Dr. SNS RAJALAKSHMI COLLEGE OF ARTS AND SCIENCE (Autonomous)
Accredited by NAAC (Cycle-IV) with 'A+' Grade,
(Recognized by UGC & Approved by AICTE, New Delhi and Affiliated to Bharathiar University, Coimbatore)
486, Thudiyalur-Saravanampatti Road, Chinnavedampatti (Post), Coimbatore - 641 049.

Subject: SUPPORTIVE / ALLIED MATHEMATICS-2: BUSINESS CALCULUS AND FINANCIAL COMPUTATION **Code:** 21UCR304

QUESTION AND ANSWER
UNIT: 1

1. Evaluate $\lim_{x\to 0} \frac{2x^3+4x^2+2}{3x^3-2x^2-3}$
2. Evaluate $\lim_{x\to 0} \frac{3x^3+5x^2-7x+2}{2x^3+6x^2+2x-3}$
3. Find $\lim_{x\to 3} \frac{x^2+x-12}{x^2-x-6}$
4. Find $\lim_{x\to 5} \frac{x^2-16}{x-4}$
5. Find $\lim_{x\to 5} \frac{x^2-25}{x-5}$
6. Find $\lim_{x\to \infty} \frac{x^2-3x+9}{x^3-x+5}$
7. Find $\lim_{x\to 5} \frac{(x-2)(x-1)}{x-4}$
8. Find $\lim_{x\to 6} \frac{(x-3)(x-2)}{x-4}$
9. Evaluate $\lim_{x\to 2} \frac{x^2-5x+6}{x^2-4}$
10. Find the derivative of $(i)y = 10x^5 - 3x^2 + logx - e^x \quad (ii)y = 5e^x - logx + \sqrt{x}$
11. If $y = \sqrt{x} + x^{-3} + e^x + \log x. \, find \frac{dy}{dx}$
12. Find the derivative of $y = (x^2 + 5)(3x + 1)$
13. Find the derivative of $y = \frac{3x^2}{4x-1}$
14. Evaluate $\lim_{x\to 2} \frac{3x^2-2x-8}{5(x-2)}$
15. Evaluate $\lim_{x\to \infty} \frac{x^2+x-2}{x^2+x+10}$
16. Evaluate $\lim_{x\to \infty} \frac{3x^3+4x^2}{x^2+2x}$
17. Evaluate $\lim_{x\to \infty} \frac{2n^2+3n+5}{-5n^2+7n+9}$
18. Evaluate $\lim_{x\to 2} \frac{x^2-5x+6}{x^2-4}$
19. Evaluate $\lim_{x\to 3} \frac{x^2-5x+6}{x^2-9}$
20. Differentiate $y = log\sqrt{2x+3}$ with respect to x .
21. Find the derivative of $y = (1 + 3x^2)(2x^3 - 1)$
22. Find the derivative of $y = \frac{x^3+x^2+3}{x^2}$
23. Find the derivative of $(i)y = (2x + 3)(3x + 2) \quad (ii)y = (x^2 + 3)(x + 7)$
24. Find the derivative of $(i)y = (x + 5)(3x - 2) \quad (ii)y = (x^2 - 3)(x + 2)$
25. Find the derivative of $(i)y = (x^2 - 16x) \quad (ii)y = x^5 - 3x^3 - 4x - 11$
26. Find the derivative of $(i)y = (x^2 - 7)^2 \quad (ii)y = x^3 - 3x^2 + 4x + 3$
27. Find $\lim_{x\to a} \frac{\sqrt{3a-x}-\sqrt{x+a}}{x-a}$

28. Find $\lim_{x\to 0} \frac{1-\sqrt{1-x^2}}{x^2}$

29. Find $\lim_{x\to 1} \frac{\sqrt{3-x}-\sqrt{x+1}}{x-1}$

30. Find $\lim_{x\to 9} \frac{x^2-5x-36}{x-9}$

Dr. SNS RAJALAKSHMI COLLEGE OF ARTS AND SCIENCE (Autonomous)
Accredited by NAAC (Cycle-IV) with 'A+' Grade,
(Recognized by UGC & Approved by AICTE, New Delhi and Affiliated to Bharathiar University, Coimbatore)
486, Thudiyalur-Saravanampatti Road, Chinnavedampatti (Post), Coimbatore - 641 049.

