ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

(Department of Mathematics)

WARNING

1. **PLAGLARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM AWARD OF DEGREE/CERTIFICATE, IF FOUND AT ANY STAGE.**
2. **SUBMITTING ASSIGNMENTS BORROWED OR STOLEN FROM OTHER(S) ONE'S WILL BE PENLIZED AS DEFINED IN "AIOU PLAGLARISM POLICY"**

Course: Mathematics-II (1308)
Level: Intermediate

Semester: Spring- 2026
Total Marks: 100
Pass Marks: 40

Note: Attempt all questions and each question carries equal marks.

Assignment No. 1
(Unit 1-5)

Question No. 1 Prove that **[20]**

(a) $\frac{\sin(\alpha-\beta)}{\cos\alpha\cos\beta} = \tan\alpha - \tan\beta.$

(b) $\frac{\sec^2\theta-1}{\sec^2\theta} = \sin^2\theta.$

Question No. 2 **[20]**

(a) Evaluate $\sin\left(\cos^{-1}\frac{1}{2} + \sin^{-1}\frac{3}{5}\right)$.

(b) Prove that $\cos 6x = \cos^2 3x - \sin^2 3x$.

Question No. 3 **[20]**

(a) Rewrite the expression $\sin^4 8x$ with an exponent no higher than 1.

(b) Prove that $\frac{\cos 6y+\cos 8y}{\sin 6y-\sin 4y} = \cot y \cos 7y \sec 5y$.

Question No. 4 **[20]**

(a) Solve the equation $2\sin^2\theta - 5\sin\theta + 3 = 0 \ \ (0 \le \theta \le 2\pi)$.

(b) Prove that $\tan^{-1}\frac{1}{11} - \tan^{-1}\frac{1}{3} = \tan^{-1}\frac{1}{2} - \tan^{-1}\frac{5}{6}$.

Question No. 5 **[20]**

(a) Draw the graph of $y = 3\sin 2x - 1; \ \ x\epsilon[-\pi, \pi]$.

(b) A circular wire of radius 13cm is cut, straightened and then bent to lie along the circumference of a hoop of radius 36cm. Find the measure of the angle that it subtends at the center of the hoop.

Total Marks: 100
Pass Marks: 40

Assignment No. 2
(Unit: 6-9)

Note: Attempt all questions and each question carries equal marks.

Question No. 1 **[20]**

(a) A blimp is flying over a football stadium. Find the height of the blimp if the angles of elevation from the southern and northern ends are 70° and 62° respectively and both ends are 145 yards apart.

(b) In a triangle ABC, find the length "b" when
$c = 5, \quad \alpha = 37^{o}, \quad \beta = 49^{\circ}$

Question No. 2 **[20]**

(a) Find the angle α if the lengths of the sides of triangle ABC are given by $a = 20; b = 25; c = 18$.

(b) A regular octagon is inscribed in a circle with radius 8 inches. Find the perimeter of the octagon.

Question No. 3 **[20]**

(a) Prove that the composition fog is continuous if the functions f and g are continuous.

(b) Sketch the graph of the function $f(x) = \begin{cases} x^2 & if\ x \leq 1 \\ 3x & if\ 1 < x \leq 2 \\ x^3 & if\ x > 2 \end{cases}$

Question No. 4 **[20]**

(a) Find $\frac{dy}{dx}$ by definition, where $y = \sqrt{x} - \sin x$

(b) Find $\frac{dy}{dx}$ if $y = \alpha(\tan t - \csc^2 t); \quad x = \ln\sqrt{e^{2t} - e^{-2t}}$

Question No. 5 **[20]**

(a) If $x = \cos\theta; \quad y = 3\cos 5\theta$, then find an equation involving $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$.

(b) Divide 66 into two equal parts so that the sum of their squares will be minimum.

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