Compile time polymorphism? Why base pointer is compatible with derived object? Explain with example. 4+4
8. Explain function overloading. Write a C++ program to overload a function named "power" which calculates a^b or $(a+b)^c$ if two or three arguments are passed respectively. 2+6
9. What is virtual base class and why is it required? Write an OOP that demonstrates the example of virtual base class. 3+5
10. What is exception in C++? Explain all Keywords used to handle exception with example 3+5
11. Write short notes on any TWO: 4+4
(a) this pointer
(b) do-nothing function
(c) Namespace

PURBANCHAL UNIVERSITY

2015

Bachelor of Computer Application (BCA) / Second Semester / Final

Time: 03:00 hrs.

Full Marks: 60 / Pass Marks: 24

BCA176CO: Object Oriented Programming in C++

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) Briefly explain about inheritance with examples. 6
- (b) Discuss on polymorphism in detail. Illustrate the implementation of virtual class with suitable examples. 6
- 2(a) Write a program to create a class that contains detail information of student of second semester, and perform a following operation. 7
- (i) Write these information in file
- (ii) Read the 3rd record
- (iii) Update 4th record by new record
- (iv) Search the record by the name of student
- (b) How ambiguity occurs in multiple inheritance and how it is removed? Explain with example. 5
- 3(a) "The feature of overloading makes object oriented programming much more powerful." Justify this statement with different types of overloading with example. 6
- (b) Write a program to overload arithmetic operator. 8

Group B

$6 \times 6 = 36$

Answer SIX questions.

4. What is OOPS? Compare procedural programming with object oriented programming. 6
5. Explain the advantage of inline function? What are the main criteria for inline function? Explain with any example. 6

(2)

6. Explain the different access specifier used in class .Write a program to add two complex number by passing object as function argument. 6
7. How exceptions are handled in OOP? Write a program that clearly illustrates try-catch statement. 6
8. What is template? Explain with examples. 6
9. Differentiate between constructor and destructor? Explain different type of constructor in detail. 6
10. Write short notes on any TWO:
(a) New and delete operator
(b) Encapsulation
(c) Friend function 3+3

PURBANCHAL UNIVERSITY

2014

Bachelor in Information Technology (B.I.T.) / Second Semester / Final / Choice / Back

Time: 03:00 hrs.

Full Marks: 80 / Part Marks: 32

BIT176CO: Object Oriented Programming in C++

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) Write an OOP to create a file named "purbuniv.dat" to store the number of college info i.e. coll_id, location and faculty to the file and read the information from the file and display in a format. 6
- (b) What is Template? Write a program to find simple interest and total amount using function Template 6
- ✓ 2(a) Discuss Default Argument and function overloading WAP showing the example of Default Argument. 3+3
- ✓ (b) What is Virtual function and how it is different from pure virtual function? Discuss with example 6
- 3(a) What is operator overloading? Write an object-oriented program to read two numbers and negate them showing the example of operator overloading. 6
- (b) What are the different features of friend function? Write an object-oriented program that contains a friend function of two classes 6

Group B

Answer SEVEN questions.

$7 \times 8 = 56$

4. List different types of Inheritance supported by C++ with neat sketches. Discuss visibility modes with example 2+6

(2)

5. Constructors and destructors are called special member functions, why? Write an object-oriented program showing the example of constructor and destructor. 3+5
6. Discuss different keywords that are used in Exception Handling Mechanism and write a program showing the example of Exception Handling. 3+5
7. Write an OOP to create a class named Student with data members roll and name. Create another class named Marks from student with data member int_score. Create an independent class Sports with data member ext_score. Now, derive another class Result from Marks and Sports with data member total score. Make necessary function for the above and show the results. 8
8. Explain the features of OOP and compare programming paradigms of OOP with POP. 4+4
9. Why DMA is used in C++? Write a program showing the example of new and delete operators. 3+5
10. What are the different properties of static variable and how static variable can be defined? Write a program showing the use of static variable. 3+5
11. Discuss this pointer and reference variable with examples. 4+4
12. Write short notes on any TWO:
(a) Type conversion
(b) Inline function and its benefits and drawbacks
(c) File modes

PURBANCHAL UNIVERSITY

2013

Bachelor in Information Technology (B.I.T.)/Second Semester/Back Paper
Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT124CS: Object Oriented Programming in C++

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) What are the types of operator overloading? Write a program to overload the assignment operator (=). 2+5
- (b) Write a program to add two complex number using '+' operator overloading. 5
- 2(a) Differentiate between runtime polymorphism and compile time polymorphism. Create a class student from the following information

Data member: Name, Roll No., course, semester

Member Function:

- a. Assign the value from the keyboard.
- b. Display the whole information of the student 3+4
- (b) Define parameterized constructor. Give one program which uses parameterized constructor. 5

- 3(a) Discuss different types of template. Write a suitable program that implements function template with multiple parameters. 7
- (b) Describe container class with an example. 5

Group B

Answer EIGHT questions.

$8 \times 7 = 56$

4. Differentiate between C and C++. Write a program to calculate the area of rectangle using 'default arguments'. 3+4

5. What is type conversion? Give an example of a type conversion from a class type to a base type. 2+5

basic

Contd. ...

(2)

6. -What is inheritance? Give one program in which the concept of inheritance has been used. 2+5
7. Explain friend function with merits and demerits. Illustrate this with the help of a program. 3+4
8. What happens if you inherit class in protected or private manner instead public manner? Explain with suitable example. 7
9. What is the input and output stream? Give one program which shows how class object can be written to and read from the disk file. 2+5
10. Differentiate between constructor and destructor. Write a program in which copy constructor has been used. 3+4
- 11(a) Illustrate the various characteristics of OOP. 3
- 11(b) Why we need virtual function? When do we make virtual function 'pure'? 4
12. What are the complexities of software? Describe water fall model. 2+5

PURBANCHAL UNIVERSITY

2012

Bachelor in Information Technology (B.I.T.)/Second Semester/*Chance*
Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT124CS: Object Oriented Programming in C++

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.



Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) Write a program to show Inheritance beyond single level with the following details:

Country is a base class having protected member data name. Country has a derived class states with member data name, population and states has a derived class village with data member data name, number of colleges. Each of the classes country, states and villages have two public member functions get () and put (). get() is for giving input and put () for displaying the output. Use scope resolution operator to invoke the member functions of the base class country in the derived class states and member functions of derived class states in the derived class villages.

10

- (b) Why do we need to use scope resolution operator. 2

- 2(a) Define friend functions with suitable example. 6

- (b) Discuss virtual function and pure virtual function with suitable example. 6

- 3(a) Write a program using overloading binary operator '+' to concatenate two string "Purbanchal" and "University" and displaying "Purbanchal University" as output. 6

- (b) What is function overloading? Discuss with suitable example. 6

(2)

Group B

Answer EIGHT questions.

$8 \times 7 = 56$

4. Define template? Write a program to find simple interest using function template. 2+5
5. Write a program to create a data file "store.txt" to perform the following operations: 7
- Enter the item name and the price of item
 - Store it in the file
 - Display the content of the item entered in the file.
6. Why do we need to handle the exceptions? Discuss with suitable example. 7
7. Write a C++ program to add two time object showing the example of passing object as function argument. 7
8. What is visibility mode? What are they? Discuss each of them which are supported by C++ in inheritance. 2+1+4
9. What are the Basic components of object oriented programming? Discuss. 7
10. Define constructor function? List the different types of constructor supported by C++ Discuss argumented constructor with suitable example. 3 2+1+4
11. Differentiate between POP and OOP Give a suitable example for default argument. 3 4
12. Differentiate between early binding vs. late binding. Compare between Inheritance and Composition. 3 4+3
13. Write short notes on any TWO:
(a) Cost and Benefits of Inheritance
(b) Operator Overloading
(c) Structures and File operations. 3.5+3.5

PURBANCHAL UNIVERSITY

2011

Bachelor in Information Technology (B.I.T.) / Second Semester / Final

Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

BIT124CS: Object Oriented Programming in C++

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

1(a) Discuss implicit and explicit type conversion with examples. 4

(b) Write a program to convert polar coordinates into rectangular coordinates, demonstrating conversion from one class to another class. The conversion routine must be written in the source class. 8

2(a) Differentiate between POP and OOP. 4

(b) Write a program to create a file "student.txt" which allows the following operations to be performed: 8

(i) Enter the name, roll and marks obtained by 4 students.

(ii) Store it in a file.

(iii) Display the contents in the given format:

Name	Roll	TotMarks
Aarti	201	80
Amit	202	75
Manish	203	85
Ram	204	65

3(a) Define function overriding with an example. 3

(b) Assume that a bank maintains two kind accounts for customers, one called as saving account and the other as current account. The saving account provides compound and withdrawal facilities. The current account provides no interest. Current account holders should maintain a minimum balance. Create a class account that stores customers name, account number and type of account. From this, derive specific to their requirements. Include necessary member functions to achieve the following tasks: 9

(2)

- (i) Accept deposit from a customer and update the balance.
- (ii) Display the balance.
- (iii) Permit withdraw & update the balance.
- (iv) Check for minimum balance

Use member functions to initialize the class members.

Group B

Answer EIGHT questions.

$8 \times 7 = 56$

- 4. Discuss the different types of visibility modes supported by C++. ✓ 7
- 5. Discuss data abstraction and encapsulation. List the merits and demerits of a friend function. 4+3
- 6. What is virtual and pure virtual function? Write a program implementing run time polymorphism. ✓ 3+4
- 7. Define generic programming. Mention its advantages. 3+4
- 8. Discuss the need of function overloading and inline function with example. 7
- 9. What is polymorphism and abstract class? Write a program implementing encapsulation. 4+3
- 10. Write a program to add two time object i.e. second, minute and hour. Showing the example of passing object as function argument. ✓ 7
- 11. Write a program to sort N numbers in ascending order using function template. 7
- 12. List the different types of inheritance in C++. Discuss benefits and cost of inheritance. ✓ 1+6
- 13. Write short notes on any TWO:
 - (a) Design modeling
 - (b) This pointer
 - (c) Copy constructor3.5+3.5

PURBANCHAL UNIVERSITY

2010

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT124CS: Object Oriented Programming in C++

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A: Long-answer Questions

Answer TWO questions.

2×12=24

1. What is operator overloading? Mention the limitations of operator overloading. Write a program to overload '+' operator to concatenate two string objects. 2+2+8
2. How friend function bridges the gap between two or more than two classes? Write a program to add two complex objects implementing friend function and returning object from function. 4+8
3. Write down the benefits and cost of inheritance. Create a class **student** that stores name (a string) and roll no (type int). From this class; derive a class **marks** that adds sub1 (type float), sub2 (type float) that stores the mark for two subjects. Then from the class **marks** derive a class **record** which adds semester type (type int) and average (type float), this average is the average marks of the sub1 and sub2 defines in class **marks**. 3+9

Group B: Short-answer Questions

Answer EIGHT questions.

8×7=56

4. What is Object-Oriented programming? Write down the different features of object oriented programming. 2+5
5. Write a program to add two times in hours and minutes illustrating passing object as function argument. 7
6. Differentiate between constructor and destructor. Give one program in which default constructor, parameterized and copy constructor has been used. 2+5

(2)

7. Why we need virtual function? Write a program which uses virtual function. 2+5
8. What are static data member and static member function? Explain each with example. 3+4
9. What is template? Explain function template and class template with example. 1+5
10. Write a c++ program to convert an object of class 'kilowt' to an object of class 'poundwt'. Attribute of class kilowt is kilogram (float) and attribute of class poundwt is pound (float). [Hint: 1kg=2.20 pound] 7
11. Differentiate between object oriented analyses and object oriented design. 7
12. How dynamic initialization of variable is done? Give an example. 3+4
13. Write short notes on any TWO:
(a) delete and new operators.
(b) Inline function.
(c) Waterfall model. 3.5+3.5



FURBANCHAL UNIVERSITY

2016

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT173CO: Digital Logic (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

1(a) Describe full subtractor circuit with truth table, logic circuit and block diagram. 8

(b) Differentiate between Analog and Digital System. 4

2(a) Prove that $A \oplus B \oplus C \oplus D = \sum (1, 2, 4, 7, 8, 11, 13, 14)$. 6

(b) State and prove De'Morgan's Theorem. 6

3(a) What do you know about decoder? Design a 4×16 decoder using two 3×8 decoders. 2+6

(b) Differentiate between (i) Multiplexer and De-multiplexer (ii) Encoder and Decoder. 2+2

Group B

Answer SEVEN questions.

$7 \times 8 = 56$

4. Perform the following operations: 2+4+2

(a) $(110110)_8 = (?)_{16}$.

(b) $(29)_{10} - (26)_{10}$ subtract using 9's complement.

(c) $(33.2)_{16} = (?)_8$

5. Simplify the Boolean function given below into 4+4

(i) SOP (ii) POS.

$$F(w, x, y, z) = \sum (0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$$

6(a) Explain Ripple counter with necessary diagram. 6

(b) What do you mean by register and shift register. 2

(2)

- 7(a) Differentiate between sequential and combinational circuit. 2
- (b) Explain JK flip-flop with necessary diagram and mathematical expression. 6
- 8(a) Design a counter which counts 0, 1, 2, 3, 4, 5 and repeat. Using T-flip flop. 6
- (b) Differentiate between synchronous and asynchronous counter. 2
- 9(a) Describe about serial in parallel out register (SIPO) with suitable example. 5
- (b) Explain 2-bit binary parallel adder. 3
- 10 Design BCD to excess-3 code converter. 8
- 11(a) Prove that $\overline{AB} + \overline{A} + \overline{AB} = 0$ 3
- (b) What is PLA? Explain why is it superior than ROM for implementing don't care conditions. 5

PURBANCHAL UNIVERSITY

2011

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT123CE: Digital Logic

Candidates are required to give their answers in their own words as far as practicable.

