

PURBANCHAL UNIVERSITY

2021

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 TWO questions.

2×10=20

1. Find the solution of the differential equation $(x+1)dy + (y-1)dx = 0$.
2. Find the inverse Laplace transform of $\frac{1}{s^2 + 3s + 2}$.
3. Express $f(z) = \log z$ in the form $u(x,y) + i v(x,y)$.
4. Find the Fourier expansion of the function in the interval $0 \leq x \leq 2\pi$, $f(x) = 2x$.
5. Find the general solution of the partial differential equation $ap + bq = c$.
6. Evaluate $\int_C f(z)dz$, when $f(z) = \frac{1}{z-a}$, C is the circle with centre at a and radius r .
7. Calculate the residue of $(Z) = f(z) = \frac{1}{z + \frac{1}{z}}$.
8. Find the Laplace transform of $e^{3t}\cos 2t$.
9. Find the general solution of the differential equation $\frac{d^2 y}{dx^2} - 2\frac{dy}{dx} + 2y = 0$.
10. Define fourier cosine and sine integral of $f(x)$.

Contd. ...

(2)

Group B

Answer EIGHT questions.

8×5=40

11. Solve the differential equation: $\frac{dy}{dx} = \frac{2xy}{x^2 - y^2}$.
12. Solve the second order differential equation
 $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 4y = e^x \sin x$.
13. Solve $xdy - ydx = \sqrt{x^2 + y^2} dx$.
14. Find the Laplace transform of $t e^{-t} \cos t$.
15. Find the inverse Laplace transform of $\frac{2s+3}{(s-1)(s-2)(s-3)}$.
16. Expand the function $f(x) = x^2, 0 \leq x \leq \pi$ in a Fourier cosine series and deduce that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$.
17. Verify Cauchy Riemann equations for the following function $e^x(\cos y + i \sin y)$.
18. Obtain the Laurent Series for $f(z) = \frac{1}{(1-z)(z+2)}$ in the domain $1 < |z| < 2$.
19. Solve the partial differential equation $p^2 + qy - z = 0$.

Group C

Answer TWO questions.

2×10=20

20. Solve the differential equation by the method of Laplace transform
 $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 5y = e^{-t} \sin t, y(0) = 0, y'(0) = 1$
- 21(a) Find an analytic function $f(z) = u + iv$, if $u = e^x \sin y$.

Contd. ...

(3)

(b) Find the fourier sine integral of the function

$$f(x) = \begin{cases} x^2 & \text{for } 0 < x < b \\ 0 & \text{for } x > b \end{cases}$$

22. Obtain the 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.

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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.

2×12=24

- 1(a) Write a program to create a class named Employee_Info with data member Emp_Id and Emp_Name. Create another class named Finance_Info from Employee_Info with data member Bas_sal and Ot_sal. Create an independent class Extra_allowances with data Member Tray_All, House_All and Dail All. Now, derive another class named Total_Info from Finance_Info and Extra_allowances with data member Tot_Sal. Make necessary function for the above and show the Gross Salary. 8
- (b) Discuss Function Overloading with example. 4
- 2(a) What is constructor and what are the properties of constructor? Write a program showing the example of Parameterized Constructor. 4+4
- (b) In what circumstances we need to use Exception Handling Mechanism. Discuss with example. 4
- 3(a) List different types operators which cannot be overloaded? WAP to read two strings and concatenate them showing the example of operator overloading. 1+5
- (b) What are the different types of Visibility modes used in Inheritance? Discuss. 6

Contd. ...

(2)

Group B

Answer SEVEN questions.

7×8=56

4. What is a template and why do we use Template in OOP? WAP to swap to variables using Function Template. 3+5
5. What is inheritance? List different types of Inheritance supported in C++. Write an OOP showing multiple inheritance. 3+5
6. Write a program to create a file named "cdplayer.dat" and store cd_id, NameofCd and price of N no. of cd player to the file and read the information from the file and display them. 8
7. What are the different types of type conversion possible in operator overloading? Write a program showing the example of basic to class type conversion. 2+6
8. What is DMA in C++? Write a program showing the example of new and delete operator. 2+6
9. What is Virtual function? Write a program showing the example of virtual function. 2+6
10. What are the different ways of defining members of a class? Discuss with example. How Encapsulation is achieved in C++? 4+4
11. **Write short notes on any TWO:** 2×4=8
 - (a) Early vs Late Binding
 - (b) POP vs OOP
 - (c) Name spaces



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BIT130EC: Electronic Devices & Circuits (New Course)

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

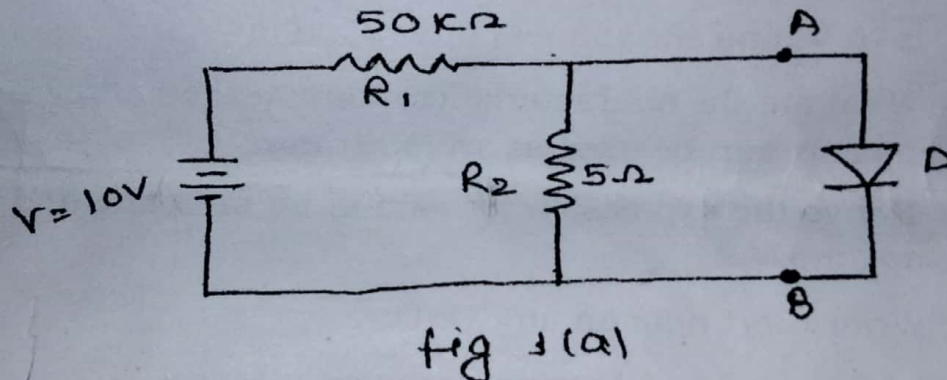
Figure in the margin indicate full marks.

