PURBANCHAL UNIVERSITY

2019

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 $\frac{dy}{dx} = 3x^2$.
2. Solve $p^2 - 3p + 2 = 0$.
3. Find the Laplace transform of $\frac{\cos 2t}{t}$.
4. Find the residue of $\frac{z}{z^2 - 5z + 6}$ at $z = 3$.
5. Express in Taylor's series of cosz.
6. Define the fourier series ~~of the given funcyion~~.
7. State Cauchy Riemann equation for a analytic function f(z).
8. Test whether (2x - 3y) dx - 3xdy = 0 is exact or not.
9. Write one dimensional heat and wave equation.
10. Define Laplace transform.

Group B

Answer all questions. **8×5=40**

11. Solve $(D-4)^2 y = e^{4x}$.
12. Solve $\frac{dy}{dx} + \frac{2x}{x^2+2} y = \frac{1}{x}$.

Contd. ...

13. Find the laplace transform of $\left(\frac{1-\cos t}{t}\right)$.

14. Find the inverse laplace transform of $\frac{s+1}{(s+2)(s^2+2)}$.

15. Express $f(x)=x-x^2;\pi\le x\le\pi$. in fourier series.

16. Show that by fourier sine integral of $e^{-x}\cos x$ is $\int_0^\infty \frac{w^3\sin wx}{w^4+4}dw$

$=\pi/2\, e^{-x}\cos x$.

17. Express $f(z)=\frac{1}{z^2-3z+2}$ in Laurents series in the region $1<|z|<2$.

18. Show that the function $u(x,y)=3x^2y+x^2-y^3-y^2$ is harmonic function. Find its harmonic conjugate.

Group C

Answer all questions. **2×10=20**

19. Solve using Laplace Transform

$2y''+5y'+2y=e^{-2t};y(0)=1;y'(0)=1.$

20. A homogeneous rod of conducting material of length 100cm has its ends kept at zero temperate and temperature initially is

$f(x)=x;0\le x\le 50$

$=100-x;50\le x\le 100$

Find the temperature $u(x,t)$at anytime.

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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**

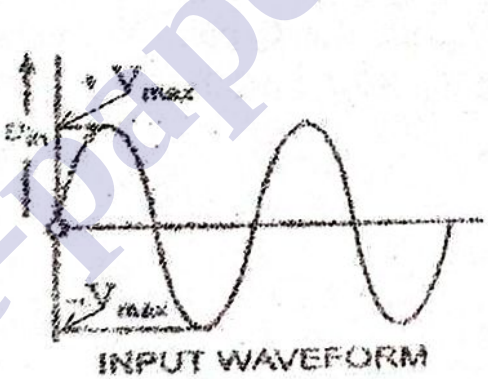
1(a) Explain construction of P-N junction diode and explain V-I characteristics. 3+3

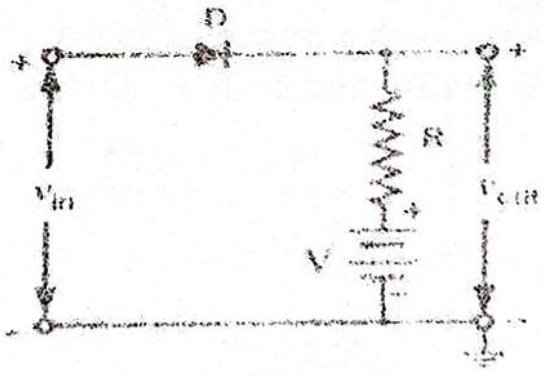
(b) Explain the working of a centre tapped type full wave rectifier with the help of circuit diagram and waveforms. 4+2

2(a) What do you understand by transistor biasing? Why is it necessary to bias a transistor? 3+3

(b) Describe construction, working and characteristics of N-channel JFET. 2+2+2

3(a) Draw the output waveform for the clipping circuit given below. The input is pure sinusoidal waveform as shown in the figure. 3