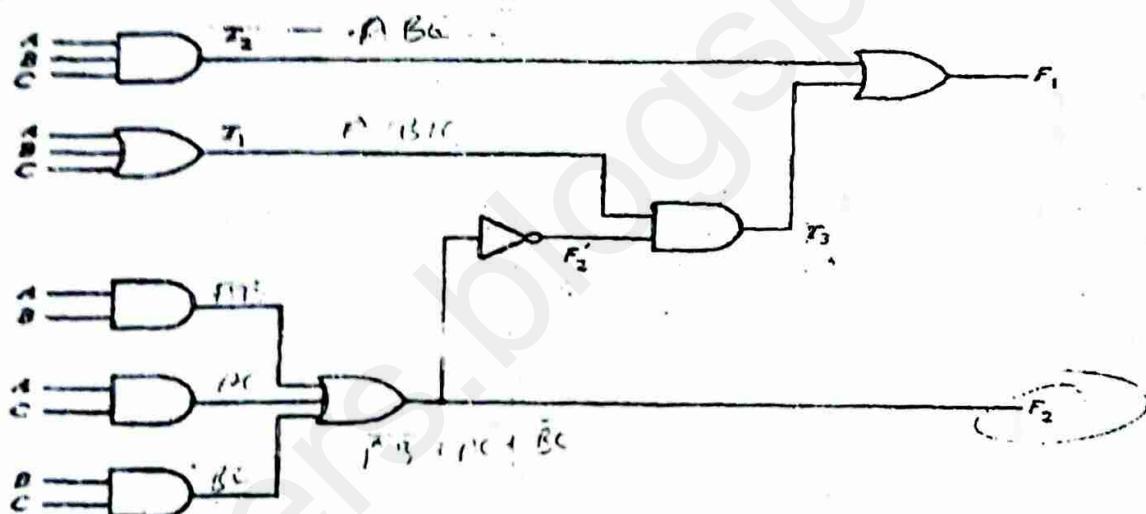
Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

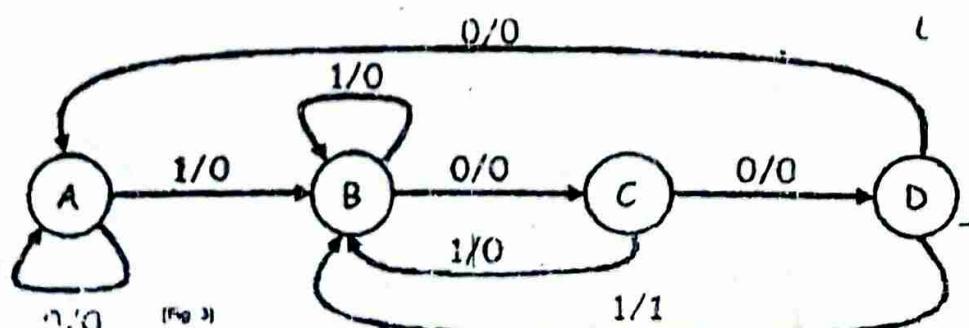
1. How analysis of logic circuit is different from its design? Explain the steps required to analyze logic circuit. Analyze the following logic circuit. 1+3+8



2. What is the limitation of truth table method? How can we overcome limitation of truth table method? Simplify the following Boolean function using K-map:

$$F(A, B, C, D) = \sum m(4, 5, 6, 8, 9, 10, 13) + d(0, 7, 15) \quad 2+10$$

3. Design a sequential circuit whose state transition diagram is as shown in fig. 3. 12



(2)

Group B:

4(a) Find the 10's complement of $(935)_{10}$ 2

(b) Perform the subtraction of following decimal number using i) 10's complement method ii) 9's complement method. 1+1

$$5250 - 321$$

(c) Perform subtraction of following binary number using

(i) 1's complement method

(ii) 2's complement method. 1+1

$$11010 - 1101$$

(d) $(510.4)_4 = (?)_2$ 2

5. Explain Full subtractor along with suitable explanations, truth table, circuit diagram and one block diagram that represents Full subtractor in terms of half subtractor. 8

6. Design a combinational circuit that converts a decimal digit from BCD to EXCESS-3 code. 8

7. Design and explain 4 bit magnitude comparator.

8. How will you convert SR flip flop to JK Flip flop? Explain your result with suitable circuit diagram. 8

9. Design Mod-10 counter. Use JK flip flop in your design. 8

10. Explain Design of Arithmetic Logic circuit along with circuit diagram in brief. 8

11. Explain CMOS technology along with suitable diagram in detail. 8

12. Design XOR gate using (i) NAND gates only (ii) NOR gates only. 4+4



PURBANCHAL UNIVERSITY

2010

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT123CE: Digital Logic

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A: Long-answer Questions

Answer TWO questions.

$2 \times 12 = 24$

1. A digital system has four bit word ABCD as input. The output Y is equal to 1 when two adjacent bits are equal to 1, or any three or all four bits are 1.
- (a) Draw the K-map for Y and obtain the minimal expression.
(b) Realize the corresponding logic circuit using NAND gates only.

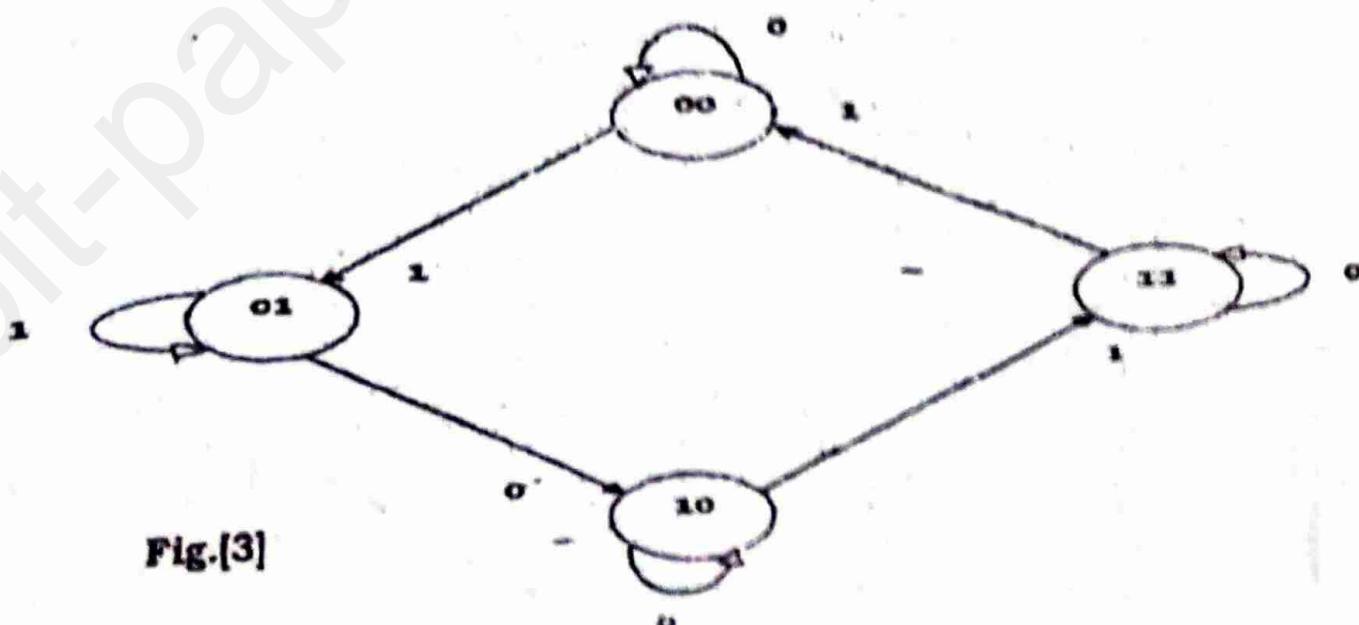
6+6

2. Optimize the following Boolean function using K-map technique
(i) in SOP form (ii) in POS form.

6+6

3. Design a sequential circuit whose state transition diagram is as shown in Fig. 3.

12



(2)

Group B: Short-answer Questions

Answer SEVEN questions.

$7 \times 8 = 56$

4×2

4. Determine the following:

- (a) $(BEE)_r = (2699)_{10}$
- (b) $(225.225)_{10} = (?)_{16}$
- (c) $(623.77)_8 = (?)_{16}$
- (d) $(2AC5.D)_{16} = (?)_{10}$

5. What are the disadvantages of 1's complement logic while subtracting binary numbers? Compare 1's complement and 2's complement logic along with suitable example. 4+4

6. Implement the following function using NAND and NOR gates only. 4+4

$$F = (A + B)(CD + E)$$

7. Implement the following function with a multiplexer. 8

$$F(A, B, C, D) = \Sigma m(0, 1, 3, 4, 8, 9, 15)$$

8. Justify briefly the statement "flip flop suffers from the limitation of race around condition". Suggest how can we overcome this limitation. 4+4

9. Design mode-3 counter using JK flip-flop and sketch the wave forms for output when clock is applied. 4+4

10. What are half and full adders? With the help of necessary truth tables and k-maps, show a full adder can be realized using one half adder and one OR gate. 8

11. Explain MOS technology along with suitable diagram in detail. 8



PURBANCHAL UNIVERSITY

2015

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT173CO: Digital Logic (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) What is Number System? Explain different types of Number System. 6
- (b) Perform the following operations: 3+3
 (i) $(1110)_2 - (1011)_2$, Subtraction using 2's compliment
 (ii) $(98)_{10} + (87)_{10}$ BCD Addition
- 2(a) What is Multiplexer? Construct a 4*1 Multiplexer using required GATES. 6
- (b) What are differences between half adder and full adder? Design a 3 bit full adder circuit using necessary gates. 6
- 3(a) Discuss the significance of GRAY CODE. Design 3 bit GRAY CODE to BINARY converter. 6
- (b) Implement $F(A, B, C, D) = \Sigma(0, 1, 2, 15)$ using a Mux. 6

Group B

Answer SEVEN questions.

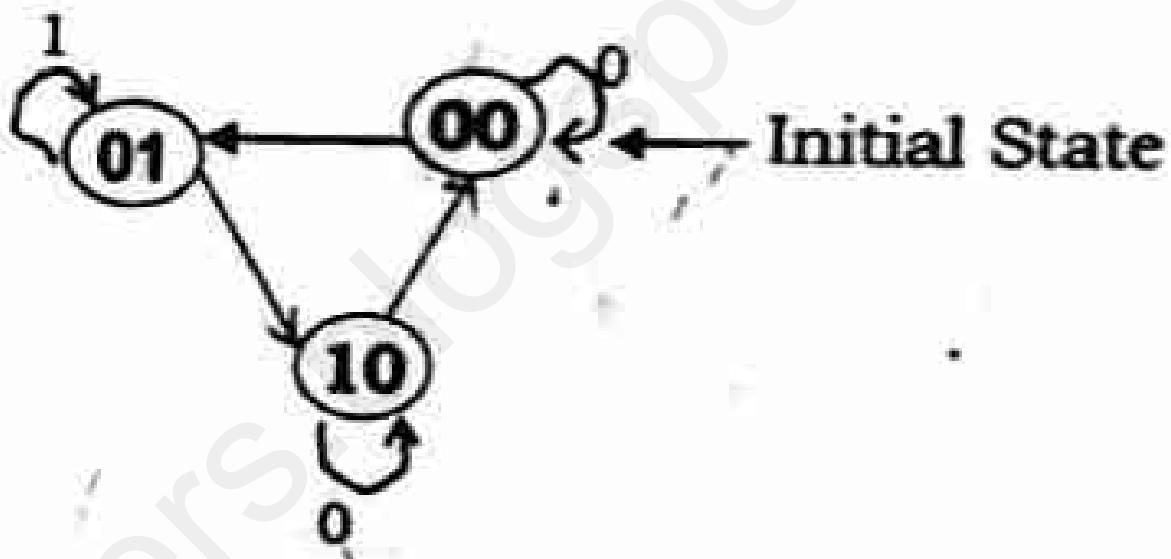
$7 \times 8 = 56$

4. Design a combinational circuit using ROM which accepts 3 bit binary number and outputs square of it.
5. What is sequential circuit? Explain the operation of SR flip-flop.
6. Explain Parallel In-Serial Out Shift Register.
7. Construct and explain synchronous binary up counter with JK flip-flop.

(2)

8. Explain the operation of 4-bit binary parallel adder.

9. Design the sequential circuit with given state diagram:



10. Differentiate PLA and ROM.

11. State and prove DeMorgan. Verify Duality Theorem.

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PURBANCHAL UNIVERSITY

2015

Bachelor in Information Technology (B.I.T.)/Second Semester/Final/Chance/Back
Time: 03:00 hrs. Full Marks: 80 / Pass Marks: 32

BIT173CO: Digital Logic

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) List out the different technique for designing the logic circuit.
Write the difference between SOP and POS technique/method. 1+5

- (b) Simplify the following Boolean function into (i) sum-of-products and (ii) product-of-sums.

$F(A, B, C, D) = \Sigma(0, 1, 2, 5, 8, 9, 10)$ by using K-Map method. 3+3

- 2(a) State and prove De'morgans theorem. 6

- (b) Implement a full-adder circuit with a decoder and two OR gate. 6

- 3(a) What is flip-flop? Discuss about JK flip-flop in detail. 1+5

- (b) Draw a 3-bit up-down counter and describe its operation. 6

Group B

Answer SEVEN questions.