Subject: SUPPORTIVE / ALLIED MATHEMATICS-2: BUSINESS CALCULUS AND FINANCIAL COMPUTATION **Code:** 21UCR304

QUESTION AND ANSWER
UNIT: 2

1. Evaluate $\int (x + \frac{1}{x})^2 \ dx$
2. Integrate $\frac{x^3-x+4}{x^2}$ with respect to x .
3. Evaluate $\int_0^2 x^2 - 4x + 5 \ dx$
4. Evaluate $\int_1^3 2x^2 + 7 \ dx$
5. Integrate $\sqrt{5x+3}$ with respect to x by method of substitution
6. Evaluate $\int e^{10x}$ with respect to x by method of substitution
7. Evaluate $\int e^{7x}$ with respect to x by method of substitution
8. Evaluate $\int (x^3 + 3x + 4) dx$
9. Evaluate $\int (x^5 - x^2) dx$
10. Evaluate $\int xe^{mx} \ dx$ by integrate by parts
11. Evaluate $\int x^2 e^x \ dx$ by Integration by parts .
12. Evaluate $\int_0^5 [\sqrt{x} - 2e^x] \ dx$
13. Evaluate $\int_0^1 [3x^2 + 8x - 5] \ dx$
14. Evaluate $\int \frac{x}{2x^2-3} \ dx.$
15. Evalute $\int_0^3 [x^2 + 2x + 8] \ dx$
16. Evalute $\int_0^2 [x^3 + 4x^2 - 5x - 6] \ dx$
17. Evaluate $\int xe^x \ dx$ by Integration by parts
18. Evaluate $\int_0^1 (2x^3 - x^2 + 10) \ dx$
19. Evaluate $\int_0^4 [\sqrt{x} + e^x] \ dx$
20. Evaluate $\int x \ log \ x \ dx.$
21. Prove the integral by using substitution method $\int \frac{x}{1+x^2} \ dx = \frac{1}{2} log(1 + x^2)$.
22. Evaluate $\int x^3 e^x \ dx.$ by integration by parts

Dr. SNS RAJALAKSHMI COLLEGE OF ARTS AND SCIENCE (Autonomous)
Accredited by NAAC (Cycle-IV) with 'A+' Grade,
(Recognized by UGC & Approved by AICTE, New Delhi and Affiliated to Bharathiar University, Coimbatore)
486, Thudiyalur-Saravanampatti Road, Chinnavedampatti (Post), Coimbatore - 641 049.

Subject: SUPPORTIVE / ALLIED MATHEMATICS-2: BUSINESS CALCULUS AND FINANCIAL COMPUTATION **Code:** 21UCR304

QUESTION AND ANSWER
UNIT: 3

1. If the demand function is $P = 4 - 5x$ for what value of x will elasticity of demand be unitary?
2. If the demand function is $P = 2 - 3x$ for what value of x will elasticity of demand be unitary?
3. Find the elasticity of supply from the supply function $p = 2x^2 + 3 when x = 3$
4. Find the elasticity of supply from the supply function $P = -2 + 5x$.
5. Find the average cost and marginal cost function from the total cost function $T = 60 + 10x + 15x^2$.
6. Find the average cost and marginal cost function from the total cost function $T = 30 + 15x + 5x^2$.
7. The marginal cost function for producing x units in $y = 23 + 16x - 3x^2$ and the total cost for producing x unit is 40 .Obtain the total cost function and the average unit function .
8. The demand curve for a monopolist is given by x = 100 - 4p , Find total revenue , avarage and marginal revenue.
9. The demand curve for a monopolist is given by x = 150 - 5p , Find total revenue and avarage revenue.
10. Find elasticity of demand$q = 32 - 4p - p^2 when p = 3$
11. If the demand law is $x = \frac{20}{P+1}$. Find the elasticity of demand at the point when $P = 3$
12. Find the marginal revenue and average revenue when x=10 from the revenue function $Y = 32x - x^2$
13. If the demand law is $x = \frac{20}{P+1}$. Find the elasticity of demand at the point when $P = 5$
14. Calculate consumer's surplus if the demand function $p = 50 - 2x$ and x=20
15. Find the total and average cost function of the firm when its fixed cost is Rs.500. The marginal cost of a product having output of q units is $90 - 12q + 0.3q^2$.
16. If the demand function of a commodity is $P = 36 - x^2$, find the consumers surplus for $P_0 = 11$
17. If the supply function of a commodity is $P = 2q + 1$, find the producers surplus for $P_0 = 9$
18. A firm produces x units of output at a total cost $C(x) = \frac{1}{10}x^3 - 9x^2 + 85x + 17$. .Find the average cost , average variable cost and average fixed cost. Find the value of these at the level of output of 10 units.
19. If the marginal revenue function of a firm is $\frac{e^x}{100} + x + x^2$. ,find the total revenue function.
20. Find the producers surplus for $P_0 = 11$ if the supply function of a commodity is $P = 2q + 1$,
21. If C(X) rupees is the total cost of manufacturing x toys and $C(x) = 500 + \frac{50}{x} + \frac{x^2}{10}$, find the average cost and the marginal cost when x=20
22. The marginal cost of a product having output of q units is $90 - 12q + 0.3q^2$. Find the total and average cost function of the firm when its fixed cost is Rs.200
23. If C(X) rupees is the total cost of manufacturing x toys and $C(x) = 500 + \frac{50}{x} + \frac{x^2}{10}$, find the average cost and the marginal cost when x=10

