2023

AGS 1st Semester Examination

B.Sc. Hons. in Agriculture

MIDNAPORE CITY COLLEGE
ESTD 2017
CENTRAL LIBRARY

PAPER — AGS-107

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer from *any* **one** Section.

[Section—I]

(Introductory Biology)

GROUP—A

1. Answer *any* **five** questions from the following : 2×5=10

(a) Distinguish between taxonomy and systematics.

MIDNAPORE CITY COLLEGE
ESTD 2017
CENTRAL LIBRARY

(b) What do you mean by binomial nomenclature?

(c) What is coacervate?

(d) Distinguish between genotype and phenotype.

(e) Write the law of independent assortment.

(f) Mention the components of a plant cell wall.

(g) Write any two double-membrane cell organelles and mention their functions.

(h) Write down the stages of cell cycle.

GROUP—B

2. Answer *any* **four** questions from the following : 5×4=20

(a) Define dormancy. Briefly discuss about the factors affecting seed germination. 1+4=5

(b) Write a short note on 'five kingdom classification'.

(c) Briefly discuss about the floral morphology of *Poaceae*.

(d) Mention the type character of *Brassicaceae*.

(e) Distinguish between cell wall and cell membrane.

(f) Briefly describe the Urey and Miller experiments.

GROUP—C

3. Answer *any* **two** questions from the following : 10×2=20

(a) Distinguish between testcross and backcross. Mention the phenotypic ratio of dominant and recessive epistasis. 2+8=10

(b) Draw and describe different stages of mitotic cell division. 10

(c) Describe the structure and function of mitochondrion. Why is it considered as the powerhouse of cell? 5+4+1=10

(d) Briefly describe the classification of fruits citing suitable examples.

MIDNAPORE CITY COLLEGE ESTD 2017 CENTRAL LIBRARY

MIDNAPORE CITY COLLEGE
ESTD 2017
CENTRAL LIBRARY

[Section—II]

(Elementary Mathematics)

GROUP—A

1. Answer *any* **five** questions from the following : $2\times5=10$

(a) Find the slope of the line joining the points $(p,-q)$ and $(p+q,p-q)$.

(b) Show that the lines $2x+3y=6$ and $3x-2y+9=0$ are perpendicular to each other.

(c) Find the equation of the line which is parallel to the line $2x-y=7$ and passes through point $(1,-2)$.

(d) Find the centre and radius of the circle $x^2+y^2-6x+8y=9$.

(e) Show that the matrix $\begin{bmatrix} 2 & -2 \\ 1 & -1 \end{bmatrix}$ is idempotent.

MIDNAPORE CITY COLLEGE
ESTD 2017
CENTRAL LIBRARY

(f) Find the value of the following :

$$D = \begin{vmatrix} 0 & -a & -b \\ a & 0 & c \\ b & -c & 0 \end{vmatrix}$$

(g) If $y = \log(\theta + \sin\theta)$, find $\frac{dy}{d\theta}$

(h) Evaluate : $\int \frac{\sin^{-1} t}{\sqrt{1-t^2}} dt$

GROUP—B

2. Answer *any* **four** questions from the following : 5×4=20

(a) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then find the value of

$$A^2 - 4A - 5I$$

MIDNAPORE CITY COLLEGE
ESTD 2017
CENTRAL LIBRARY

(b) If $x^m y^n = (x+y)^{m+n}$, then show that $\frac{dy}{dx} = \frac{y}{x}$.

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

(d) Prove that

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$$

(e) Find the equations of the tangents to the circle $x^2+y^2-3x+10y-15=0$ which are perpendicular to the line $12x = 1-5y$.

(f) Prove that any point on the line $11x-3y+11=0$ is equidistant from the lines $12x+5y+12=0$ and $3x-4y+3=0$.

GROUP—C

MIDNAPORE CITY COLLEGE • ESTD 2017 • CENTRAL LIBRARY

3. Answer *any* **two** questions from the following : $10\times2=20$

(a) *(i)* If the line $\frac{x}{a}+\frac{y}{b}=1$ moves in such a way that $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{c^2}$, where c is a constant, a and b are variables, then show that the locus of the foot of the perpendicular from the origin is $x^2+y^2=c^2$.

(ii) Evaluate : $\int_0^1 x(\tan^{-1}x)^2\,dx$

(b) *(i)* Determine the condition that a line $lx+my=n$ may touch the circle $x^2+y^2=c^2$.

(ii) If $x^y y^x=1, x\neq0, y\neq0$, then find $\frac{dy}{dx}$.

(c) *(i)* Use definite integral to find the value of

$$\lim_{n\to\infty}\left[\frac{1}{n}+\frac{1}{n+1}+\frac{1}{n+2}\ldots+\frac{1}{3n}\right]$$

(ii) Let $f(x)=e^{\sqrt{x}}$, find $f'(x)$ using first principle.

(d) (i) Prove that

$$\begin{vmatrix} 2\cos\theta & 1 & 0 \\ 1 & 2\cos\theta & 1 \\ 0 & 1 & 2\cos\theta \end{vmatrix} = \frac{\sin 4\theta}{\sin\theta}$$

MIDNAPORE CITY COLLEGE
ESTD 2017
CENTRAL LIBRARY

(ii) Solve the following by matrix inversion method :

$$2x + y - z = 2$$
$$x + y + 3z = 5$$
$$x - 2y + 5z = 4$$

★★★