$7 \times 8 = 56$

4. Perform the following operations:

- (a) $(576)_{10} - (456)_{10}$ using 9's complement. 3
(b) $(1011010)_2 - (100101)_2$ using 2's complement. 3
(c) $(7B2CAD)_{16} = (?)_8$ 2

5. What is magnitude comparator? Design 3-bit magnitude comparator. 2+6

6. What is the advantage of K-Map (Karnaugh map) method for designing the logic circuit? Implement $F = AB + CD + BC$ with NAND gate. 2+6

(2)

7. Define "Carry propagation". Write the different solution technique for reducing the "carry-propagation delay time". Discuss about a look-ahead carry generator. **2+2=4**
8. Design a 4-bit binary to Gray code converter. **8**
9. What is register and shift register? Discuss about the SISO shift register with logic circuit and timing diagram. **2+6**
10. Write the difference between synchronous and asynchronous counter. Draw the 4-bit binary ripple counter with truth-table. **3+5**
11. Write short notes on any TWO:
(a) PLA
(b) Master Slave FF
(c) Multilevel NOR circuits

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**PURBANCHAL UNIVERSITY
2013**

Bachelor in Information Technology (B.I.T.) / Second Semester / Final

Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

BIT173CO: Digital Logic

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- (a) What do you mean by Number system? Explain different types of Number system with examples. 6
- (b) Perform the following subtraction using $(r-1)$'s complement method. 3+3
(i) $(526)_{10} - (1025)_{10}$ (ii) $(110011)_2 - (11010)_2$
- 2(a) What do you mean by don't care condition? Simplify the Boolean Function $F(A,B,C,D) = \Sigma(1, 3, 7, 11, 15)$ and $dc(A,B,C,D) = (0,2,5)$. 1+3
- 2(b) Why NAND and NOR gate are called universal gate? Implement $P = A \oplus B + CD + E$ using NAND only. 3+3
- 3(a) What is magnitude comparator? Design a three bit magnitude comparator. 1+6
- (b) Differentiate between sequential and combinational circuit. 5

Group B

Answer EIGHT questions.

$8 \times 7 = 56$

4. Prove that:

(i) $\overline{ABC} + B + \overline{BD} + A\overline{BD} + \overline{AC} = B + C$

(ii) $\overline{ABC}(A + B + C) = \overline{A} + \overline{B} + \overline{C}$

5. Implement a full-subtractor with two half-subtractor and OR gate.

(2)

6. What do you mean by code converter? Design 4-bit Binary to Gray code converter. 2+7
7. What do you mean by Multiplexer? Implement $F(A,B,C,D) = \sum(0,1,3,4,8,9,15)$ using Multiplexer. 1+6
8. What do you mean by master-Slave Flip-Flop? Explain with diagram. 7
9. Design a synchronous mod 10 counter using T Flip-Flop. 7
10. What you mean by shift register? Explain the operation of serial-in/serial-out shift register. 1+6
11. "J-K Flip-Flop is refinement of R-S Flip-Flop". Illustrate this statement. 7
12. Simplify using k-map $F(A, B, C, D) = \sum(0, 2, 4, 6, 8, 10, 12)$. 7
13. Write short notes on any TWO: 3/5+3.5
(a) Decoder
(b) ROM
(c) Gray Code

6.000 - 0

PURBANCHAL UNIVERSITY

2011

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT123CE: Digital Logic

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2x12=24

1. What is magnitude comparator? Design a 4-bit magnitude comparator using all the necessary Boolean expressions for circuit implementation.
2. Discuss the design of logic circuit in context of processor logic design
3. Design a sequential circuit with JK flip-flops to satisfy the following state equations:
A(t+1) = A'B'CD + A'B'C + ACD + AC'D'
B(t+1) = A'C + CD' + A'BC'
C(t+1) = B
D(t+1) = D'

$$A(t+1) = A'B'CD + A'B'C + ACD + AC'D'$$

$$B(t+1) = A'C + CD' + A'BC'$$

$$C(t+1) = B$$

$$D(t+1) = D'$$

Group B

Answer EIGHT questions.

8x7=56

4. Do the following conversion:
(a) (132.231)₁₀ = ()₂
(b) (10101001) excess-3 code = ()₁₀
(c) (E1F)₁₆ = ()₈
5. What is gate? Why NAND and NOR gate are known as universal gate? Explain with logic diagram.
6. A majority function is generated in a combinational circuit when the output is equal to 1 if the input variables have more 1s than 0s. The output is 0 otherwise. Design a 3-input majority

- 1—1
- function: List the step-by-step design procedure followed.
7. Explain the operations of a clocked RS flip-flop with the help of its characteristic table. What is the drawback of this flip-flop?
8. What is subtractor? Explain about full subtractor with circuit diagram and necessary Boolean expression.
9. What do you mean by Boolean algebra? Write down the Huntington postulates of Boolean algebra. Write down the circuit symbol of three basic gates along with their truth tables.
10. Draw a 3-bit up-down counter and explain its operation and write its count sequences with the help of waveforms.
11. Why memory is necessary in a computer? Write short note on Memory Unit.
12. Which is the fastest Logic family? Write short note on CMOS Logic family.
13. What is multiplexer? Design 8×1 multiplexer using 4×1 multiplexer.



PURBANCHAL UNIVERSITY

2016

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT130EC: Electronic Devices & Circuits (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

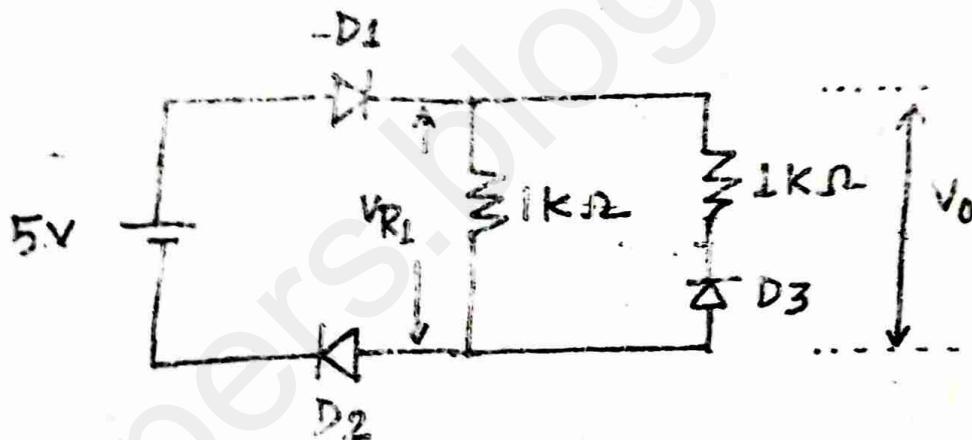
$2 \times 12 = 24$

1(a) Explain the forward bias and reverse phenomena for the PN junction diode with relevant diagrams. 8

(b) Calculate the following for the circuit given below: 4

(i) V_{R1}

(ii) V_o



2(a) Draw the different types of transistor biasing. Explain the common emitter configuration with relevant diagrams and graphs. 4+4

(b) Mention the difference between the BJT and FET devices. 4

3(a) Explain input and output characteristics of BJT. 6

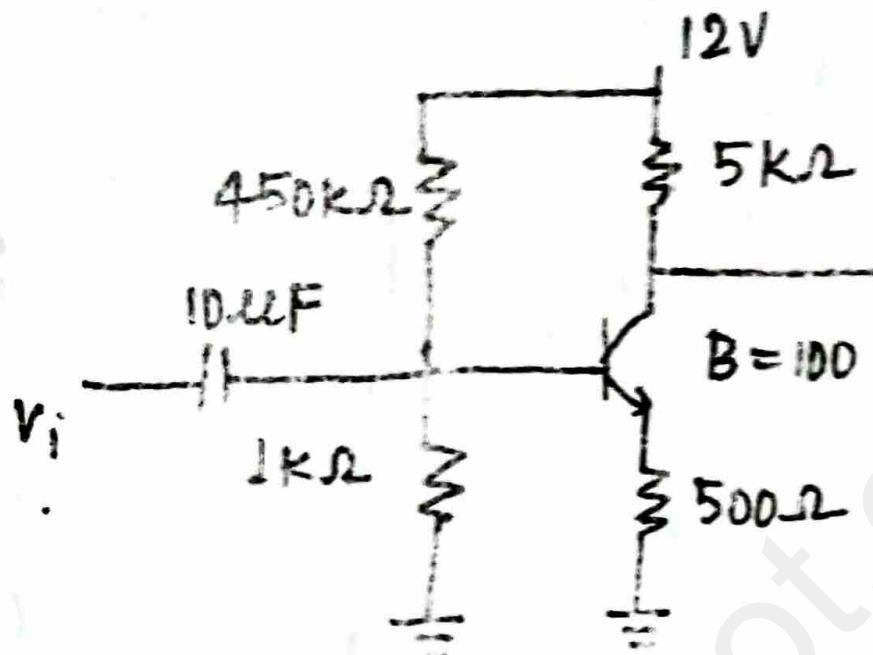
(b) Calculate the following for the circuit given below. 6

(i) V_{CE}

(ii) I_C

(iii) V_E

(2)



Group B

Answer SEVEN questions. $7 \times 8 = 56$

- ~~4.~~ Explain about op-amp as adder with necessary circuit diagram. 8
- ~~5.~~ Explain the operation of N-channel JFET with necessary diagrams. 8
- ~~6(a)~~ Explain the principles of Oscillator. 4
- ~~(b)~~ Explain ideal characteristics of op-amp. 4
- ~~7.~~ Define α and β . Deduce the relation between α and β . 8
- ~~8.~~ Explain the Non-Inverting and Inverting Amplifier. 8
- ~~9.~~ Explain diode as half wave rectifier with necessary circuit diagram. 8
- ~~10.~~ Explain Avalanche breakdown phenomena in P-N junction diode. 8
- ~~11.~~ Explain about voltage and current controlled sources. 8
- ~~12.~~ Write short notes on any TWO: 4+4
 (a) Feedback concept (b) Clipping circuit
 (c) Pinch off voltage

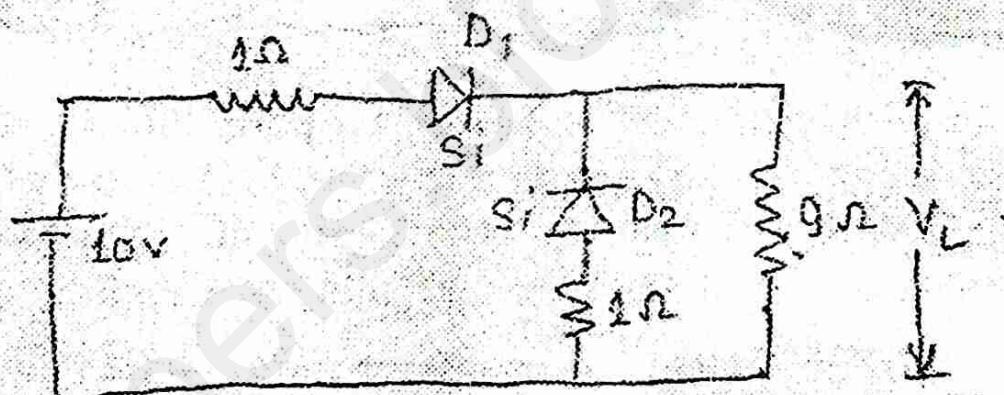
Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Answer ENGH7T questions.

$8 \times 10 = 80$

- 1(a) Explain briefly about the voltage and current controlled sources? 6
- 1(b) What are the two mechanisms of breakdown in a P-N junction? Explain any one of them. 4
- 2(a) Find the voltage drop V_L for the circuit of given figure. Assume that the voltage drop across silicon diode is 0.7V. 3



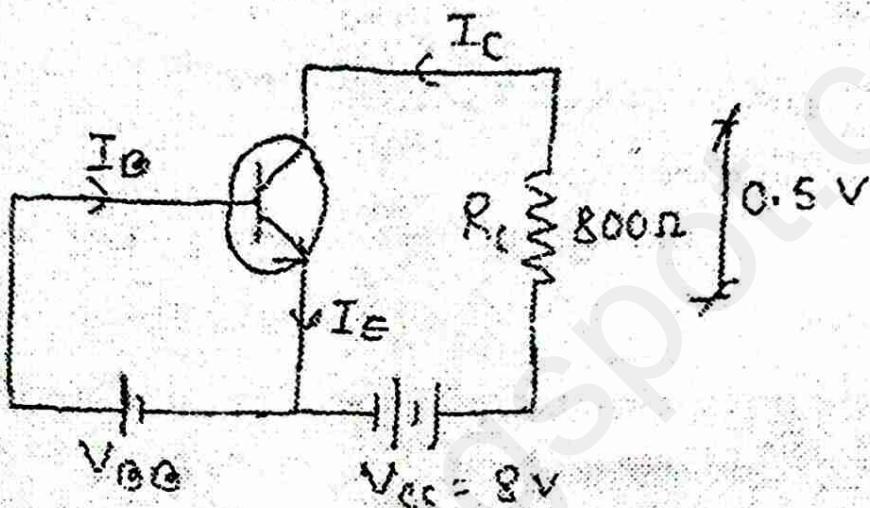
- 3(b) Explain the working of a half-wave rectifier with necessary diagram and device an expression for the efficiency of half-wave rectifier. 4+3
- 3(a) What is meant by clipping circuit? Discuss in details 'diode as a clipper'. 2+4
- 3(b) Compare the characteristics of transistor amplifier in the three possible configurations. 4
- 4(a) What do you mean by α and β ? Derive the relation between α and β . 2+3

(2)

- (b) What is transistor biasing? What is the need for biasing a transistor? 2+3

- 5(a) Draw and explain potential divider biasing circuit for a BJT. 5

- (b) A transistor is connected in CE configuration in which collector supply is 8V and the voltage drop across is 0.5V. If $\alpha=0.96$, determine: (i) Collector-Emitter voltage, (ii) Base current. 2+3



- 6(a) Explain the working of a JFET with the help of necessary diagram. 6

- (b) Distinguish between BJT and JFET. 4

- 7(a) In an N-channel JFET biased by potential divider method, it is designed to set the operating point at $I_D=2.5\text{mA}$ and $V_{DS}=8\text{V}$. If $V_{DS}=30\text{V}$, $R_1=1\text{M}\Omega$ and $R_2=500\text{k}\Omega$, find the value of R_S and R_o . The parameters of JFET are $I_{oss}=10\text{mA}$ and $V_P=5\text{V}$. 4

- (b) With a neat sketch, explain the working of an N-channel DE-MOSFET in depletion mode and enhancement mode. 6

- 8(a) What do you mean by feedback? List out the advantages of negative feedback in amplifiers. 2+4

- (b) Draw the circuit diagram of a Wein Bridge oscillator and explain briefly. 4

9. Write short notes on: 5+5

- (a) Drain characteristics of a JFET
(b) Properties of ideal op-amp

PURBANCHAL UNIVERSITY
2015

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT130EC: Electronic Devices & Circuits (New Course)

Candidates are required to give their answers in their own words as far as practicable.

