PURBANCHAL UNIVERSITY
2018

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. State the order and degree of the differential equation $\sqrt{\frac{d^3y}{dx^2}} = \frac{dy}{dx}$.

2. Show that $(xe^{xy} + 2y)\frac{dy}{dx} + ye^{xy} = 0$ is exact differential equation.

3. Solve $(x+1)dy + (y-1)dx = 0$.

4. Find the Laplace transform of t sin t.

5. Find the inverse Laplace transform of $\frac{1}{s(s+4)}$.

6. Define odd and even function.

7. Obtain a partial differential equation by eliminating, a and b from the relation $z = (x-a)^2 + (y-b)^2$.

8. Show that the derivative of $f(z) = \bar{z}$ does not exist everywhere.

9. What is singularity? Write its types.

10. Find the points at which the function $f(z) = \frac{\cos z}{z^2+1}$ is not analytic.

Contd

Group B

Answer EIGHT questions. **8×5=40**

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

12. Find the complete solution of the differential equation.

$$\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 4y = e^{3x} + \cos 5x.$$

13. Define Laplace transform and find the Laplace transform of

(a) $3Cos2t - \sin 2t$ (b) $3t^2 + 2e^{-t}$

14. Find the inverse laplace transform of $\frac{1}{(s-2)(s-3)^2}$.

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

16. Find the Fourier series for the function defined by

$$f(x) = \begin{cases} 1; 0 \le x \le \pi \\ -1; \pi \le x \le 2\pi \end{cases}$$

17. Solve: $\frac{\partial^2 u}{\partial x^2} + 4\frac{\partial^2 u}{\partial y^2} = 0$.

18. Write Cauchy- Riemann equations and verify them for the function $f(z) = z^2$.

19. Find an analytic function whose real part is $u(x,y) = e^x$ (x Cosy - y siny).

20. Find the Laurent series of $\frac{1}{(1-z)(z+2)}$.

Group C

Answer FOUR questions. **4×5=20**

21. Solve: $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 4y = e^x \sin x$.

22 Find the general solution using laplace transform of the differentiation equation $y''(t) + 9y(t) = \cos 2t$ with initial conditions $y(0)=1$ and $y'(0) = 0$.

23. Expand $f(x)=x$ as a cosine series in the interval $(0,\pi)$ and hence deduce $1+\frac{1}{3^2}+\frac{1}{5^2}+\ldots=\frac{\pi^2}{8}$.

24. A rod 1-cm long with insulated lateral surface is initially at temperature 0°C throughout. If one end is kept at 0°C and the other at 100°C, find the temperature $u(x,t)$ where x is measured from the end at 0°C.

25. Find the Residue of $f(z)=\frac{\cos z}{z^3}$ at its poles.

PURBANCHAL UNIVERSITY

2018

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. **2×12=24**

1. Prove the Universality of NAND & NOR Gates. Implement the Boolean Function F = XY + X'Y' + Y'Z using Only NAND gates 12

2. Perform a complete design of a BCD to Excess - 3 Code Convertor. 12

3. Design a synchronous counter using J-K Flip Flop's that has following sequence: 000, 001, 010, 011, 100 and repeat. The undesired (Unused) States 101, 110, 111 must always go to 000 on the next clock pulse. 12

Group B

Answer SEVEN questions. **7×8=56**

4. Perform the following conversions:
   (a) $(101110101)_2 \rightarrow (?)$ excess 3 code.
   (b) $(175.175)_{10} \rightarrow (?)_2$.
   (c) $(B2F.35)_{16} \rightarrow (?)_{10}$.
   (d) $(888.0625)_{10} \rightarrow (?)_8$

5. Simplify the Boolean function in (a) Sum of Product and (b) Product of Sum $F(A,B,C,D) = \Sigma(0,1,2,5,8,9,10)$.

6. A combinational circuit having three inputs generates the High output only when the majority of inputs are High and the Output remains low if the majority of inputs are Low. Preform the combinational logic circuit design following the design procedure.

7. Describe 2 bit Magnitude Comparator with logic circuit.

8. State & Prove De-Morgan's Theorem and verify [illegible] truth table.

9. What are adders? Use truth tables and K-maps, show a full adders that can be realized using only half adder and an OR gate.

10. Design a combinational circuit using a ROM. The Circuit accepts a 3 bit number and generates an output binary number equal to the square of the input number.

11. Explain the concept of a Flip flop as a basic memory element. Differentiate between synchronous & Asynchronous sequential with example.