Group A

Answer TWO questions.

2×12=24

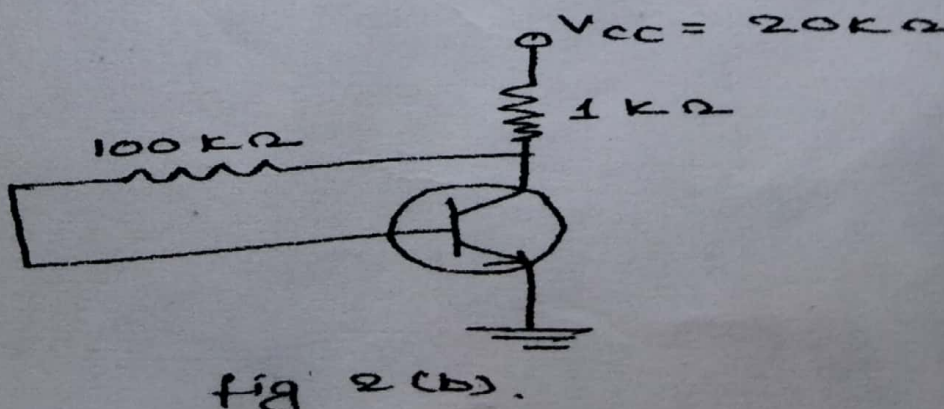
- 1(a) Draw a circuit diagram of a bridge full wave rectifier and explain its operation with waveforms. 8



- (b) Find the current through the diode in the circuit shown in fig. 1 (a). Assume the diode to be ideal. 4

- 2(a) Draw the circuits of a transistor amplifier in CB, CE and CC configurations. Compare the characteristics of these configurations. 8

- (b) Fig 2(b) shows a silicon transistor biased by feedback resistor method. Determine the operating point. Given that $\beta = 100$. 4



Contd. ...

(2)

3. What is feedback in amplifiers? What is Barkhausen criterion for the feedback oscillator? Explain the working of a Weinbridge oscillator with necessary diagram. 2+2+8

Group B

Answer SEVEN questions.

7×8=56

4. / List and explain the various voltage and current controlled sources.
5. / Explain about application of diode as half wave and full wave rectifier.
6. What do you understand by transistor biasing? What is its need?
7. / Explain the construction and working of an N channel E MOSFET.
8. / A JFET has a drain current of 5 mA. If $I_{DSS} = 10$ mA and $V_{GS(off)}$ is -6 V, find the value of (i) V_{GS} and (ii) V_p .
9. / What are the characteristics of an ideal op amp? Explain how an op amp can be used as an integrator.
10. / Derive the expression for gain of an inverting and non inverting op amp.
11. Write short note on any TWO: 2×4=8
 - (a) Forward and Reverse transfer function
 - (b) Voltage divider biasing method for BJT
 - (c) Clipping circuit



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BIT173CO: Digital Logic (New Course)

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

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Group A

Answer TWO questions.

2×12=24

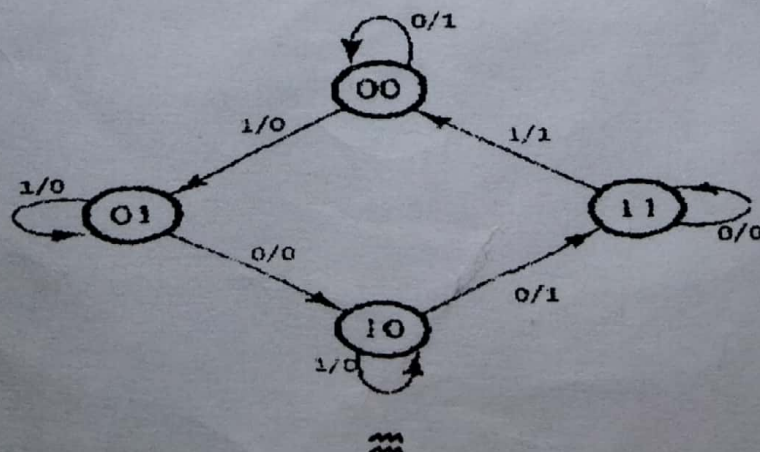
1. Design the 4 bit Synchronous up-down counter with timing diagram, logic diagram and truth table.
2. What is master slave flip-flop? Design its logic circuit, truth table and explain the working principle.
3. Design a 4 bit magnitude comparator.