(b) Explain Ideal and practical characteristics of an OP-AMP. 5

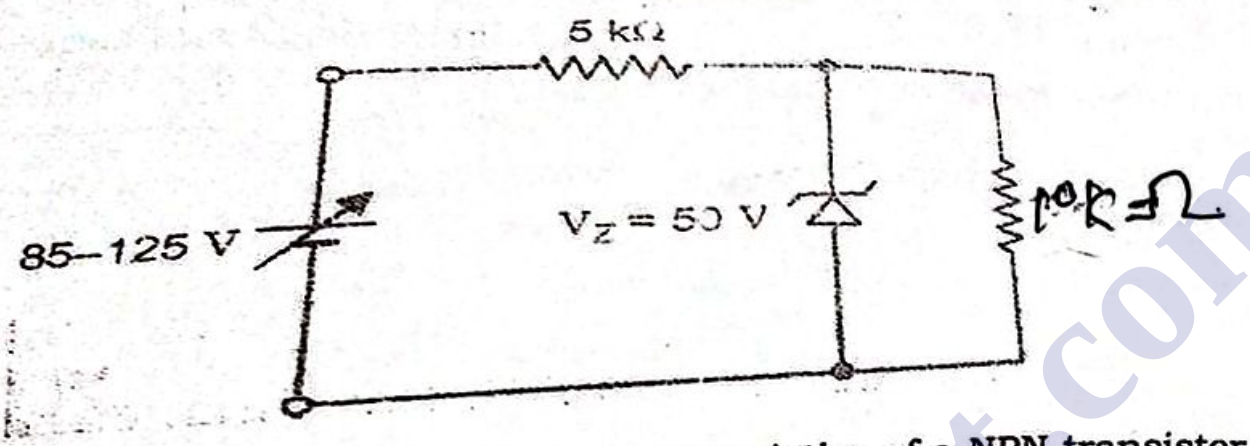
(c) What are the major differences between a BJT and FET. 4

Group B

Answer EIGHT questions. **7×8=56**

4. Discuss about tunnel diode and explain tunneling phenomenon. 7

5. For the zener regulator shown below, find the maximum and minimum current flowing through the zener diode. 4+3



6. Explain input and output V-I characteristics of a NPN transistor in CE configuration with neat sketches. 3+4

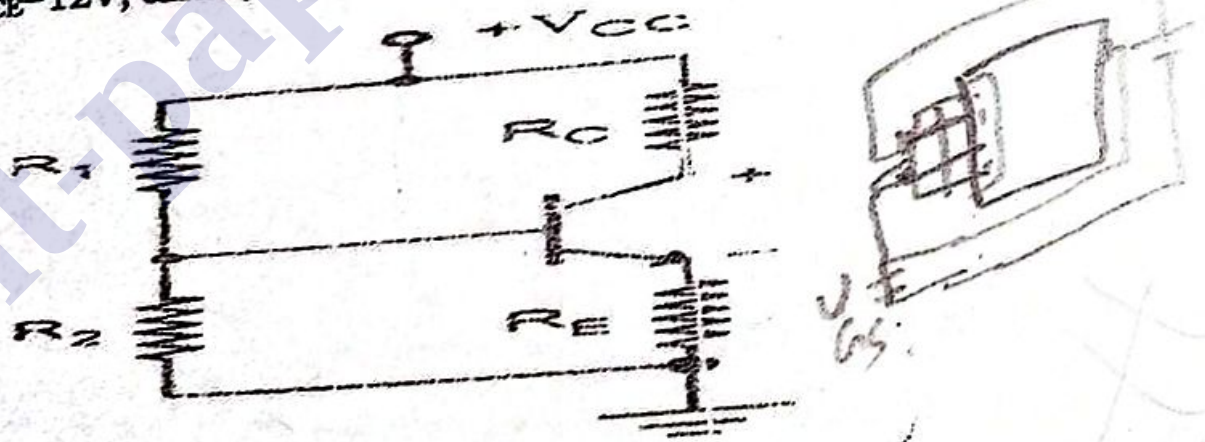
7. Draw the hybrid model of a BJT and define (i) hi (ii) hr (iii) h_f and (iv) h_o. 3+4