12. Describe T Flip flop with logic diagram, graphic symbol, characteristic table and characteristic equation.

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Group A

Answer TWO questions. **2×12=24**

1(a) Differential between combinational and sequential logic with example. 4

(b) Define half adder. Design full adder using two half adder and OR gate. 8

2. What is magnitude comparator? Design a 4-bit magnitude comparator with necessary logic diagram and explain it. 12

3. What do you mean by shift registers? With necessary diagrams explain the various types of shift registers. 12

Group B

Answer SEVEN questions. **7×8=56**

4. Perform the following conversions:
   (a) $(0.95)_{10} = (....)_8$.
   (b) Add +32 with -50 using 2's compliment method.
   (c) $(725.63)_8 = (....)_{16}$.
   (d) $(1011001001.0011100101)_2 = (....)_{16}$

5. Why NAND and NOR gates are known as universal gate? Implement the following expression using NAND gate only: $F(W,X,Y,Z) = \Sigma m(1,2,7,11,15) + \Sigma d(0,3,5)$.

6. What do you mean by mm-term and max-term? State the De-morgan theorem and Duality theorem.

7. Implement the following Boolean expression using combinational circuit.

8. Define flip-flop. Explain the working of RS flop-flop.

9. Design a circuit which can perform both parallel addition and subtraction.

10. Design a combinational circuit that accepts 3 bit binary number and generates an output binary which is square the input number.

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

(a) Master-slave flip-flop

(b) Multiplexer

(c) IC digital logic families

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Group A

Answer TWO questions. **2×12=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 $A \oplus B \oplus C \oplus D = \Sigma (1, 2, 4, 7, 8, 11, 13, 14)$. 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. **7×8=56**

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

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

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

(c) $(33.2)_{16} = (?)_{10}$

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

(i) SOP (ii) POS.

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

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

(b) What do you mean by register and shift regi... 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 $\overline{\overline{AB} + \overline{A} + AB} = 0$ 3

(b) What is PLA? Explain why is it superior than ROM for implementing don't care conditions. 5

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BIT102SH: Mathematics-II *(New Course)*

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Group A

Answer ALL questions. **10×2=20**

1. Solve the equation $(x^2+1)\,dy/dx = 1$.

2. Solve $p^2-7p+12=0$ where $p = dy/dx$.

3. Solve $\frac{d^2y}{dx^2} - a^2y = 0$.

4. Form partial differential equation by eliminating arbitrary constant from the relation $z=(x-c_1)^2+(y-c_2)^2$.

5. Find the laplace transform of $\left(\frac{1}{t}\sin t\right)$.

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

7. Define fourier cosine series.

8. Find the real and imaginary part of $f(z)=\log z$.

9. Derive residue of complex function.

10. Show that $\int_c \frac{z^2}{z-2}dz = 0$, where c is the unit circle $|z|=1$.

Group B

8×5=40

Answer EIGHT questions.

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

12. Solve $(D^2-2D+5)y=e^{2x}$.

13. Show that $u=e^{-x}(x\sin y-y\cos y)$ is harmonic and find corresponding analytic function.

14. Find the pole and residue of the function $f(z)=\frac{2z-3}{z^3+3z^2}$.

15. Find the laplace transform of $\frac{1}{t}(e^{-at}-e^{-bt})$.

16. Find the inverse laplace transform of $f(s)=\frac{s+2}{(s^2+4s+5)^2}$.

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

18. Find the general solution of 1st order partial differential equation $xp+zq=y$.

19. Solve the differential equation: $\frac{d^2y}{dx^2}+5\frac{dy}{dx}+6y=0$

Group C

2×10=20

Answer TWO questions.

20. Solve the wave equation $\frac{\partial^2u}{\partial t^2}=c^2\frac{\partial^2u}{\partial x^2}$ under the condition $u(0,t)=0$, $u(\bar{\lambda},t)=0$ $\left(\frac{\partial u}{\partial t}\right)_{t=0}=u_t(x,0)$ and $u(x,0)=x$, $0<x<\bar{\lambda}$.