Group B

Answer SEVEN questions.

7×8=56

4. Design a full subtractor circuit.
5. Describe the three variables K-map with example.
6. Design 3 to 8 line decoder.
7. State and prove De Morgan's theorems.
8. What do you mean by the register? What are the various types of registers?
9. Explain the 4 bit ripple counter and draw a timing diagram.
10. Differentiate between a MUX and a DEMUX using suitable diagrams.
11. Design sequential circuit for given state diagram.



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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.

2×12=24

1. Discuss the importance and objectives of financial management. Why is wealth maximization goal is considered to be superior than profit maximization goal.
2. A company is considering two mutually exclusive projects A and B. Both projects initial cash outlay and regular cash inflow are given below:

Year	Project A	Project B
0	(100,000)	(100,000)
1	30,000	30,000
2	30,000	40,000
3	30,000	20,000
4	30,000	10,000
5	30,000	40,000

Calculate:

- (a) Payback period for both projects.
 - (b) Net present value for both project, going interest rate @ 14%.
 - (c) Which project would you select as per your above calculation?
3. From the following Trial Balance of ABC Trader for the year ended 30th Chaitra 2075 is given below:

Contd. ...

(2)

Particulars	Dr. (Rs.)	Cr. (Rs.)
Opening Stock	1,50,000	
Purchase	8,00,000	
Carriage inward	22,000	
Wages	80,000	
Sales Return	10,000	
Salary	2,50,000	
General Expenses	15,000	
Printing & Stationery	25,000	
Insurance premium	5,000	
Advertisement	30,000	
House Rent	40,000	
Machinery	2,00,000	
Furniture	170,000	
10% Investment	1,50,000	
Debtors	1,20,000	
Cash Balance	156,000	
Building	6,50,000	
Sales		16,00,000
Purchase Return		15,000
Creditors		2,50,000
Capital		8,00,000
Interest Received		8,000
5% Debentures		200,000
Total	28,73,000	28,73,000

Additional Information:

- (i) Closing stock at the end of Chaitra of Rs. 2,00,000

Contd. ...

(3)

- (ii) Depreciate machinery and furniture at 15% and 10% respectively.
- (iii) Further bad debts of Rs. 5,000 and create provision for bad debts on debtors at 5%
- (iv) insurance premium expired to the extent of Rs. 2,000
- (v) Wages outstanding Rs. 10,000

Required:

- (i) Trading Account
- (ii) Profit and Loss Account
- (iii) Balance Sheet

Group B

Answer EIGHT questions.

8×7=56

- 4. "Financial Management is equally important to both manufacturing and service rendering organization" why?
- 5. Explain about different types of dividend distribution policy of an organization.
- 6. What is business entity concept? Why is it important?
- 7. Describe the factors effecting the working capital requirement of a firm.
- 8. Describe the factors affecting capital structure policies of a firm.
- 9. The following transaction are given:
 - Jan 1 Sold goods to Shital for Rs. 60,000
 - Jan 10 Shital returned Rs. 5000 worth of goods being defective.
 - Jan 12 Sold goods for cash to Shital Rs. 40,000
 - Jan 17 Received from Shital Rs. 53,000 in full settlement
 - Jan 21 Received Rs. 20,000 on account from her.
 - Jan 31 Received information that Shital become insolvent and only 50 paise in every rupee was realized.

Required: (i) Journal entries

(ii) Shital Account and Cash Account

Contd. ...

(4)

10. Following transactions are given:

Chaitra 1: Cash balance Rs. 40000 and bank balance Rs. 90000

Chaitra 3 : Goods sold for Rs. 30000 and received cash Rs.

10000 and cheque Rs. 19500 in full settlement

Chaitra 10 : Cash deposited into bank Rs. 12000

Chaitra 16 :Cash paid to Ram Rs. 4500 alter deducting 10% discount

Chaitra 25 :Goods purchased for Rs. 5000 and received 10% discount.

Chaitra 30 : Salary paid Rs. 6000

Chaitra 30 : withdrew from bank of Rs. 10,000 including 2,000 for private use.

Required: Triple Column Cash Book with cash, Bank and discount

11. Following information is given to you.

a. Jestha 1. Opening balance of stock of 1000 units @ Rs. 6

b. Jestha 5. Purchase 500 units @ Rs. 7.

c. Jestha 10. Issued 1200 units.

d. Jestha 15. Return to store 50 units.

e. Jestha 20. Purchased 1000 units @ Rs.8.

f. Jestha 22. Issued 1150 units.

g. Jestha 23. Purchased 500 units @ Rs. 9

h. Jestha 25. Purchased 300 units @ Rs. 10.

i. Jestha27. Issued 1250 units

j. Jestha 28. Defective goods returned to vendor of 30 units.

k. Jestha 29. Stock verifier found shortage of 20 units.

Required: store ledger Account under FIFO Method

12. Write short notes on any TWO:

(a) Annuity

(b) Cash flow statement

(c) Ratio analysis