Dr. SNS RAJALAKSHMI COLLEGE OF ARTS AND SCIENCE (Autonomous)
Accredited by NAAC (Cycle-IV) with 'A+' Grade,
(Recognized by UGC & Approved by AICTE, New Delhi and Affiliated to Bharathiar University, Coimbatore)
486, Thudiyalur-Saravanampatti Road, Chinnavedampatti (Post), Coimbatore - 641 049.

Subject: SUPPORTIVE / ALLIED MATHEMATICS-2: BUSINESS CALCULUS AND FINANCIAL COMPUTATION **Code:** 21UCR304

QUESTION AND ANSWER
UNIT: 4

1. A project is expected to provide the cash flows indicated below.would you invest rs.100000 in this project if the cost of capital is j1=7 ○/○

$$\begin{pmatrix} yearend & 1 & 2 & 3 & 4 \\ cashflow & 40000 & 25000 & 35000 & 30000 \end{pmatrix}$$

2. A project is expected to provide the cash flows indicated below.would you invest rs.100000 in this project if the cost of capital is j1=14 ○/○

$$\begin{pmatrix} yearend & 1 & 2 & 3 & 4 \\ cashflow & 40000 & 25000 & 35000 & 30000 \end{pmatrix}$$

3. An investor is presented with projects ,A with the following end of year cash flows.project requires an investment of Rs.200000. if j1=6 ○/○

$$\begin{pmatrix} YEAR & 1 & 2 & 3 & 4 \\ PROJA & 80000 & 70000 & 60000 & 35000 \end{pmatrix}$$

4. A company is considering whether or not to develop a mine site.It will take a capital investment of Rs. 14000000 to starat a mining production.The mine is expected to produce Rs. 3400000 of profits from the ore each year for 10 years.At that time (that is,at the end of 11 years) an expenditure of Rs. 6400000 will be needed to bring the site to environmental standards.If the company wishes to earn j1=20 ○/○what should they do?

5. A certain machine costs Rs. 25000 and lasts 6 years ,after which time it has a scrap value value of Rs. 5000.Annual maintenance costs are Rs 800.If money is worth 8 ○/○per annum,find the capitalized cost of the machine?

6. A machine costing Rs. 40000 is estimated to have a useful lifetime of 5 years and scrap value of Rs. 5000.prepare a depreciation schedule using the straight line method.

7. Prepare a depreciation schedule using the straight line method for the car costing Rs. 20000 is estimated to have a useful lifetime of 5 years and scrap value of Rs. 1000.

8. A machine costing Rs. 40000 is estimated to have a useful lifetime of 5 years and scrap value of Rs. 5000. Determine the rate of depreciation and construct the depreciation schedule for the machine of the above using constant percentage method.

9. An investment of Rs. 10000 returns Rs. 3000 at the end of years 1 and 2 and Rs. 3500 at the end of years 3 and 4.calculate the IRR?

10. An investment of Rs. 5 million is expected to produce the following cash-flows at each year end(in million)

$$\begin{pmatrix} YEAR & 1 & 2 & 3 & 4 \\ CASHFLOW & 1.25 & 2.00 & 2.50 & 0.75 \end{pmatrix}$$

11. A car costing Rs. 24000 depreciation 25 ○/○ of its value each year .Make a depreciation schedule for the first 3 years ;find the book value at the end of 5 years and the depreciation expense for the 6th year?