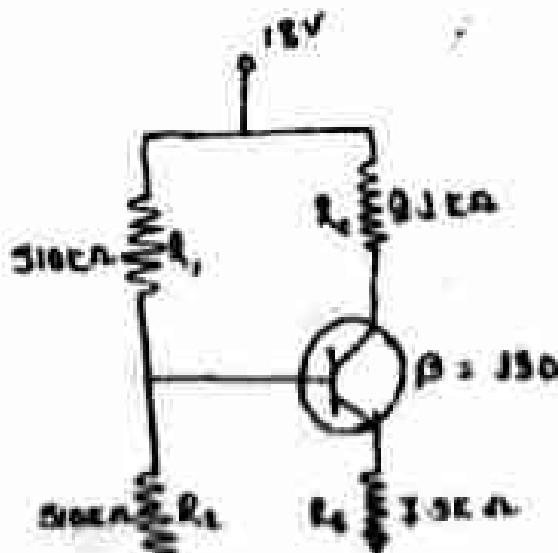
Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) Draw and explain V-I characteristics of a diode with the help of diode equation of current. 6
- (b) Explain the working of a full-wave bridge rectifier with the help of necessary diagram. 6
- 2(a) Explain the transistor characteristics in CE configurations. Explain the behavior of the transistor in active, cut-off and saturation mode. 6
- (b) State Barkhaussen criteria and explain the working of Wein-bridge oscillator with necessary figures. 6
- 3(a) What is need for stabilization? Explain various factors for shift in Q-point in a transistor. 6
- (b) Calculate I_B , I_C , V_E and V_{CE} for the given circuit of Fig. 3(b), if $\beta = 130$.



(2)

Group B

Answer SEVEN questions.

7x8=56

- 4(a) Explain how zener diode can be used as a voltage regulator. 4
 (b) Determine the voltage V_A in the circuit shown in figure 4(b). 4

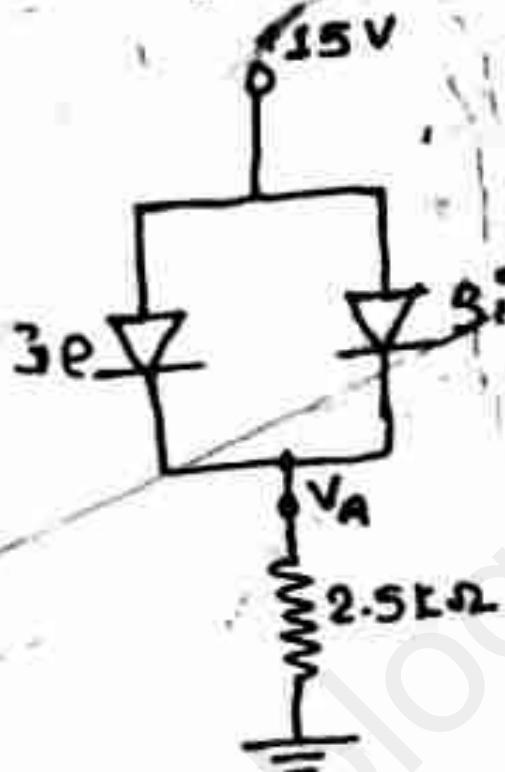


Fig. 4(b)

5. With the help of neat diagram, explain the construction and working of an n-channel JFET. 8
- 6(a) Differentiate between depletion-enhancement MOSFET and enhancement-only MOSFET. 4
- (b) Why are feedbacks important? Explain briefly about the positive and negative feedback. 4
- 7(a) What is BJT biasing? Explain the voltage divider biasing. 4
- (b) What do you mean by α and β ? Derive the relation between α and β . 4
- 8(a) Explain the drain characteristics of an N-channel JFET showing the different regions. 4
- (b) For the voltage divider bias arrangement shown in Fig. 8(b), calculate V_{DS} , I_D and V_{GS} . The JFET has $I_{DS} = 12 \text{ mA}$ and $V_T = 4 \text{ V}$. 4

(3)

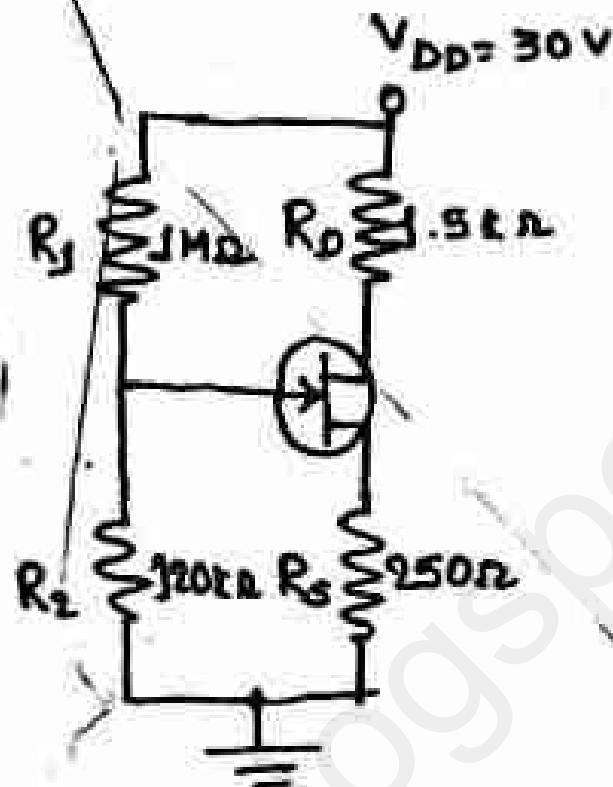


Fig. 8(b)

9. What do you mean by a two-port network? Explain about the various types of voltage current controlled sources. 2+6

10. What is an ideal op-amp? List out the various characteristics and some applications of an ideal op-amp. 8

11. Draw and explain the operation of a non-inverting Op-Amp and derive the expression for gain. 8

12. Write short notes on any TWO: 4+4

(a) Schottky diode

(b) Thermal Runaway

(c) Bipolar Junction Transistor

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**PURBANCHAL UNIVERSITY
2014**

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT130EC: Electronic Devices & Circuits

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Answer EIGHT questions.

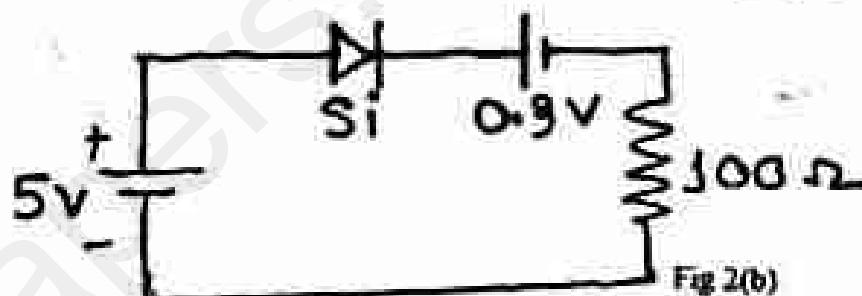
$8 \times 10 = 80$

1(a) Define the different types of voltage and current controlled source. ✓

(b) Draw and explain the V-I characteristics of an ordinary P-N junction diode. ✓ 5

2(a) Draw the circuit diagram of a centre tapped full-wave bridge rectifier and explain its working. ✓ 6

(b) What is the current in the circuit shown in fig 2(b). 4



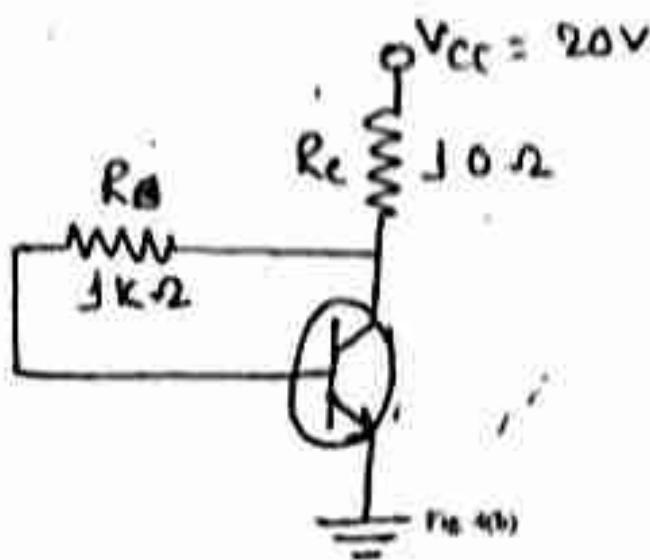
3(a) Compare the characteristics of transistor amplifier in the three possible configurations. 6

(b) What do you mean by α and β ? Derive the relation between α and β . 4

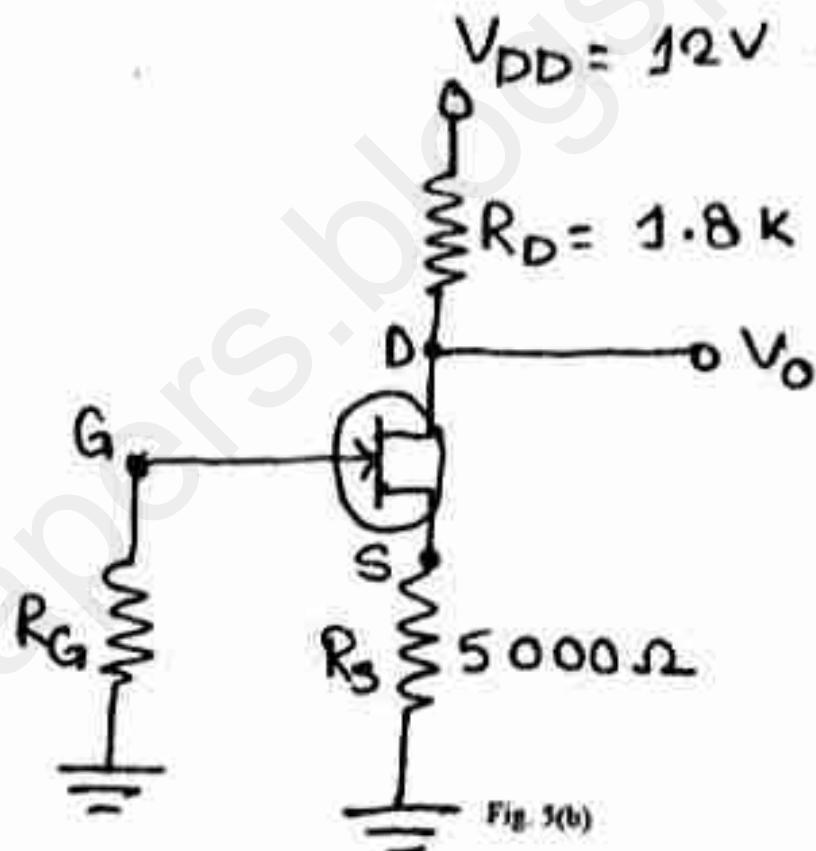
4(a) Define the voltage divider biasing of a bipolar junction transistor with necessary diagram. ✓ 5

(b) Draw the dc load line and locate the operating point of the fig 4(b). 5

(2)



- 5(a) Draw and explain the drain characteristics of a JFET. 5
 (b) Find the value of V_{DS} and V_{OS} in the given fig 5(b) for $I_D = 4mA$.
 2.5+2.5



- 6(a) Differentiate between DE-MOSFET and E-MOSFET. 4
 (b) Explain the wein bridge oscillator with necessary diagram. 6
 7(a) An amplifier with voltage gain of 60dB uses 1/20 of its output in negative feedback. Calculate the gain with feedback in dB. 5
 (b) What do you mean by feedback? Explain briefly about the type of feedback. 5

(3)

- 8(a) List out the characteristics of practical op-amp. 5
- (b) Explain how an op-amp can be used as a subtractor. 5
9. Write short notes on any TWO: 2×5=10
- (a) Clipping circuit
 - (b) BJT biasing
 - (c) Pinch-off voltage and its importance

≡

PURBANJAL UNIVERSITY

2012

Bachelor in Information Technology (B.I.T.)/Second Semester/*Chance*

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT122CE: Electronic Devices & Circuits

