Assignment

Class 12 **Subject: Business Mathematics And Statistics**

UNIT – 2
INTEGRAL CALCULUS – 1

PART - A

I. Choose the correct answer.

1. $\int \frac{1}{x^8} dx$ is_____.

   a) $\frac{-3}{x^8}$ +C b) $\frac{-1}{2x^2}$ +C c) $\frac{-1}{3x^2}$ +C d) $\frac{-2}{x^2}$ +C

2. $\int \frac{e^x}{\sqrt{1+e^x}} dx$ is_____.

   a) $\frac{e^x}{\sqrt{1+e^x}}$+C b) $2\sqrt{1+e^x}$+C c) $\sqrt{1+e^x}+c$ d) $e^x\sqrt{1+e^x}$+C

3. $\int e^{2x}(2x^2+2x)dx$_____.

   a) $e^{2x}x^2+c$ b) $xe^{2x}+c$ c) $2x^2e^2+c$ d) $\frac{x^8e^x}{2}+c$

4. $\int_0^1 (2x+1)dx$ is_____.

   a) 1 b) 2 c) 3 d) 4

5. $\int_0^\infty e^{-2x}dx$ is_____.

   a) 0 b) 1 c) 2 d) $^1/_2$

6. The value of $\int_{-\pi/2}^{\pi/2} cosx\ dx$ is_____.

   a) 0 b) 2 c) 1 d) 4

7. $\int_0^{\pi/3} tanx\ dx$ is_____.

   a) log2 b) 0 c) log$\sqrt{2}$ d) 2log 2

8. $\lceil(1)$ is_____.

   a) 0 b) 1 c) n d) n!

9. $\int_0^\infty x^4e^{-x}\ dx$ is_____.

a) 12 b) 4 c) 4! d) 64

10. $\int_{-1}^{1} x^3 e^{x^4}\, dx$ is _____.

a) 1 b) $2\int_{0}^{1} x^3 e^{x^4}\, dx$ c) 0 d) e^{x^4}

PART - B

II. Answer the following questions :

11. Evaluate : $\int \frac{dx}{(2x+3)^2}$

12. Evaluate: $\int \frac{3x^2+2x+1}{x}\, dx$

13. Evaluate: $\int cos^3 x\, dx$

14. Evaluate: $\int_{0}^{\pi/2} cos^2 x\, dx$

15. Evaluate: $\lceil(6)$

16. Evaluate: $\int_{0}^{\infty} e^{-2x} x^5\, dx$

17. Evaluate: $\int_{0}^{\infty} e^{-x/2}\, dx$

18. Evaluate: $\int \frac{dx}{\sqrt{x^2+25}}$

19. Evaluate: $\int \frac{e^x+7}{e^x}\, dx$

20. Evaluate: $\left\lceil\left(\frac{7}{2}\right)\right.$

PART - C

III. Answer the following questions :

21. Evaluate: $\int_{-1}^{1} (x^2 + x)\, dx$

22. Evaluate: $\int_{a}^{b} \frac{\sqrt{logx}}{x}\, dx$ a,b > 0

23. Evaluate: $\int x^3 e^{x^2} dx$

24. Evaluate: $\int x log x\, dx$

25. Evaluate: $\int 3^{2x+3}\, dx$

PART - D

IV Answer the following questions :

