



C. ABDUL HAKEEM COLLEGE (AUTONOMOUS)

(Affiliated to Thiruvalluvar University)

(Re – Accredited by NAAC)

Hakeem Nagar, Melvisharam-632 509, Ranipet District.

MODEL SEMESTER EXAMINATIONS-MARCH 2020

CONTINUOUS INTERNAL ASSESSMENT TEST: II

Class: I B.C.A.[C]

Name of the Subject: Mathematical Foundation-II [Allied]

Subject Code: U18AMA202

Maximum: 75Marks

Duration of Exam: 3 Hours

Date & Session: 26.03.2020 & F.N.

Semester: II

Batch: 2019-2022

SECTION-A [10 X 2 = 20 Marks]

Answer ALL the Questions. Each Question Carries Equal Marks.

1. Define orthogonal matrix.
2. Find the rank of matrix

$$A = \begin{bmatrix} 1 & 2 & 3 & 2 & 4 & 6 & -1 & -2 & -3 & 4 & 8 & -4 \end{bmatrix}$$
3. State Cayley-Hamilton theorem
4. Find the characteristic equation of the Matrix

$$\begin{bmatrix} 3 & 2 & 2 & 3 \end{bmatrix}$$
5. Evaluate $\int \left(x^2 + 2\sin x + \frac{3}{x} \right) dx$
6. Evaluate $\int x e^x dx$

7. Prove that $\int_a^b f(x) dx = \int_a^c f(x) dx + \int_c^b f(x) dx$

8. Evaluate $\int_0^{\pi/2} \sin^2 x dx$

9. What are the intercept made by the plane $2x + 3y + 5z + 7 = 0$ on the coordinate planes

10. Find the equations of the line joining the points $(2, 1, 3)$, $(1, -2, 4)$

SECTION-B [5 X 5 = 25 Marks]

Answer ALL the Questions. Each Question Carries Equal Marks.

11. (a) Show that

$$\begin{bmatrix} i & 3 & + & i & - & 2 & - & i & - & 3 & + & 2i & 0 & 3 & - & 4i & 2 & - & i & - & 3 & - & 4i & - & 2 \end{bmatrix}$$

is skew hermitian

OR

(b) Solve the equations

$$\frac{x^2 z^3}{y} = e^8, \frac{y^2 z}{x} = e^4, \frac{x^3 y}{z^4} = 0$$

12. (a) Show that the system of equations

$$3x - 4y = 2, 5x + 2y = 12, -x + 3y = 1$$

are consistent

OR

(b) Find the characteristic values of

$$A = [a \ h \ 0 \ b \ 0 \ 0 \ g \ 0 \ C]$$

13. (a) Evaluate $\int \frac{dx}{x^2+4x-7}$

OR

(b) Evaluate $\int \frac{dx}{\sqrt{x^2+a^2}}$

14. (a) Evaluate $\int_0^{\pi/2} \frac{\sin^3 x}{\sin^3 x + \cos^3 x} dx$

OR

(b) Reduction formula for $\int \cos^n x \, dx$

15. (a) Find the equation of the plane passing through the points (2, 2, -1) (3, 4, -2) and (7, 0, 6)

OR

(b) Determine the centre and radius of the sphere $4(x^2 + y^2 + z^2) - 16x - 24y + 43 = 0$

SECTION-C [3 X 10 = 30 Marks]
Answer Any THREE Questions. Each Question Carries Equal Marks.

16. Solve the equations Cramer's rule
 $x + y + z = -1, x + 2y + 3z = -4, x + 3y + 4z = -6$

17. Verify Cayley-Hamilton theorem for
 $[1 \ 0 \ 3 \ 2 \ 1 \ -1 \ 1 \ -1 \ 1]$

18. Evaluate $\int \frac{dx}{\sqrt{x^2+x+1}}$

19. Show that

$$\int_0^{\pi/2} \log \log (\tan x + \cot x) \, dx = \pi \log \log 2$$

20. Find the equation of the plane passing through the points $(-1, 3, 2)$ and perpendicular to the planes, $x + 2y + 2z = 5$ and $3x + 3y + 2z = 8$