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

- 1(a) Draw the V-I characteristics of a p-n junction diode and explain how does a p-n junction diode behaves under (i) no bias (ii) forward bias (iii) Reverse bias

(b)

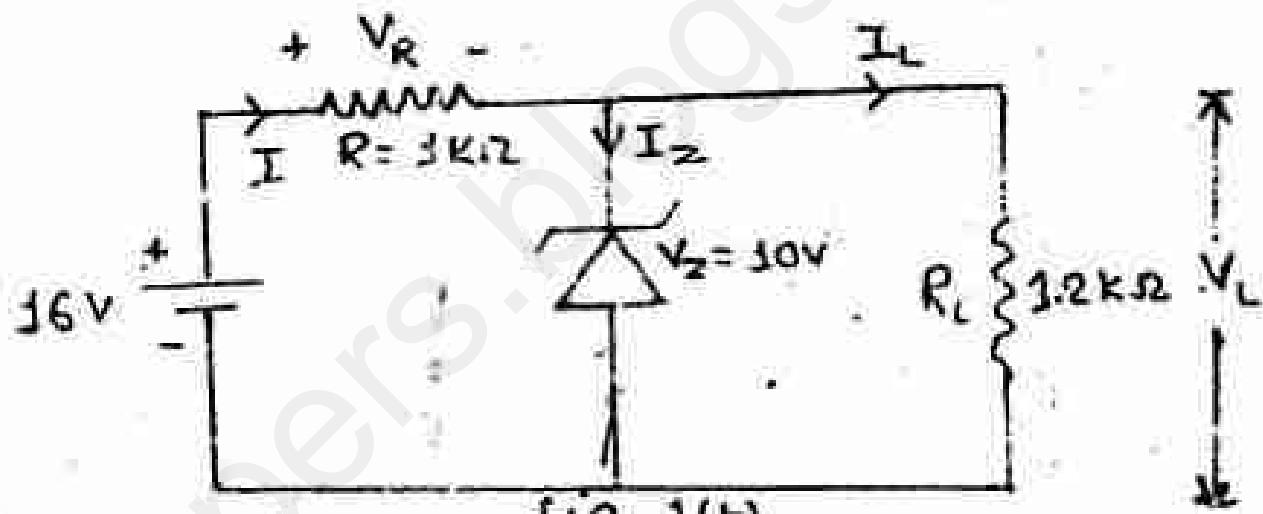


fig. 1(b)

For a zener diode network shown in fig 1(b) determine V_L , V_R , I_Z and P_Z

- 2(a) Explain the operation of a Bipolar junction transistor as a switch.
 (b) Prove that the transconductance g_m of a JFET is given as:

$$g_m = g_{mo} \left(1 - \frac{V_{GS}}{V_r} \right)$$

- 3(a) Draw the circuit diagram of Hartley oscillator and briefly explain how the oscillations are maintained in this oscillator

- (b) List out five major advantages of negative feedback in amplifiers.

Answer SEVEN questions.

7×8=56

- 4(a) What do you mean by tunneling effect? Draw and explain the V-I characteristics of an Esaki diode. 2+4
- (b) What is Barkhausen criterion for oscillator? 2
- 5(a) Draw the Eber's Moll model for a transistor and give the equation for emitter current and collector current. 4
- (b) With a neat sketch, describe the working principle of a depletion-enhancement MOSFET. 4
6. What is an operational amplifier? 2

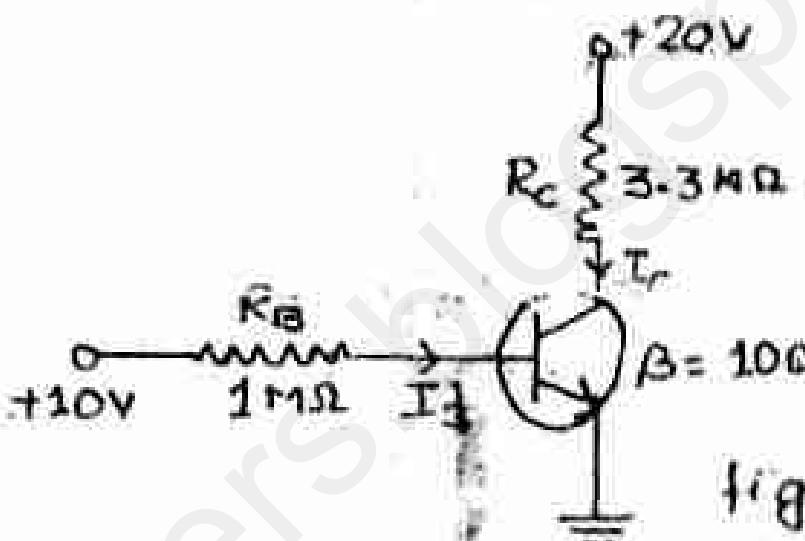


Fig. 6(b)

Draw the dc load line for the given Fig. 6(b) and determine the operating point.

- (a) Draw and explain potential divider biasing circuit in a BJT. 4
- (b) In a self bias n-channel JFET, the operating point is to be set at $I_D = 1.5 \text{ mA}$ and $V_{DS} = 10 \text{ V}$. The JFET parameters are $I_{DSS} = 5 \text{ mA}$ and $V_P = -2 \text{ V}$. Find the values of R_S and R_D . 4

Given that $V_{DD} = 20 \text{ V}$.

- 8(a) What is an IC? What are the advantages of IC's over discrete component circuits? 1+4
- (b) Draw the circuit diagram of a non-inverting amplifier and derive the expression for voltage gain. 3

- (i) The following test results were obtained in a CE amplifier circuit while measuring h parameters experimentally. 6

(3)

- (i) With ac output shorted, $I_b = 20\mu A$, $I_c = 1mA$, $V_{be} = 22$ mV and $V_{ce} = 0$
- (ii) With ac input open circuited $I_b = 0$, $V_{be} = 0.25$ mV, $I_c = 30\mu A$ and $V_{ce} = 1V$.

Determine hybrid parameters of the given transistor.

- (b) Define h-parameter for a BJT transistor.

- 10(a) Draw the high frequency T model of a CB transistor and derive the relation for high frequency α

- (b) What do you mean by extrinsic semiconductor?

12. Write short notes on any TWO:

- (a) Voltage and current controlled sources
- (b) Diode switching time
- (c) Thermal runaway

PURBANCHAL UNIVERSITY
2011

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT122CE: Electronic Devices & Circuits

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2x12=24

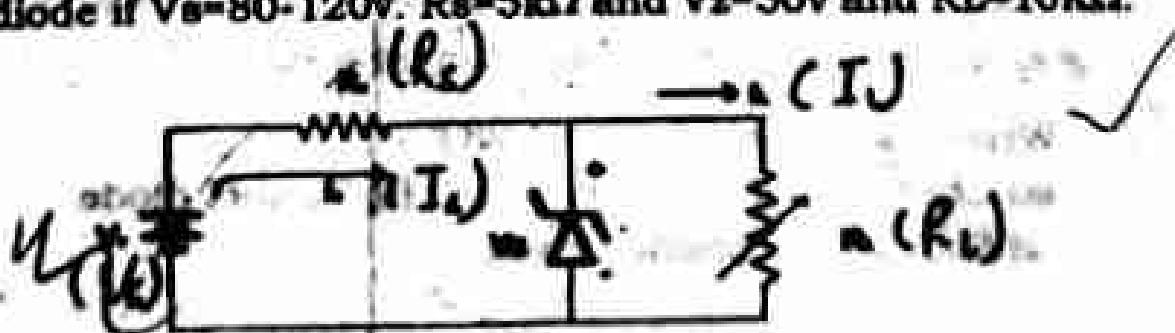
- 1(a) ✓ Explain briefly about the P-N junction in silicon semiconductor device. What are the characteristics of diode? Describe about full wave rectifier. 2+2+3
- 1(b) ✓ Draw the complete hybrid equivalent model of a two port network. Define two port networks. 3+2
- 2(a) ✓ Explain briefly the types of biasing of JFET. Which types of biasing is considered as the best and why? 5+2+1
- 2(b) ✓ Describe the construction of BJT. Explain transistor as an amplifier. 2.5+2.5
- 3(a) ✓ Describe the high frequency T-model of transistor with the help of diagram. 8
- 3(b) ✓ Describe the working principle of depletion type in n-MOSFET. 4

Group B

Answer SEVEN questions.

7x8=56

- 4(a) ✓ Describe the V-I characteristic curve of the silicon diode. 4
- 4(b) ✓ For the circuit Fig. 4(b), find the maximum and minimum value of zener diode if $V_S = 80-120V$, $R_S = 5k\Omega$ and $V_Z = 50V$ and $R_L = 10k\Omega$. 4



(2)

- 5(a) Why the criteria for oscillation that are used for oscillator are simpler than those used for feedback amplifier? 4
- (b) Describe about the tuned oscillator with the circuit diagram. 4
6. What do you mean by IC? What are its uses? Explain in details about fabrications process of resistor, diode in monolithic IC. 2+1+5
- 7(a) What is the difference between ideal op-amp and practical op-amp? It has ability to direct coupling? Explain. 2+2
- (b) Derive expression for the gain of an op-amp in inverting configuration with diagram. 4
- 8(a) Differentiate JFET and MOSFET. 4
- (b) Why unijunction transistor is used in switching? Explain the construction of a UJT. 2+2
- 9(a) Derive the expression of transconductance (g_m) and dynamic resistance (r_o) in the small signal analysis of a JFET amplifier. 4
- (b) What do you mean by load line? Describe and write its uses. 4
10. For the figure $\alpha=0.985$, $V_{BE}=0.3V$, $V_{CC}=16V$, calculate R_1 and R_C to place Q point at $I_C=2mA$, $V_{CE}=6V$, $R_2=20\Omega$ and $R_E=2k\Omega$. 8

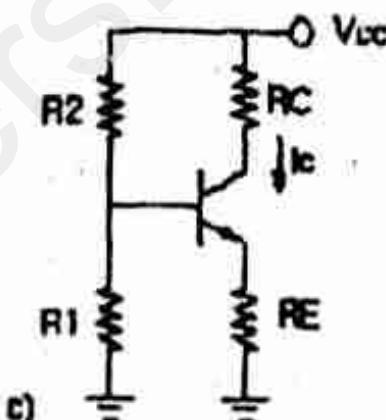


Fig. (10)

$$\begin{aligned} V_{CE} &= I_C R_C + V_C \\ V_{CE} &= I_B R_B + V_B \\ \sqrt{R_D} &= \sqrt{R_B} \times \sqrt{R_C} \end{aligned}$$

- 11(a) Explain about delay time, rise and fall time in BJT switching time. 1.5+1.5
- (b) Draw and explain the input and output characteristic curve of a common emitter configuration of a BJT? 5
12. Write short notes on any TWO: 4+4
- (a) Eber's moll equation (b) Tunnel diode
- (c) Breakdown phenomenon

PURBANCHAL UNIVERSITY

2016

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT191MS: Financial Management & Accounting (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

***Answer TWO questions.**

$2 \times 12 = 24$

1. The following balances are taken from the books of Ram Chandra.

- Capital	120000	Drawings -	21000
- Stock (1.1.2010)	45000	Plant and machinery	24000
- Furniture	1500	- Purchase	295000
- Sales	435000	- Insurance	1500
- Purchase returns	4000	- Sales returns	7000
- Rent	5000	Trade expenses	2000
- Salaries	24000	- Wages	40000
- Bad debts	1000	- Investments (1.4.2010) int. 6%	50000
- Sundry debtors	40000	- Sundry creditors	19000
- Bad debts reserve	800	- Cash	12200
- Establishment	6000	- Miscellaneous receipts	1200
- Patents	4800		

After making the following adjustment prepare a trading and profit and loss account for the year ended 31st December 2010 and the balance sheet as on that date.

- Stock on 31st December 2010 was Rs 75000.
- Depreciate machinery by 10% and furniture by 20%. Wages Rs 5000 and salaries Rs 1200 are outstanding.
- Write off Rs 500 as bad debt and create a reserve on bad and doubtful debts at 5% and reserve for discount on debtors at 2%.

(2)

- Investment is made on 1.4.2010 and no interest has been received so far
2. You are given the following information relating to financial statement:

Sales during the year	Rs. 10,00,000
Cost of goods sold	Rs. 6,00,000
Account receivable decreased	Rs. 50,000
Increase in Inventory	Rs. 30,000
Salary paid	Rs. 40,000
Other administrative expenses	Rs. 50,000
Tax paid	Rs. 25,000
Interest paid	Rs. 30,000
Dividend paid	Rs. 40,000
Increase in share capital	Rs. 3,00,000
Paid for redemption of debentures	Rs. 1,50,000
Machinery purchased	Rs. 1,00,000
Investment sold	Rs. 3,00,000
Building purchased	Rs. 2,00,000

Required:

- (a) Cash from operating activities
- (b) Cash from investing activities
- (c) Cash from financing activities

Interpret your result.

3. Briefly explain the functions of financial management. Why is wealth maximization better than profit maximization? Justify.

Group B

$7 \times 8 = 56$

Answer SEVEN questions.

4. Enter the following transactions in the triple column cash book and balance the book as on January 2010:

- (a) Hira commenced business with cash Rs 3000. He pays 2750 into bank account from cash box.
- (b) He purchases goods for cheque Rs. 690.
- (c) He paid rent Rs. 150 by cheque.
- (d) He settled debt of Rs. 75 due to Hari by cheque deduct discount at 5%.
- (e) He received a cheque of Rs. 30 less 5% discount from Go
- (f) He drew for personal use Rs. 70 from cash box
- (g) He paid wages Rs. 20 in cash.