26. Evaluate : $\int_{0}^{\pi/2} \frac{sinx}{sinx+cosx}\, dx$

Unit – 3 Integral Calculus - II

I. Choose the correct answer :

1. Area bounded by the curve y = x(4-x) between the limits 0 and 4 with x axis.
   a) $\frac{30}{3}$ sq.units b) $\frac{31}{2}$ sq.units
   c) $\frac{32}{3}$sq.units d) $\frac{15}{2}$ sq.units
2. Area bounded by the curve y = $\frac{1}{x}$ between the limits 1 and 2 is
   a) log 2 sq.units b) log 5 sq.units
   c) log 3 sq.units d) log 4 sq.units
3. If MR and MC denotes the marginal revenue and marginal cost functions, then the profit function is
   a) $P = \int(MR - MC)dx + K$ b) $P = \int(MR + MC)dx + K$
   c) $P = \int(MR)\ (MC)dx + K$ d) $P = \int(R - C)dx + K$
4. The demand and supply functions are given by D(x) =16-$x^2$and S(x) = $2x^2$+4 are under perfect competition, then the equilibrium price x is
   a) 2 b) 3 c) 4 d) 5
5. If the marginal revenue = 35+7x- $3x^2$ then the average revenue AR is
   a) $35x + \frac{7x^2}{2} - x^3$ b) $35 + \frac{7x}{2} - x^2$
   c) $35 + \frac{7x}{2} + x^2$ d) $35 + 7x + x^2$
6. The profit of a functionP(x) is maximum when
   a) MC- MR = 0 b) MC = 0 c) MR = 0 d) MC+ MR = 0
7. When x_0 = 2 and P_0 = 12 the producers surplus for the supply function P_s = $2x^2$+4 is
   a) $\frac{31}{5}$units b) $\frac{31}{2}$ units c) $\frac{32}{3}$ units d) $\frac{30}{7}$ units
8. The demand and supply function of a commodity are P(x) = $(x-5)^2$ and S(x) = x^2+x+3 then the equilibrium quantity X_0 is
   a) 5 b) 2 c) 3 d) 19
9. For a demand function P, if$\int \frac{dP}{P} = K\int \frac{dx}{x} = K\int \frac{dx}{x}$ then K is equal to
   a) η_d b) $-\eta_d$ c) $-\frac{1}{\eta_d}$ d) $\frac{1}{\eta_d}$
10. Area bounded by y = IxI between the limits 0 and 2 is
    a) 1 sq.units b) 3sq.units c) 2 sq.units d) 4 sq.units

Part – B

II. Answer the following questions :

11. The price of a machine is ₹6,40,000 if the rate of cost saving is represented by the function f(t) = 20000 t. Find out the number of years required to recoup the cost of the function.
12. The marginal revenue function (in thousand of rupees) of a commodity is $10 + e^{-0.05x}$ where x is the number of units sold. Find the total revenue from the sale of 100 units.[$e^{-5} = 0.0067$]
13. Mr.Arul invests Rs.10000 in ABC Bank each year, which pays an interest of 10% Per annum compounded continuously for 5 years. Howmuch amount will there be after 5 years.[$e^{0.5} = 1.6487$]
14. Find the area bounded by y = 4x+3 with x axis between the lines x = 1 and x = 4.
15. Find the area bounded by the line y = x the x axis and the ordinates x = 1, x = 4.
16. A company has determined that the marginal cost function for a product of a particular commodity is given by MC = $125 + 10x - \frac{x^2}{9}$ where C rupees is the cost of producing x units of the commodity. If the fixed cost is Rs.250/- What is the cost of product.
17. The rate of new product is given by $f(x) = 100 – 90e^{-x}$ where x is the number of days the product is on the market. Find the total sale during the first four days [$e^{-4} = 0.018$]
18. In year 2000 world gold production was 2547 metric tons and it was growing exponentially at the rate of 0.6% per year. If the growth continues at this rate, howmany tons of gold will be produced from 2000 to 2013? [$e^{0.078} = 1.0811$]
19. If $MR = 14-6x+9x^2$, find the demand function.
20. If $MR = 20-5x+3x^2$, find the total revenue function.

Part C

III. Answer the following questions :

21. The marginal cost function $MC = 2+5e^x$
    (i) Find C, if C(0) = 100 (ii) Find AC
22. Find marginal revenue function $MR = 35+7x-3x^2$, Find the revenue function and demand function.
23. The demand function of a commodity is $y = 36-x^2$. Find the consumer's surplus for $y_0 = 11$
24. Find the area of parabola $y^2 = 8x$ bounded by its latus rectum.
25. If themarginal revenue functionis $R^1(x) = 1500-4x-3x^2$Find the revenue function and average revenue function.

Part D

III. Answer the following question:

26. Under perfect competition for a commodity the demand and supply laws are $P_d = \frac{8}{x+1} - 2$ and $P_s = \frac{x+3}{2}$ respectively. Find the consumer's and producer's surplus.