21. Solve by the method of laplace transform, the equation $y''+4y'+3y=e^{-t}$ with the given conditions $y(0)=y$

22. Find the Fourier integral of the function $f(x) = \cos x \quad for \quad |x| < \pi/2$

$= 0 \quad for \quad |x| > \pi/2$

and show that $\int_0^\infty \frac{\cos(W\,\pi/2)\cos wx}{1-w^2}\,dw = \pi/2 \cos x \quad \text{for} \quad |x| < \pi/2$

$= \quad 0 \quad \text{for} \quad |x| > \pi/2$

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BIT102SH: Mathematics-II

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Group A

Answer ALL questions. 10×2=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 $\frac{s+3}{(s+3)^2+4}$.
6. Define the Fourier integral of $f(x)$.
7. Find general solution of $ap+bq=c$ where $p=\frac{\partial z}{\partial x}$, $q=\frac{\partial z}{\partial y}$
8. Find the real and imaginary part of sin2.
9. Derive a partial differential equation by eliminating constant a and b from the relation $z = axy + b$.
10. Find the residue of $f(z)=\frac{Cosz}{z^3}$.

Group B

Answer EIGHT questions. **8×5=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 $(D^2-2D+5)y=e^x$.

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. **2×10=20**

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

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

$= \frac{2k(l-x)}{2}$; $l/2 < x < l$

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

22(a) The differential equation of closed circuit containin Resistance R, an inductance L and a battery which supp 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 take i to reach one-half of its final value.

(b) Find the orthogonal trajectories of the circle r = C cos θ.

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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. Define the concept of financial management? Explain its objectives.

2. 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.

3. 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	85000

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 interest 6%)	50000
Sundry debtors	40000	Sundry creditors	19000
Bad debts reserve	800	Cash	12200
Establishment	6000	Misc. receipts	1200
Patents	4800		

After making the following adjustments prepare a trading and profit and loss account for the year ended 31st Dec. 2016 and balance sheet as on that date.

(a) Stock on 31st Dec. 2016 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 1.4.2016 and no interest has been received so far.

Group B

Answer EIGHT questions. **8×7=56**

4. The following particulars are available:

Annual need	: 12000 units
Cost of material per unit	: Rs. 40
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 f June 2005 on the basis of data given below.

(a) Sales:

February 2016	Rs. 26000
March 2016	Rs.22000
April to June 2016	Rs. 32000 per month

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

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

(c) Wages and salaries for second quarter were budgeted at 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 (in April and May only)

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

Calculate

- Inventory turnover
- Gross profit ratio
- Net profit ratio
- Average age of inventory

Cont

7. The Himalayan Company limited is attempting to determine the most it should pay to purchase a particular annuity. The firms requires 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.

8. Prepare a petty cashbook on imprested system from the following transactions:

2016, June 1	Received for petty cash payments Rs. 500
June 2	Paid for postage Rs. 40
June 5	Paid for stationery Rs. 25
June 8	Paid for advertisement Rs. 50
June 12	Paid for wages Rs. 20
June 16	Paid for carriage Rs. 15
June 20	Paid for conveyance Rs. 22
June 25	Paid for travelling Rs. 80
June 27	Paid for postage Rs. 50
June 28	Paid for office clearance Rs. 10
June 30	Paid for telegrams Rs. 20
June 30	Sent registered notice to landlord Rs. 3

9. 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 examples.

12. Discuss about cash flow statement and its importance.

13. Write short notes on any TWO:
    (a) Inventory management
    (b) Stock split and stock dividend
    (c) Business and financial risk
    (d) Profit Vs. wealth maximization

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BIT191MS: Financial Management & Accounting *(New Course)*

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Group A

Answer TWO questions. **2×12=24**

1. A Company is considering the purchase of a machine. Two machines are available and each machine costing Rs. 10,000 Each machine has expected life of 4 years. The cost of capital is 12%. Net cash flow during the expected life of the machinery is given below.

Year	Machine A	Machine B
1	Rs.4500	Rs.3500
2	3500	3500
3	3500	3500
4	3000	3500

Required: (a) Net present value (b) The internal rate of return
(c) Payback period.

2. Define Financial Management. Briefly explain about the objectives of financial management.

3. Given below is the trail and balance of a Raj and Brothers as on 30th chaitra 2072::

Particulars	Debit (Rs)	Credit(Rs)
Capital B/S		300,000
Purchase T	400,000	
Opening Stock T	350,000	
Purchase return T		10,000
Sales T		690,000
Sales return T	10,000	

Carriage outwards	10,000	
Debtors	42,000	
Creditors		30,000
Advertisement Expenses	4,000	
Discount	2,000	
Insurance paid	10,000	
Salaries paid	65,000	
10% bank loan		80,000
Interest on bank loan	4,000	
General Expenses	20,000	
Wages	40,000	
Carriage inward	8,000	
Furniture	50,000	
Rent paid	40,000	
Bank and cash balance	55,000	
Total	11,10,000	11,10,000

Additional Information:

(a) Closing stock Rs. 3,75,000

(b) Bad debts Rs 2000.