5. Information relating to inventory are::

Annual requirement - 40,000 units

Ordering cost - Rs.200 per order

Carrying cost - Rs. 2 per unit p.a.

Safety stock - For 10 day consumption

Days in a year - 200 days

Required:

- (a) Economic order quantity (EOQ)
 (b) No. of order
 (c) Safety stock

6. From the following data calculates:

Gross profit ratio

Current ratio

Inventory turnover ratio

Liquid ratio = $\frac{\text{eq. ass}}{\text{c. liab}}$

Total assets turnover ratio

Net profit ratio

Average inventory	Rs, 1,00,000.
Cost of goods sold	Rs, 6,00,000
Current liabilities	Rs, 2,00,000
Fixed assets	Rs, 4,00,000
Liquid assets	Rs, 2,00,000
Long term debts	Rs, 2,00,000
Net profit	Rs, 1,50,000
Sales	Rs, 1,00,000

(4)

Mr. Shyam whishes to determine how much money he will have at the end of five years. If he deposits Rs. 15000 annually in a saving account paying 10 % annual interest. The deposits will be made at the end of each of the next five years and show the time line.

~~Compute the NPV, PBP of both projects~~
A firm whose cost of capital is 10% is considering two mutually exclusive projects X and Y; the details of which are:

.....	Year	Project X	Project Y
Cost (Rs)	0	70000	70000
CFAT (Rs)	1	10000	15000
	2	20000	40000
Maximum	3	30000	20000
	4	45000	10000
	5	55000	30000

What are the factors effecting dividend policy? Explain.

What do you understand by optimum capital structure? Explain.

Define the concept of double entry system of accounting.

Briefly explain the cash flow management.

What is trial balance? How it is prepared and which method is preferred? Explain.



PURBANCHAL UNIVERSITY
2015

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT191MS: Financial Management & Accounting (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

1. Prepare the trading and profit and loss account and the balance sheet of a firm as on 31st July 2012 from the following balances:

Particulars/Heads	Rs.	Particulars/Heads	Rs.
Capital	5600	Salaries	600
Machinery	700	General expenses	200
Sales	6200	Rent	500
Purchases	4000	Purchases Returns	50
Sales Returns	100	Debtors	3000
Stock	1000	Cash	400
Drawings	400	Carriage outwards	200
Wages	1000	Advertising	200
Carriage inwards	50	Creditors	500

Additional information:

- (a) The closing stock was valued at Rs. 2000.
(b) Provide depreciation on Machinery at @ 10% p.a.
(c) Wages due but not paid were Rs. 200.
(d) Rent paid in advance was Rs. 100.
(e) Outstanding salaries were Rs. 100.
2. What is financial management? "Share holder's wealth maximization processes better operating than profit maximization." Do you agree? Justify.
3. A firm whose cost of capital is 10% is considering two mutually projects is 'X' and 'Y' the details of which are:

(2)

Year	Project X (Rs.)	Project Y (Rs.)
0	70,000	70,000
1	10,000	50,000
2	20,000	40,000
3	30,000	20,000
4	45,000	10,000
5	60,000	10,000

Compute the Net Present Value (NPV) of both projects at 10% and Internal Rate of Return (IRR) for the two projects.

Group B

Answer SEVEN questions.

7×8=56

4. Find the present value and future value of Rs. 1000 under each of the following conditions:
- (a) 10% annually for 6 years
 - (b) 12% semi annually for 3 years
5. The transactions of a business for a period are provided below:
- (a) Invested Rs. 500000 in business.
 - (b) Purchase furniture worth Rs. 100000, and paid Rs. 1000 for transportation.
 - (c) Bought goods on credit Rs. 20000.
 - (d) Sold furniture worth Rs. 100000 for Rs. 125000.
 - (e) Paid cash to creditors Rs. 19000 in full settlement of his a/c.

Required: Accounting equation.

Out of 56

Income Statement

For the year ending 31st Dec. 2012

To opening stock	45750	By sales	300000
To purchases	189150	By closing stock	59100
To carriage	1200		
To wages	3000		
To G/P	120000		
	359100		
To Administrative expenses	60600	By G/P	359100
To finance Expenses	4200	By Non-operating income:	120000
To selling and distribution expenses	7200	Interest	900
To Non operating expenses	1200	Dividend	2250
To N/P	50400	Sales of Securities	450
	123600		123600

(3)

Your are required to calculate:

- (a) Expenses Ratio
- (b) Gross Profit Ratio
- (c) Net Profit Ratio
- (d) Operating Ratio

~~7. Prepare store ledger using LIFO Method and find out the value of closing stock and value of material consumed from the following records:~~

June- 1: Opening stock 200 units @ Rs. 10 p.u.

June- 5: Purchased 300 units @ Rs. 12 p.u.

June- 10: Issued 200 units.

June- 15: Purchased 150 units @ Rs. 11 p.u.

June- 20: Issued 200 units.

June- 25: Purchased 200 units @ Rs. 13 p.u.

June- 30: Issued 300 units.

June- 30: Stock verifier reveals a shortage of 10 units.

~~8. Estimates the cash requirements of Himalaya Fruits Co. Ltd. for June 2012 on the basis of data given below:~~

(a) Sales:	February 2012	Rs. 25000
	March 2012	Rs. 20000
	April to June 2012	Rs. 30000 per months

~~Roughly half the sales are for cash, 90% of credit sales are collected in the month following the month of sales and balance one month later.~~

~~(b) Fruits are always bought for cash to avail of the cash discount of 5%. The purchase budget for the second quarter (April to June) was Rs. 15000 baskets per month at Re. 1 per basket.~~

~~(c) Wages and salaries for 2nd quarter were budgeted at Rs. 500 per month.~~

~~(d) Manufacturing and other expenses budget for the quarter:~~

~~Cash expenses: Rs. 4500~~

~~Depreciation: Rs. 7500~~

~~Selling expenses: Rs. 3000~~

~~Administrative expenses: Rs. 2000 (April and May only)~~

(4)

9. The following opening and closing balances are extracted from the balance sheet of Sun Fittings Limited:

	Opening Balance (Rs.)	Closing Balance (Rs.)
15% debentures	50,000	20,000
Bank loan (long-term)	50,000	60,000
Provisions for dividend	30,000	40,000
Plant and equipment	1,50,000	1,70,000
Share capital	1,50,000	2,30,000
Share premium	20,000	28,000

Net profit for the year was Rs. 80,000 and dividend paid for the year was Rs. 30,000. 5% debentures were redeemed at 10% premium.

Required: Cash form financing activities.

10. Explain the concept of optimal capital structure with suitable example.
11. Briefly discuss about stock dividend. Why do firms pay stock dividend? Explain.



PURBANCHAL UNIVERSITY**2015**

Bachelor in Information Technology (B.I.T.)/Second Semester/Final/Chance/Back
 Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT191MS: Financial Management & Accounting

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

1. Define financial management. Explain in short about the objectives of the firm.
2. A company is considering two mutually exclusive projects. Both require an initial cash outlay of Rs. 10,000 each (with no salvage value) and have a life of five years. The company's required rate of return is 10 % and it pays tax rate of 50%. The projects will be depreciated on straight line method. The cash flows (before depreciation and tax)expected to be generated by the projects are as follows:

Year	1	2	3	4	5
Project A	4000	4000	4000	4000	4000
Project B	6000	3000	2000	5000	5000

Calculate the net present value and internal rate of return for each project and suggest which project should be accepted and why?

3. From the following trial balance, prepare Trading and Profit and Loss A/C and Balance Sheet for the year ended 30th Chaitra 2069 after giving effects to under mentioned Adjustments:

Particulars	Dr. Amount	Particulars	Cr. Amount
Purchase	310,000	Sales	300,000
Carriage	5,000	Advance rent	20,000
Salaries	24,000	Creditors	85,000
Electricity Charges	4,500	Bank Overdraft	80,000

(2)

Traveling expenses	8,900	Bills Payable	10,000
Telephone	4,600	Capital	120,000
Advertisement	10,000		
Insurance Paid in advance	3,000		
Plant & Machinery	150,000		
Bad debts	2,000		
Sundry debtors	45,000		
Bills receivables	30,000		
Cash in hand	8,000		
Furniture	10,000		
	615,000		615,000

Adjustments:

- Salaries outstanding Rs. 6,000/-
- The electricity bill were outstanding to the extent of Rs.500/-
- Rs.12,000/- rent income was earned during the year out of the advance rent.
- Provide Rs.1,000/- further bad debts and create a reserve for bad debts @ 5%.
- Provide 10% depreciation on plant and machinery and 15% on furniture.
- The closing stock was valued at Rs. 120,000/-.

Required: (a) Trading Account (b) Profit and Loss Account (c) Balance Sheet

Group B

Answer SEVEN questions.

7×8=56

4. Following transactions of Nivan trading concern are given to you:

- Baisakh 1st Started a business with bank balance Rs. 5,00,000.
Baisakh 7th Paid salary by cheque Rs. 60,000.
Baisakh 13th Withdraw from bank for office use Rs. 20,000.
Baisakh 21st Purchased goods on credit Rs. 80,000.
Baisakh 28th Cash drew from bank for private use Rs. 50,000.
Baisakh 30th Purchase building for cash Rs. 150,000.

Required: (a) Journal Entries (b) Bank account

(3)

5. > The following information is given to you:

Annual requirement 10,000 units

Price per unit Rs. 20

Average cost per order Rs. 16

Insurance charge per unit Rs 1/unit.

Inventory carrying cost excluding insurance 5% of unit price.

Required:

(a) Economic order quantity

(b) No. of order

(c) Total cost of EOQ.

6. The following information is provided:

Closing stock	Rs. 300,000	Account receivable	Rs. 100,000
Creditors	Rs. 200,000	Land &Building	Rs. 500,000
Debtors	Rs. 250,000	Debtor turnover ratio	5 times
Cash in hand	Rs. 50,000	Gross profit	Rs. 200,000.

Required:

(a) current ratio

(b) Quick ratio

(c) Sales amount

(d) fixed assets turnover ratio

(e) Gross profit margin

7. The balance sheet and other information of Kiran & Brother Co. Ltd. have been illustrated below.

Balance Sheet

Capital and liabilities	2012	2013	Assets	2012	2013
Account payable	40,000	70,000	Cash	55,000	20,000
Outstanding expenses	20,000	5,000	A/C Receivable	1,20,000	2,00,000
Debentures	1,00,000	1,50,000	Inventories	20,000	50,000
Equity-Share capital	3,30,000	4,10,000	Pre-paid exp	5,000	10,000
Profit and loss A/C	10,000	15,000	Fixed Assets	3,00,000	3,70,000
	5,00,000	6,50,000		5,00,000	6,50,000

Further information:

(a) Sales Rs. 5,00,000

(b) Cost of goods sold Rs. 2,70,000

(c) Selling and administrative expenses Rs. 1,00,000

(d) Interest paid	Rs 20,000
(e) Income tax paid	Rs 35,000
(f) Dividend paid	Rs 35,000
(g) Depreciation on fixed assets	Rs 20,000

Required: Cash flow Statement Using Direct Method.

8. Following information of XYZ Company is provided to you:

Month	Sales	Purchase	Wages	Factory Exp.	Office Exp.	Selling Exp.
March	5,000	3,000	600	500	400	300
April	5,600	3,200	650	550	400	300
May	6,000	3,500	700	600	400	350
June	8,000	4,000	900	750	400	450
July	9,000	4,000	950	800	400	450

Additional information given:

- (i) Cash balance on 1st May was Rs. 25,00.
- (ii) 20% of sales are in cash and the remaining amount is collected in the month next following.
- (iii) Credit terms for suppliers are two months.
- (iv) Wages and all other expenses of the current month are paid on the 1st of the month following.
- (v) The company pays dividends to equity shareholders and bonus to employees amounting to Rs. 1000 and 1500 respectively in the month of May.
- (vi) Income tax paid Rs. 2500 in July.

Required: Cash Budget for the month of May, June & July.

- 9(a) Miss Hira invested Rs.100,000, 10 years ago at 12% compounded half yearly. How much has she Accumulated?
- (b) Mr. Ashim wishes to determine the present value of the annuity considering of cash flows of Rs. 5000 Per year for 5 years. The rate of interest he can earn from his investment is 10%, then what will be the present value of an annuity?
10. What do you mean by dividend policy? Explain the factors affecting dividend policy?
11. Define trial balance. Explain the objectives of trial balance.

PURBANCHAL UNIVERSITY
2014

Bachelor in Information Technology (B.I.T.)/Second Semester/Final
Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT191MS: Financial Management & Accounting

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

$2 \times 12 = 24$

1. The following balances are taken from the books of Gautam D.

Particulars	Rs	Particulars	Rs
Capital	120000	Drawings	2100
Stock	45000	Plant & machinery	24000
Furniture	1500	Purchases	295000
Sales	435000	Insurance	— 1500
Purchases returns	4000	Sales returns	7000
Rent	5000	Trade expenses	2000
Salaries	24000	Wages	40000
Bad debts	1000	Investments (1.4.2005 int. 6%)	50000
Sundry debtors	400000	Sundry creditors	19000
Bad debts reserve	800	Cash	12200
Establishment	6000	Misc. receipts	1200
Patents	4800		

After making the flowing adjustments prepare a trading and profit and loss account for the year ended 31st Dec. 2005 and balance sheet as on that date.

- (a) Stock on 31st Dec. 2005 was Rs 75000
- (b) Depreciate machinery by 10% and furniture by 20%
- (c) Wages Rs 5000 and salaries Rs 1200 are outstanding.
- (d) Write off Rs 500 as bad debts and create reserve for discount on debtors at 2%.
- (e) Investment is made on 1.4.2005 and no interest has been received so far.