8. A BJT has the following parameters;

$h_{ie} = 2k\Omega, h_{re} = 16\times10^{-5}\, h_{fe} = 49$ and $h_{oe} = 50\mu A/V$

Determine the current gain, voltage gain, input resistance and output resistance of the CE amplifier, if the load resistance is 30KΩ. Neglect source resistance. 1+1+2+3

9. A silicon transistor with β=100 is to be used in self-biasing circuit as shown below in such a way that the Q-point corresponds to V_{CE}=12V, and I_c=2mA. Find R_E if V_{cc}=12V, and R_c=5KΩ. 7



10. Draw schematic diagram of a depletion type MOSFET and explain its mechanism of operation. Sketch the drain current-drain voltage characteristics of the device and explain the meaning of threshold voltage. 2+2+3

11. Explain about Wein-bridge oscillator. 7

12. Calculate the output voltage of an op-amp summing amplifier for following sets of voltage and resistors. Use R_f=1MΩ in all cases,

(a) V_1= 1V, V_2=+2V, V_3=+3 V, R_1=500KΩ, R_2=1 MΩ, R_3=1MΩ. 4

(b) V_1=-2V, V_2=+3V, V_3=+1, V, R_1=200KΩ, R_2= 500KΩ, R_3 = 1MΩ. 3

13. Write short note on: 3.5×2=7

(a) Application of OPAMP.

(b) Advantages of Negative Feedback.

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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. **2×12=24**

1. What is magnitude comparator? Design logic circuits for 4 bit magnitude comparator and explain it
2. What is JK master slave flip-flop? Design its logic circuit, truth table and explain the working principle.
3. Differentiate between ROM and PLA with necessary logic diagram.

Group B

Answer SEVEN questions. **7×8=56**

4. Design a half subtractor logic circuit using only NOR gate.
5. Describe the three variables K-map with example.
6. What is combinational logic? What are its important features?
7. What is logic gate? Explain the basic logic gates.
8. State and prove DE Morgan's theorem 1 and 2 with logic; gates and truth table.
9. Explain about SISO shift registers with logic diagram.
10. Differentiate between synchronous and asynchronous counter.
11. Convert the following decimal number into binary, hexadecimal and octal number.

    (a) 1987 (b) 2074

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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. **2×12=24**

1. What is the importance of financial management? Why is wealth maximization goal considered to be superior than profit maximization goal?

2. The following ledger balances of a company given as on 31.12.2002.

Debit	Rs	Credit	Rs
Plant and Machinery	125000	Purchase return	4500
Drawing	40000	Creditors	40000
Land & Building	80000	Provision for doubtful debts	5000
Salaries	32450	Rent received	8000
Cash in hand	21250	Sales	275000
Motor vehicles	53300	Bank overdraft	15500
Investment	48000	Capital	400000
Goodwill	38000	Commission	4000
Sundry debtors	60400	Bills payable	36000
Advertising	20500		
Purchases	140000		
Legal charges	12500		
Carriage in ward	9600		
Wages	23000		
Rent	30000		
Stock on 1. 1.2002	42000		
Sales commission	12000		
Total	788000		788000

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

- Closing stock was valued at Rs 20000
- Depreciate plant and machinery & motor vehicles by 10% per year and appreciate land and building by 5%.
- Create a provision for doubt ful debt @ 5%
- Salary paid in advance Rs 400
- Outstanding wages Rs 5000.

3. Kalika construction Pvt. Ltd is considering investing in project X and project Y in this year's capital budget. The projects are independent. The cash outlay for projects X is Rs 25000 and for project Y is Rs 23000 respectively. The firm's cost of capital is 12% and the net cash flows are as follows:

year	Projects X	Projects Y
	6500	6000
2	6500	6500
3	6500	5500
4	6500	5000
5	6500	6500

Which projects should be selected? Give your decision using NPV and IRR criteria.

Group B

Answer EIGHT questions. **8×7=56**

4. Mr. Messy wishes to determine how much money he will have at the end of five years, if he deposits Rs 1000 annually in a saving account paying 8% annual interest. The deposits will be made at the end of each of the next five years and show the time line.

