GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Second Semester Regular) Examinations, May – 2024

23BBSBS120B1 - Engineering Mathematics-II

(Biotech)

Time: 3 hrs   Maximum: 60 Marks

(The figures in the right hand margin indicate marks)

PART – A	(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

		CO #	Blooms Level
a.	Find the value of 'p', is the distance between two points is $(p, 3)$ and $(4,5)$ is $\sqrt{5}$.	CO1	K1
b.	Find the Derivative of $\frac{1-\tan x}{1+\tan x}$.	CO1	K1
c.	Find the value of $\int \sec x(\sec x + \tan x)dx$	CO1	K2
d.	Find the gradient of F , where i. $F = e^{xyz}$ ii. $F = x^2 + y^2 + z^2$.	CO2	K2
e.	If $P(E) = 0.6$, $P(F) = 0.3$ and $P(E \cap F) = 0.2$ .Find $P(E/F)$ and $P(F/E)$.	CO1	K1

PART – B	(10 x 5 = 50 Marks)

Answer **ALL** questions

		Marks	CO #	Blooms Level
2. a.	Find the intercept form of straight line passing through points (3,4) and having sum of intercept is 14.	5	CO2	K3
b.	Find the internal, external and mid point of (3,6) and (5,2) with ratio $5:2$.	5	CO3	K2
	(OR)			
c.	Find the angle between three points $(0,1), (-2,0)$ and $(-3, -2)$.	5	CO2	K2
d.	Find the equation of circle passing through the points (2,3) and (4,5) and also find its centre and radius .	5	CO3	K3
3.a.	Find the derivative of i. $\left[\frac{x^2+1}{(x^3-3x)}\right]$ ii.$\sqrt{\sin x + \cos x}$ iii. $\cos(\ln x)^2$	6	CO3	K3
b.	Prove that the function f(x) =5x+3 is continuous at point x=2	4	CO2	K2
	(OR)			
c.	Prove that the function f(x)=$x^2 + 2x + 1$ is continous at $x = 3$	4	CO2	K2
d.	Find the Derivative of i.$e^{\sqrt{\sin x}} + e^{\sqrt{\cos x}}$ ii.$\log\sqrt{\sin x} + \log\cos x$ iii. $[\sin x + \cos x]e^{2x}$	6	CO3	K3
4.a.	Find the i. $\int \frac{x^3+x^2+x+1}{x^3} dx$ ii.$\int (ax^2 + bx + c)dx$ iii.$\int \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right) dx$	6	CO2	K3
b.	Find the value of i. $\int_0^1 \log x \, dx$ ii. $\int_2^3 x^2 \, dx$	4	CO2	K2
	(OR)			
c.	Find the value of i. $\int \frac{1}{(x+5)^2(x-1)} dx$ ii. $\int \frac{x^2+1}{x(x+2)(x+1)} dx$	6	CO2	K2

d.	Find the value of i. $\int_0^1 xe^{x^2}dx$ ii. $\int_0^\pi sinx\,dx$	4	CO3	K3

5.a. A die is thrown. Find the probability of getting: (i) a prime number (ii) 2 or 4 (iii) a multiple of 2 or 3 (iv) an even prime number (v) a number greater than 5 (vi) a number lying between 2 and 6.

6   CO2   K3

b. A car manufacturing factory has two plants, X and Y. Plant X manufactures 70% of cars and plant Y manufactures 30%. 80% of the cars at plant X and 90% of the cars at plant Y are rated of standard quality. A car is chosen at random and is found to be of standard quality. What is the probability that it has come from plant X ?

4   CO3   K2

(OR)

c. If P(A) = 0.45 P(B) = 0.25 , P(A ∪ B) = 0.35 then Find P(A∩B) . Are A and B independent?

4   CO2   K3

d. There are 3 Companies A_1, A_2 and A_3 which products 30%, 30% and 40% of the product and 1%, 2%, 3% products are defective produced by A_1, A_2 and A_3 respectively. If a product is chosen randomly which is defective then what is the probability that it is produced by Company A_1 .

6   CO3   K3

6.a. Find the Divergence and Curl of $\mathbf{F} = x^2\hat{\imath} + y^2\hat{\jmath} + z^2\hat{k}$ and $\mathbf{F} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$

5   CO2   K2

b. Find the angle between the planes $x + y + z = 1$ and $x + 2y + 3z = 6$.

5   CO2   K3

(OR)

c. Find the directional derivative of a function $f = x^2 + 3y^2 + 4z^2$ in the direction of a vector $(1, -1, -1)$ at a point $(1,0,1)$.

6   CO2   K3

d. Find the angle between the vectors $\vec{a}$ and $\vec{b} + \vec{c}$. Where $\vec{a} = \hat{\imath} + \hat{\jmath}$, $\vec{b} = 3\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ and $\vec{c} = \hat{\imath} + 2\hat{\jmath}$.

4   CO2   K3

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