2. What is financial management? What are the important functions of financial management? Explain.
3. A firm whose cost of capital is 10% is considering two mutually exclusive projects X and Y the details of which are:

.....	Year	Project X	Project Y
Cost	0	70000	70000
Cash inflows	1	10000	45000
	2	20000	40000
	3	30000	20000
.....	4	45000	10000
	5	55000	10000

Compute the net present value (NPV) of both projects at 10%, payback period and internal rate of return (IRR) for the two projects.

Group B

Answer EIGHT questions.

$8 \times 7 = 56$

4. The following particulars are available:

Annual need : 12000 units

Cost of material per unit 40 Rs

Ordering cost Rs 60 per order

Annual carrying cost per unit Rs 4

Required:

Economic order quantity

No. of order in a year

Total cost of EOQ

5. Estimate the cash requirements of BIRAT JUICE Co. Ltd for June 2005 on the basis of data given below:

(i) Sales:

February 2005

26000 Rs

March 2005

22000 Rs

April to June 2005

32000 Rs per month

(3)

Roughly half the sales are for cash. 90% of credit sales are collected in the month following the month of sales and the balance one month later.

- (ii) Fruits are always bought for cash to avail of the cash discount of 5%. The purchase budget for the second quarter (April — June) was Rs 15000 baskets per month at Re 1 per basket.
- (iii) Wages and salaries for second quarter were budgeted at Rs 500 per month.
- (iv) Manufacturing and other expenses budget for the quarter.
- | | |
|------------------|---------|
| Cash expenses | Rs 4500 |
| Depreciation | Rs 7500 |
| Selling Expenses | Rs 3000 |

Administrative Expenses Rs 2000 (in April and May only)

6. Opening stock Rs 80,000; purchases Rs 4,80,000; direct expenses Rs 4,000; closing stock Rs 1,60,000; administrative expenses Rs 21,100; selling and distribution expenses Rs 40,000; sales Rs 10,00,000.

Calculate:

- Inventory turn over
- Gross profit ratio
- Net profit ratio
- Average age of inventory

7. The Himalayan Company limited is attempting to determine the most it should pay to purchase a particular annuity. The firms require minimum returns of 9% on all investments, and the annuity consists of cash flows of Rs 800 per year for five years. Find out the present value of annuity and show the time line also.

(4)

8. Prepare a two column cash book from the following transactions of Mr X:

2005-Jan 1	Cash in hand	Rs 4000
Jan 6	Cash Purchase	Rs 2000
Jan 10	Wages paid	Rs 40
Jan 11	Cash sales	Rs 6000
Jan 12	Cash received from Suresh and Allowed his discount	Rs 1980,20
Jan 19	Cash paid to Munna and discount received	Rs 2470, 30
Jan 27	Cash paid to Radha	Rs 400
Jan 28	Purchased goods from Ram	Rs 2070
Jan 30	sold gods to Hari	Rs 2000

Find out the total discount allowed and received and balance.

What are the factors effecting dividends policy? Explain.

10. Discuss about capital structure. Mention the factors to be considered when making capital structure decision.
11. What is financial accounting? Define the rules of double entry system with suitable example.
12. What is trial balance? What are the main objectives of preparing the trial balance?
13. Write short notes on any TWO:
(a) Cash flow statement
(b) Stock split and stock dividend
(c) Business and financial risk



PURBANCHAL UNIVERSITY

2011

Bachelor in Information Technology (B.I.T.) / Second Semester / Final

Time: 03:00 hrs. Full Marks: 80 / Pass Marks: 32

BIT125MS: Financial Management & Accounting

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

1. What is financial management? What do you understand by finance functions in business? Give an example of a business transaction for each type.
2. The following is the trial balance of sh. Ram Kumar on 31st December 2005.

Debit	Rs.	Credit	Rs.
Opening stock	30000	Capital ✓	40000
Advertising	7000	Bad debt reserve	500
Wages	1500	Discount	800
Factory rent	1000	Bills payable	4200
Carriage inwards	500	Sales ✓	159100
Return inwards	550	Returns outwards	350
Salaries	3300	Creditors	4600
Office rent	700		
Plant	10000		
Purchases	135000		
Bills receivable	1500		
Cash	3500		
Furniture	2000		
Debtors	9000		
General expenses	800		
Drawings	3000		
Insurance	200		
	209550		209550

You are required to prepare trading account, profit and loss account and balance sheet after taking into following adjustments:

(a) Closing stock was valued at Rs. 42000.

D✓ (b) Salaries outstanding Rs. 300 and wages outstanding Rs. 500.

D✓ (c) Unexpired insurance Rs. 50.

D✓ (d) Depreciate plant by @10% and furniture by @ 15%.

(e) Write off Rs. 1000 as bad debts and create reserve for doubtful debts @ 5% and for discount on debtors @2%.

3. Project X has a cost of Rs. 4 lakh, its expected net cash inflows are Rs. 1 lakh per year for 8 years, and its cost of capital is 12% calculate the following:

(a) What is the project's pay back period?

(b) What is the project's NPV?

(c) What is the project's IRR?

(d) What is the project's discounted payback period?

Group B

Answer EIGHT questions.

$8 \times 7 = 56$

4. The ABC Company has been offered an opportunity to receive the following mixed stream of cash flows over the next five years:

Year	Cash Flows
1	Rs. 400
2	Rs. 800
3	Rs. 500
4	Rs. 400
5	Rs. 300

If the firm must earn @ 9% at minimum, on its investments what is the most it should pay for this opportunity.

5. Estimate the cash requirements of FRUITS JUICE Co. Ltd for June 2005 on the basis of data given below:

(a) Sales:

February 2005	30000 Rs
March 2005	25000 Rs
April to June 2005	35000 Rs per month

Roughly, half the sales are for cash. 90% of credit sales are collected in the month following the month of sales and the balance one month later.

(3)

- (b) Fruits are always bought for cash to avail of the cash discount of 5%. The purchase budget for the second quarter (April-June) was Rs. 15000 baskets per month at Re. 1 per basket.
- (c) Wages and salaries for second quarter were budgeted at Rs. 500 per month.
- (d) Manufacturing and other expenses budget for the quarter.

Cash expenses Rs. 5000

Depreciation Rs. 8500

Selling Expenses Rs. 3000

Administrative Expenses Rs. 2200 (in April and May only)

6. Following in the income statement of Strong Ltd. for the year ending 31st December 2005

Income Statement

(For the year ending 31st December 2005)

Particulars	Rs.	Particulars	Rs.
To operating Stock	45750	By Sales	300000
To Purchases	189150	By Closing Stock	59100
To Carriage	1200		
To Wages	3000		
To Gross Profit	120000		
	359100		359100
To Administrative Expenses	60600	By Gross Profit	120000
To Finance Expenses:		By Non Operating Income:	
Interest	720	Interest	900
Discount	1440	Dividend	2250
Bad Debt	2040	By Profit or Sale of Securities	450
To Selling and distribution Expenses	7200		
To Non Operating Expenses	1200		
To Net Profit	50400		
	123600		123600

You are required to calculate:

- (a) Expenses Ratio
(b) Gross Profit Ratio
(c) Net Profit Ratio
(d) Operating Ratio

(4)

7. You are provided the following information:

- (a) Commenced a business with a cash of Rs. 25000 and stock of goods worth Rs. 20000.
- (b) Sold goods costing Rs. 5000 for Rs. 4500.
- (c) Distributed goods worth Rs. 100 as samples.
- (d) Took goods worth Rs. 400 for personal use.
- (e) Paid rent of Rs. 500.

Required: Effects of transactions on accounting equation.

8. A local shop is attempting to determine how many tea glasses to order. The annual sale is estimated 50000 sets. The purchase price is Rs. 40 per unit and carrying cost is estimated at 20% of the purchase price per year. The ordering cost per order is Rs. 90 the desired safety stock is 1000 units:

- (a) What is the economic order quantity [EOQ].
- (b) What is the optimal number of order to be placed?
- (c) Calculate total cost.

9. What is financial risk and how does it arise?

10. How does the type of assets used affect a firm's capital structure?

11. What are the factors influencing dividend policy?

12. Explain the various elements of a firm's credit policy.

13. Define the concept of double entry system of accounting.

PURBANCHAL UNIVERSITY
2016

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT102SH: Mathematics-II

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer ALL questions.

10x2=20

1. Solve $xdy + (x+1)dx = 0$.
2. Find the general solution of $(D^2 + D)y = 0$.
3. Solve $p^2 + 5xp + 6x^2 = 0$.
4. Find the laplace transform of e^{2t} .
5. Find the inverse laplace transform of $\frac{s}{(s+3)^2 + 4}$.
6. Define the Fourier integral of $f(t)$.
7. Find general solution of $ap_{xy} - bp_x$ where $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$.
8. Find the real and imaginary part of $\sin z$.
9. Derive a partial differential equation by eliminating constants a and b from the relation $z = axy + b$.
10. Find the residue of $f(z) = \frac{\cos z}{z^3}$.

(2)

Group B

Answer EIGHT questions.

$8 \times 5 = 40$

11. Solve: $\frac{dy}{dx} = \frac{2xy}{x^2 - y^2}$

12. State Clairaut's equation. Find the general and singular solution of $y = px + a/p$.

13. Solve $(D^2 - 2D + 5)y = 0$.

14. Find the laplace transform $f(t) = \cos(t - 2\pi/3)$ $t > 2\pi/3$
= 0 $t < 2\pi/3$

15. Find the inverse laplace transform of $\frac{1}{2} \log \frac{s^2 + b^2}{s^2 + a^2}$.

16. State and prove Cauchy-Riemann equation.

17. Determine the poles and residue at each pole of the function

$$f(z) = \frac{9z+i}{z(z^2+1)}$$

18. Find the Taylor's series of $f(z) = \frac{z}{(1-z)^2}$ at the origin.

19. Find Fourier cosine series of $f(x) = x$ in $0 < x < 2$.

Group C

Answer TWO questions.

$2 \times 10 = 20$

20. Solve the differential equation by laplace transform
 $y'' + 4y' + 3y = e^{-t}$ given $y(0) = y'(0) = 1$

(3)

21. Solve the wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ corresponding to the initial deflection $u(x,0) = \frac{2kx}{l}; \quad 0 < x < \frac{l}{2}$

$$= \frac{2k(l-x)}{l} \cdot \frac{1}{2} \quad \left(\frac{l}{2} < x < l \right)$$

and initial velocity $\left(\frac{\partial u}{\partial t} \right)_{\text{at } t=0} = 0$.

- 22(a) The differential equation of closed circuit containing a Resistance R, an inductance L and a battery which supplies a constant voltage E is given by $L \frac{di}{dt} + Ri = E$.

Where i is the current. Find i as function of t. How long will it take i to reach one-half of its final value.

- (b) Find the orthogonal trajectories of the circle $r = C \cos \theta$.

**PURBANCHAL UNIVERSITY
2015**

Bachelor in Information Technology (B.I.T.)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT102SH: Mathematics-II (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer ALL questions.

10×2=20

1. Solve: $(x^2 + 1) \frac{dy}{dx} = 1$
2. Find the general solution of $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = 0$.
3. Derive the partial differential equation by eliminating arbitrary constants from the relation $z = (x - c_1)^2 + (y - c_2)^2$.
4. Find the Laplace transform of $(e^{2t} \cos 3t)$.
5. Find the inverse Laplace of $\frac{1}{s^2 - 5s + 6}$.
6. Define Fourier cosine integral of $f(x)$.
7. Show that the function $u(x, y) = y^3 - 3x^2y$ is harmonic function.
8. Find the residue off(z) = $\frac{z}{(z-1)(z-2)^2}$
9. Find the real and imaginary part of $\log 2$.
10. Solve: $3p + 4q = 2$

Group B

Answer EIGHT questions.

8×5=40

11. Solve: $\frac{dy}{dx} + y = \cos x$

(2)

12. Solve: $(2x + 3y - 5)dx + (3x - 2y + 4)dy = 0$
13. Solve: $(D^2 - 4D + 4)y = x^2 + e^{2x}$
14. Find the Laplace transform of
(a) $f(t) = t^3 e^{3t}$ (b) $f(t) = 3\cos 2t - \sin 2t$
15. Find the inverse Laplace transform of $\frac{s+2}{(s^2 + 4s + 5)^2}$.
16. Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin although the Cauchy-Riemann equation are satisfied at the origin.
17. Expand $f(z) = \frac{1}{z}$ by Taylor's series about the point $z=1$.
18. Obtain the Fourier series for $f(x) = \begin{cases} x; & -1 < x \leq 0 \\ x+2; & 0 < x \leq 1 \end{cases}$
19. Find the Fourier sine series of $f(x) = \pi x - x^2$ in $(0, \pi)$.

Group C

Answer TWO questions.

2×10=20

20. Solve the differential equation by Laplace transform
$$\frac{d^2y}{dx^2} + dy/dx - 2y = t, \quad y(0) = 1, \quad y'(0) = 0$$
21. Obtain a general solution of wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ using variable separation method.
22. Find the Fourier sine integral of $f(x) = e^{-kx}$, $x > 0$, $k > 0$ and hence show that $\int_0^\infty \frac{\omega \sin \omega x}{k^2 + \omega^2} d\omega = \frac{\pi}{2} e^{-kx}$, $x > 0$, $k > 0$.

PURBANCHAL UNIVERSITY

2015

Bachelor in Information Technology (B.I.T.)/Second Semester/Final/Chance/Back

Time: 03:00 hrs.