5. **From the following data calculate:**

- Gross profit ratio
- Current ratio
- Inventory turnover ratio
- Liquid ratio
- Assets turnover ratio
- Net profit ratio

Average inventory	400000
Costs of goods sold	96000
Current liabilities	300000
Fixed assets	720000
Liquid assets	380000
Long term debts	450000
Net profit	180000
Sales	1260000

6. From the following forecasts, prepare the cash budget for the months of April, May and June 2010.

Months	Credit sales Rs	Credit purchases Rs	Wages Rs	Office expenses Rs
February	60000	3500	5000	6000
March	60000	3500	8000	7500
April	70000	3300	10000	7000
May	68000	3500	7500	6500
June	56000	3800	6500	5600

- Cash balance on 1st April 2010 Rs 10000
- Advance tax of Rs 7000 is payable in May.
- Period of credit allowed to customers is one month and by suppliers one months.
- Lag in paymeat of office expenses and wages is one month.

7. Makalu Inc., expects annual sales of 600,000 units, purchased by the firm for Rs 10 per unit. The order cost is Rs 30 and Makalu's carrying cost as a percentage of the inventory value has been estimated @ 20%.

Required:

- What is the economic order quantity?
- How many orders Makalu should place each year?
- What is total cost of EOQ?

8. Enter the following items in two-column cashbook.

- 2010 Jan. 1st-Tarun commenced business with cash Rs 10,000; He pays Rs 2300 for goods bought; Rs 500 for furniture purchased; Rs 400 for office equipment.
- 02- He pays rent Rs 100; pays legal cost Rs 100
- 03- He sells goods for cash Rs 1800
- 04- He sells goods to Nitin on 5 days credit Rs 800
- 05-He pays wages Rs 15; cartage Rs 5
- 06-he buys goods for cash Rs 700 and pays a creditors Sunil Rs 425 in settlement of claim of Rs 430
- 07-He receives cash from Nitin allowing discount Rs 2
- 08-He sells goods for cash Rs 50
- 08-Cash deposited into bank Rs 500

9. What is the concept of time value of money? Explain.
10. What do you understand by dividend policy? Differentiate between stock dividend and cash dividend.
11. Explain the concept of optimal capital structure with suitable example.
12. Outline the rules of debit and credit for both equation rule and account type rule.
13. Discuss about the working capital. Why is it important to a firm?

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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. **2×12=24**

1(a) How data hiding is accomplished? 3

(b) Differentiate between object oriented paradigm and procedural oriented paradigm. 4

(c) Discuss implicit and explicit type conversion with proper examples. 5

2(a) discuss static data member and static member function with proper illustrations. 3

(b) Write a program to illustrate copy constructor. 3

(c) Write a program to add two complex numbers of two different classes. 6

3(a) Give a suitable example for default argument. 5

(b) Create a class named Employee with four data members (ID, name, position, and salary). Using member functions initialize the data members for 3 objects and display information of all three of them. Assume appropriate data types. 7

Group B

Answer SEVEN questions. **7×8=56**

4. Write a program using function template that ask user to enter the 10 elements in the array of type int and float and display the five largest values in ascending order. 8

Contd. ...

5. Write a program to overload binary '+' operator. 8

6. Define function prototype, How function overloading is achieved? Mention advantages of using an inline function. 2+3+3

7. Define pure virtual function and abstract class. Write a program to demonstrate ambiguity in multiple inheritance. 3+5

8. Create a class student that stores name and roll. From this class, derive a class marks that stores marks for 3 subjects. Then from the class marks derive a class record which stores semester and average marks for 3 subjects. Create an object for class record and display name, roll, marks in 3 subjects, semester, and average marks for a student. Assume appropriate data types. 8

9. Write a program to demonstrate writing an object to a data file and reading it back. 8

10. Mention features of this pointer. Write a program to demonstrate use of constructor in derived class. 2+6

11. Write short notes on any TWO: 2×4=8

(a) Namespaces

(b) Exception handling

(c) Basic functions of seekg( ), seekp( ), tellg( ), tellp( )