(c) Provide reserve for bad debts 5% on debtors.

(d) Advance salaries paid Rs 5000.

(e) Outstanding wages Rs. 2000.

(f) Bank loan was taken at the beginning of the year.

(g) Depreciation on furniture at 10% p.a.

Required:

(a) Trading Account (b) Profit and loss Account

(c) Balance Sheet as on 30th Chaitra 2072.

Group B

8×7=56

Answer EIGHT questions.

Show the accounting equation on the basis of following transactions:-

(a) Commenced a business with bank balance Rs. 80,000.

(b) Paid [illegible] by cheque Rs. 5000.

(c) Withdraw from bank for office use. 2000.
(d) Purchased goods from Srijana of Rs. 10,000.
(e) Cash drew from bank for private use Rs. 4000.
(f) Purchase machinery for cash Rs. 30,000.
(g) Rent received Rs 5000 and still to be received Rs 2000.

5. What do you mean by time value of money? Explain its importance.

OR

Following are the information rating to a firm:

Annual requirement - 60,000 units
Ordering cost per order - Rs. 300
Cost per unit – Rs. 20
Carrying cost per unit 20% of average inventory

Required:

(a) EOQ (b) No. of order (c) Total cost of EOQ

6. The following is provided:

Inventory	Rs. 30,000	Bill receivable	10,000
Creditors	Rs. 20,000	Fixed assets	50,000
Debtors	Rs. 250,000	Debtor turnover ratio	6 times
Cash in hand	Rs. 5,000	Gross profit	20,000

Required:

(a) Current ratio (b) Quick ratio
(c) Sales amount (d) Fixed assets turnover ratio

7(a) You will require Rs 1000 in 6 years. If you earn 7% interest on your funds, how much will you need to invest today in order to reach your saving goal?

(b) Which amount is worth more at 14 percent: Rs 7000 in hand today or Rs. 14000 due in six years?

8. The balance sheet and income statement of a company ltd are as under:

Liabilities	2013	2014	Assets	2013	2014
Share Capital	100000	200000	Plant & machinery	160000	200000
Share Premium	10000	20000	Investments	30000	60000
10 % debenture	50000	-	Account receivable	50000	40000
Bills payable	30000	20000	Inventory	10000	25000
Account payable	40000	70000	Cash at Bank	30000	50000
P/L Account	70000	90000	Prepaid Expenses	20,000	25,000
	3,00,000	**4,00,000**		**3,00,000**	**4,00,000**

Additional Information:

Contd. ...

(a Sales Revenue Rs.3,00,000.

(b) Cost of goods sold Rs.2,00,000.

(c) Administrative & other operating cost Rs15,000.

(d) Debenture Interest Rs.5,000.

(e) Depreciation on Plant and Machinery Rs.30,000.

(f) Plant having Book value 30,000 sold at a loss Rs.5,000.

(g) Dividend paid Rs.25,000.

(h) Plant Purchased during the period Rs.1,00,000.

Required: Cash flow from operating activities.

9. Consider the following transactions:

May 1 Started a business with cash Rs 40,000 and Furniture Rs. 25,000.

2 Cash deposited into bank Rs. 50,000.

11 Goods purchased from Nivan of Rs.15000.

18 Sold goods to Ram on credit for Rs. 1000.

25 Cash received from Ram Rs 900 in full settlement of Rs. 1000.

28 Cash paid to Nivan Rs.14500 in full settlement of his account.

Required: Double column cash book

10. A Ltd. Company prepares business budget to exercise control over operations. The sales figure and purchase figure for recent month and expected for next month are as follows:

Months	Sales	Purchase
Baishakh	Rs. 200,000	
Jestha	Rs.300,000	Rs.175,00
Ashad	Rs.350,000	Rs.300,000

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Group A

Answer TWO questions. **2×12=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 (1.4.20 10) 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%.

Contd. ...

- 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 you result.

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

Group B

Answer SEVEN questions. **7×8=56**

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 Rs 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 deducting discount at 5%.

(e) He received a cheque of Rs. 30 less 5% discount from Gopal

(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

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

7. 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.