Full Marks: 80/Pass Marks: 32

BIT102SH: Mathematics-II

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer ALL questions.

10×2=20

1. Define Poisson's, equation and wave equation.
2. Solve $(x + y)dy + (y - x)dx = 0$.
3. Find the Laplace transform of $3 \sin 4t$.
4. Express the function $f(z) = e^z$ in the form $u(x,y) + i v(x, y)$.
5. Find the complementary function of the differential equation.
 $(D^2 + 16)y = \cos 4x$
6. Define singular point of a function $f(z)$, give an example.
7. Find the inverse Laplace transform of $\frac{1}{s(s+1)}$.
8. Define Fourier series of $f(x)$ in the interval $-l \leq x \leq l$.
9. Derive a partial differential equation by eliminating a and b from the relation $z = axy + b$.
10. Find the zeros and poles of the function $f(x) = \left(\frac{z+1}{z^2+1} \right)^2$.

Group B

Answer EIGHT questions.

8×5=40

11. Find $L[te^{-2t} \cos 5t]$.

12. **Solve:**

$$\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 0.$$

Or

$$\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 7y = e^{-x/2} + 5.$$

13. Solve the partial differential equation by the method of separation of variables

$$\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial y^2} = 0.$$

14. If $f(z) = u + iv$ be an analytic function of z and let $u - v = e^x(\cos y - \sin y)$, find $f(z)$ in terms of z .

15. Expand $f(x) = 1$ in a sine series in $0 < x < \pi$.

16. Find the inverse Laplace transform of

$$L^{-1}\left\{\frac{3+e^{-2s}}{s^2+2s+10}\right\}$$

Or

Use convolution property to find the inverse Laplace transform of $\frac{1}{(s-2)(s-3)}$.

17. Verify Cauchy Riemann equation for $e^x(\cos y + i \sin y)$.

18. Find the residue of $f(z) = \tan z$ at $z = \frac{\pi}{2}$.

19. Find the orthogonal trajectories of the family of curves given by $y = A \sin(Bx + t)$, where A and B are constants and t is a parameter.

(3)
Group C

• Answer FOUR questions.

4×5=20

20. Using the Fourier integral, show that

$$\int \frac{1 - \cos \pi s}{s} \sin xs ds = \begin{cases} \pi/2 & 0 < x < \pi \\ 0 & x > \pi \end{cases}$$

21. Suppose that an object is heated to 300°F and allowed to cool in a room whose air temperature is 80°F. If after 10 minutes the temperature of object is 250°F, what will be its temperature after 20 minutes?
22. Find the values of K such that $u = e^{kx} \cos y$ is the real part of the analytic function $u + iv$, and also find the function.

23. Find Laurent's series for $f(z) = \frac{1}{(1-z)(z+2)}$ in the domain $1 < |z| < 2$.

24. Solve initial value problem,

$$\frac{dy}{dx} = x + y, \quad y(0) = 1$$

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BIT102SH: Mathematics-II

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks

Group A

Answer ALL questions.

$10 \times 2 = 20$

1. Determine the order and degree of the equation

$$x \frac{d^2y}{dx^2} + 2y + \left(\frac{dy}{dx} \right)^4 = 0$$

2. Solve the differential equation $(x+1)dy + (y-1)dx = 0$.

3. Write down the general solution of the equation $\frac{d^3y}{dx^3} = 0$

4. Find the Laplace transform of t^2e^{at} .

5. Find the inverse Laplace transform of $\frac{1}{s(s+1)}$

6. Find whether the function $f(x) = \log\left(\frac{1-x}{1+x}\right)$ is odd or even.

7. A function $f(x)$ is defined by $f(x) = 1$, $0 < x < \pi$. Find Fourier cosine series of $f(x)$.

8. Derive a partial differential equation from the relation $z = (x-a)^2 + (y-cz)^2$.

9. Express the function $f(z) = e^z$ in the form $u(x, y) + iv(x, y)$.

10. Find the residue of $\frac{1}{(z+1)^3}$ at its pole.

(2)

Group B

Answer EIGHT questions.

8x5=40

11. Solve $x dy - y dx = \sqrt{x^2 + y^2} dx$

Or,

Solve the differential equation: $y = px + \frac{a}{p}$

12. Solve: $\frac{d^2y}{dx^2} + 16y = \cos 4x$

13. Find the Laplace transform of the function $\int_0^x t^2 e^t dt$.

Or,

Find the inverse Laplace transform of $\left(\frac{s^2 + 6}{(s^2 + 1)(s^2 + 4)} \right)$

14. Express $f(x) = |x|$, $-\pi < x < \pi$ as fourier series.

15. A function $f(x)$ is defined as follow:

$$f(x) = \begin{cases} 1, & 0 < x < 1 \\ 0, & x \geq 1 \end{cases}$$

Using the fourier cosine integral, show that in $0 < x < 1$,

$$\int_{-1}^{1} \sin s \cos(sx) ds = \frac{\pi}{2}$$

16. Solve the partial differential equation by the method of separation of variables, $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$.

(3)

17. Using Laplace transform, solve the differential equation $y'' + y = t$,
 $y(0) = 1, y'(0) = 2$.
18. Show that $f(z) = e^x (\cos y + i \sin y)$ is an analytic function.
- Or
- Find an analytic function $f(z) = u + iv$
if $u = y^3 - 3x^2y$.
19. Find the Taylor's expansion of the analytic function $f(z) = \sin z$ at the origin.

Group C**4×5=20**

20. In a circuit with resistance R, inductance L, electromotive force E, the current i satisfies the differential equation $L \frac{di}{dt} + Ri = E$.
Taking L and R as constant and $E = kt$, solve this equation subject to the initial condition that $i = 0$ at $t = 0$.
21. If $f(z) = u + iv$ and $u - v = e^x(\cos y - \sin y)$, Find $f(z)$ in terms of z .
22. Solve the differential equation $(D^2 - 4D + 4)y = e^{3x} + \cos 5x$.
23. A metal ball is heated to a temperature of 100°C and at time $t = 0$, it is placed in water which is maintained at 40°C . If the temperature of the ball is reduced to 60°C in 4 minutes. Find the time at which the temperature of the ball is 50°C .
24. Expand the function $f(x) = x^2, 0 \leq x \leq \pi$ in a Fourier cosine series and hence deduce that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$.

PURBANCHAL UNIVERSITY
2013

Bachelor in Information Technology (B.I.T.) / Second Semester / Final
 Time: 03:00 hrs. Full Marks: 80 / Pass Marks: 22

BIT102HS: Mathematics-II

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer ALL questions.

10x2=20

1. State the order and degree of the differential equation

$$\frac{d^2y}{dx^2} - \left[1 + \left(\frac{dy}{dx} \right)^2 \right]^{\frac{3}{2}} = 0$$

2. Solve the differential equation $(\cos^2 x)y' = \sqrt{1+y^2}$.

3. Find the differential equation corresponding to the general solution given by $y = Cx^2 - x$.

4. Find the Laplace transform of $e^{3t} \sin 2t$.

5. Find Inverse Laplace transform of $\frac{1}{s^2 - 5s + 6}$.

6. Define odd and even function. Find whether the function x^{2n} is odd or even.

7. Show that $\int_{-\pi}^{\pi} \sin mx \sin nx dx = \pi$ if $m = n$.

8. Find the real and imaginary part of the complex function z^3 .

9. Derive a partial differential equation by eliminating arbitrary constants c_1 and c_2 from the relation $z = c_1 x^2 + c_2 y^2$.

10. Find the zeros and poles of the function $f(z) = \left(\frac{z+1}{z^2+1} \right)^2$.

Group E

8×5=40

Answer EIGHT questions.

11. Solve the differential equation $y' = \frac{y - 4x}{x - y}$.

12. Solve the differential equation $(D^2 - 1)y = 2x^2$.

13. Find the inverse Laplace transform of the function $\frac{2s+3}{(s-1)(s-2)(s-3)}$.

14. Find the Fourier series for the function defined by

$$f(x) = 1, \quad 0 \leq x \leq \pi \\ = -1, \quad \pi \leq x \leq 2\pi$$

and $f(x + 2\pi) = f(x)$

15. Find the Fourier sine series for $f(x) = x^2$ in the interval $0 < x < 3$.

16. Solve the partial differential equation $\frac{\partial^2 z}{\partial x \partial y} = z$ by the method of separation of variables.

17. Prove that $L[f''(t)] = s^3 L[f(t)] - s^2 f(0) - sf'(0) - f''(0)$.

Or

Find Laplace transform $te^{2t} \cos 5t$.

18. Show that

$$\frac{1}{(z+1)(z+3)} = -\frac{1}{6} \left(1 - \frac{z}{3} + \frac{z^2}{3^2} - \dots + \frac{(-1)^n z^n}{3^n} - \dots \right) + \frac{1}{2} \left(\frac{1}{z} - \frac{1}{z^2} + \dots + (-1)^{n+1} \frac{1}{z^n} + \dots \right)$$

Where $1 < |z| < 3$.

(3)

19. Calculate residues of $\frac{ze^z}{(z-a)^3}$ at its pole.

Group C

4×5=20

20. Find the orthogonal trajectories of the family of hyperbola $xy=A$ where A is a variable parameters.

21. Show that the solution of wave equation $c^2u_{xx}=u_{tt}$ which also satisfies the initial conditions

$$u(x,0) = f(x), \quad -\infty < x < \infty$$

$$u_t(x,0) = 0, \quad -\infty < x < \infty$$

is given by

$$u(x,t) = \frac{1}{2} [f(x-ct) + f(x+ct)]$$

Solve the differential equation $(D^2 - 2D + 2)y = e^x \sin x$.

23. Solve $\ddot{x} - \dot{x} + 4x = \sin \omega t$, $x(0)=a$ and $\dot{x}(0)=b$ using Laplace transform method.

24. Find the values of C_1 and C_2 such that the function $f(z) = x^3 + C_1y^2 - 2xy + i(C_2x^2 - y^2 + 2xy)$ is analytic. Also find $f'(z)$.

BIT121HS: Mathematics-II

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer ALL questions.

10×2=0

1. Show that the differential equation $(x^2 + 2y)dy + (2xy + 1)dx = 0$ is exact.
2. Find the general solution of the differential equation $y = px + \sin x$.
3. Find the complementary function of the differential equation $y'' + y = -\tan x$
4. Find the Laplace transform of $t^2 e^{at}$.
5. Find the inverse Laplace transform of $\frac{1}{(s+1)(s+2)}$.
6. Find whether the function is $\sqrt{1+x+x^2} - \sqrt{1-x+x^2}$ is odd or even.

A function $f(x)$ is defined as follows:

$$f(x) = \begin{cases} 1, & 0 < x < 1 \\ 0, & x \geq 1 \end{cases}$$

Find Fourier cosine integral of $f(x)$.

8. Obtain a partial differential equation by eliminating arbitrary constants c_1, c_2 and c_3 from the relation $c_1x + c_2y + c_3z = 1$.
9. Verify Cauchy-Riemann equations for the function $\cosh y \sin x + i \sinh y \cos x$
10. Show that the function $f(z) = \frac{z^2 - 2z + 5}{z - 2}$ has a simple pole at $z = 2$.

(2)

Group B

8x5=40

Answer EIGHT questions.

11. Solve the differential equation $xyy' = y^2 - x^2$.

Or

Solve the differential equation $y = p \tan p + \log \cosec p$.

12. Solve the differential equation by operator method:

$$(D^2 + 16D + 15)y = e^{-3x/2}$$

13. Find the Laplace transform of the function $\int_0^t x^2 e^x dx$.

Or

Find the inverse Laplace transform of $\left[\frac{s^2 + 6}{(s^2 + 1)(s^2 + 4)} \right]$.

14. Expand the function of $f(x) = x^2$, $0 \leq x \leq \pi$ in a Fourier cosine series and hence deduce that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$.

15. Using Fourier cosine integral, show that, for $x > 0$,

$$\boxed{e^{-bx}} = \frac{2b}{\pi} \int_0^{\infty} \frac{\cos sx}{s^2 + b^2} ds$$

16. Solve the partial differential equation by the method of separation of variables $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$.

17. Show that the function $x^2 - y^2 - 2xy + i(x^2 - y^2 + 2xy)$ is analytic. Also find $f'(z)$.

Or

Let $f(z) = u + iv$ be an analytic function of z and let $u - v = (x - y)(x^2 + 4xy + y^2)$. Find $f(z)$ in terms of z .

(3)

18. Show that $f(z) = \frac{1-e^{2z}}{z^3}$ has a pole of order 3 at $z=0$.
19. Find the Laurent's series for $f(z) = \frac{1}{(1-z)(z+2)}$ valid for the domain $1 < |z| < 2$

Group C

answer FOUR questions.

4×5=20

20. In a circuit with resistance R, inductance L, and electromotive force E, the current i satisfies the differential equation $L \frac{di}{dt} + Ri = E$.

Taking L and R as constant and $E=kt$, solve this equation subject to the initial condition that $i=0$ at $t=0$.

21. Let $f(z) = u + iv$ be an analytic function. Given that $u=v^2$, show that $f(z)$ is a constant.

22. Solve the differential equation $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$.

23. Solve the boundary value problem $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$, $x > 0, t > 0$,
- $$u(x, 0) = 0, \quad x > 0$$
- $$u(0, t) = g(t), \quad t > 0$$

24. A body of mass M is attached at the lower end of an elastic spring whose upper end is fixed. The differential equation describing its forced oscillations is given by $Mx = -kx + F$, where k is the spacing constant and F is the driving force. Solve this problem with $F = f_0 \sin pt$, and initial conditions $x(0) = \dot{x}(0) = 0$.