12. An investor is presented with alternative projects ,A and B with the following end of year cash flows.Each project requires an investment of Rs.200000.Which project would be chosen if j1=8 $\circ/\circ$

$$\begin{pmatrix} YEAR & 1 & 2 & 3 & 4 \\ PROJA & 80000 & 70000 & 60000 & 35000 \\ PROJB & 30000 & 40000 & 40000 & 150000 \end{pmatrix}$$

13. For an investment of Rs. 7200 today and Rs. 27000 in 2 years time ,an investor expects to receive Rs. 24200 in 1 year and Rs. 10000 in 3 years.Determine the IRR?

14. An investor is presented with alternative projects ,A and B with the following end of year cash flows.Each project requires an investment of Rs.200000.Which project would be chosen if j1=6 $\circ/\circ$

$$\begin{pmatrix} YEAR & 1 & 2 & 3 & 4 \\ PROJA & 80000 & 70000 & 60000 & 35000 \\ PROJB & 30000 & 40000 & 40000 & 150000 \end{pmatrix}$$

15. Machine A costs Rs.36000,will last 15 years ,and will have salvage value Rs. 4800 at that time.Its cost of maintenance is Rs. 3000 a year.Machine Z costs Rs. 40000, will last 20 years,and will have salvage value Rs. 4000 at that time.Its annual maintenance cost is Rs. 2400.If money is worth j1=11 $\circ/\circ$,which machine should be purchased?

16. Calculate IRR : An investment of Rs. 20000 returns Rs. 6000 at the end of years 1 and 2 and Rs. 2500 at the end of years 3 and 4.?

17. The marginal cost function of a firm for a certain product is $5 + x + 2x^2$. Find the total cost and average cost function if the fixed cost is 200

18. The marginal cost function of a firm for a certain product is $5 + x + 2x^2$. Find the total cost and average cost function if the fixed cost is 100

19. The marginal cost function of a firm for a certain product is $10 + x^2 + 2x^3$. Find the total cost and average cost function if the fixed cost is 100

Dr. SNS RAJALAKSHMI COLLEGE OF ARTS AND SCIENCE (Autonomous)
Accredited by NAAC (Cycle-IV) with 'A+' Grade,
(Recognized by UGC & Approved by AICTE, New Delhi and Affiliated to Bharathiar University, Coimbatore)
486, Thudiyalur-Saravanampatti Road, Chinnavedampatti (Post), Coimbatore - 641 049.

Subject: SUPPORTIVE / ALLIED MATHEMATICS-2: BUSINESS CALCULUS AND FINANCIAL COMPUTATION **Code:** 21UCR304

QUESTION AND ANSWER
UNIT: 5

1. Find the probability that a male aged 30 will survive for atleast one year?
2. Find the probability that a female aged 30 will survive for atleast 20 years?
3. Find the probability that a female aged 50 will die before age 60?
4. Find the net single premium for a one year term insurance policy of face Rs. 1000 is issued to a male aged 28.Assume j1=10 ○/○.
5. A box contains four Rs. 10 bills ,six Rs. 5 bills,and three$1 bills.You are allowed to pull one bill from the box and keep it.What is the expected value of your winnings.
6. Mr.A pays Rs. 10 to enter a betting game.If he can get 3 tails in a row by tossing a fair coin ,he wins Rs. 50;otherwise ,he loses his Rs. 10.What is his expected gain?
7. Find the probability that a female aged 30 dies between ages 50 and 60?
8. Find the probability that in drawing two cards from a standard deck of 52 cards ,I get an ace and a king.
9. Find the discounted expected value of Rs. 50000 to be paid to Mr.Saujani,now aged 30 ,if he survives to age 65.Let j1=10 ○/○.
10. Find the net single premium for a whole life annuity due of Rs. 3000 per year issued to a male now aged 95,using j1=7 ○/○.
11. Find the net single premium for a whole life annuity due of Rs. 5000 per year issued to a male now aged 95,using j1=8 ○/○.
12. Find the net single premium for a whole life annuity due of Rs. 8000 per year issued to a male now aged 95,using j1=9 ○/○.
13. Find the net single premium for an ordinary whole life annuity of Rs. 2000 per annum issued to a male aged 95 ,if j1=7 ○/○.
14. Find the net single premium for an ordinary whole life annuity of Rs. 1000 per annum issued to a male aged 95 ,if j1=7 ○/○.
15. Find the net single premium for an ordinary whole life annuity of Rs. 5000 per annum issued to a male aged 95 ,if j1=5 ○/○.