8. 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	45000
Maximum	2	20000	40000
	3	30000	20000
	4	45000	10000
	5	55000	30000

9. What are the factors effecting dividend policy? Explain.

10. What do you understand by optimum capital structure? Explain.

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

12. Briefly explain the cash flow management.

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

PURBANCHAL UNIVERSITY

2022

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

Time: 03:00 hrs. Full Marks: 60/Pass Marks: 24

BIT154CO/BIT176CO/BIT124CS: Object Oriented Programming in C++ *(New/Old)*

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. List and explain different types of operators in C++. Explain function overloading with a suitable program. 5+7

2. What is constructor? List and explain the different types of constructors supported by C++ with examples. Explain destructor with an example. 2+8+2

3(a) What do you mean by class and object? Create a class named Employee with four data members (*ID, name, position, and salary*). Write a program with member functions: one that initializes necessary data members and another that displays employee's information. 2+6

(b) Explain inline function with example. 4

Group B

Answer ~~SEVEN~~ SIX questions. 6×6=36 ~~7×8=56~~

4. What do you mean by inheritance? Explain types of inheritance with example. 2+6

5. Write an object-oriented program to initialize an integer array of size 10 and find sum and average of array elements.

6. Write a program to add two strings "Hello" and "World" overloading binary '+' operator.

Contd. ...

7. Write a program to demonstrate conversion from one class to another class.

8. What is container class? Write a program using function template to find the largest number among given three numbers. 2+6

9. What is abstract base class? Explain virtual function and polymorphism with example. 2+6

10. Differentiate between public, protected and private class members with example.

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

(a) 'this' operator

(b) Class template

(c) Encapsulation

PURBANCHAL UNIVERSITY

2022

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

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

BIT151HS: 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. Evaluate the double integral:

$$\int_0^2 \int_1^2 (x^2 + y^2)dx\,dy$$

2. Define Taylor's theorem and Laurent's series.
3. Determine the order and degree of the differential equation:

$$\sqrt{\frac{d^3y}{dx^3}} = \frac{dy}{dx}$$

4. Solve: $(x+1)dy+(y-1)dx=0$.
5. Find the general solution of the differential equation: $y'' + 4y'-5y = 0$.
6. Define odd and even function with examples.
7. If $f(z)$ is differentiable at z_0, then show that $f(z)$ is continuous at $z = z_0$.
8. Express the function $f(z) = z^2$ in the form of $f(z) = u(x,y) + iv(x,y)$.
9. Define isolated singularity with example.
10. Show that the function.

$$f(z) = \frac{z^2 - 2z + 5}{z - 2}$$

has a simple pole at $z = 2$.

Contd. ...

Group B

Answer EIGHT questions. 8×5=40

11. Find by double integration, the area which lies inside the cardoid $r = a(1+\cos\theta)$ and outside the circle r = a.

12. Solve:

$$\frac{dy}{dx} = \frac{x^2 + xy + y^2}{x^2}$$

13. Find the orthogonal trajectories of the family of curves given by

$$y = kx^2 ; \quad k \neq 0$$

14. Solve:

$$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = 2x + x^2$$

15. Find the Fourier series for the function defined by:

$$f(x) = \begin{cases} 1 & \text{for } 0 \leq x \leq \pi \\ -1 & \text{for } \pi \leq x < 2\pi \end{cases}$$

16. Expand f(x) = x as a cosine series in the interval $0 \leq x \leq \pi$ and hence show that

$$1 + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$$

17. State and prove Cauchy-Riemann equation.

18. Expand $f(z) = \frac{1}{z}$ by Taylor's series about the point z=1.

19. Show that:

$$f(z) = \frac{1 - e^{2z}}{z^3}$$

has a pole of order 2 at z = 0.

20. Find the residue of:

$$f(z) = \frac{3z - 4}{z(z-1)(z-2)}$$

Contd. ...

Group C

Answer FOUR questions. 4×5=20

21. Find the volume bounded by the sphere $x^2 + y^2 + z^2 = a^2$ using triple integral.

22. Solve:

$$\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 4y = e^{3x} + \cos 5x$$

23. Find the Fourier transform of the function

$$f(x) = \begin{cases} 1 - x^2, & \text{for } -1 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

24. Show that $u=e^x \cos y$ is harmonic and find an analytic function.

25. Obtain the Laurent series of the function

$$f(z) = \frac{\sin z}{z^6}$$

and hence show that

$$\int_C \frac{\sin z}{z^6} dz = \frac{1}{60}\pi i$$

where C is the circle $|z| = 2$ taken in the counter-clockwise sense.