Mid-West University

Examinations Management Office

End Semester Exam-2082

B.Ed. Level / V Semester

Sub: Projective Geometry (MATH454)

Roll No. .....

Group 'A' **10×1=10**

Tick (✓) the Best Answer.

1. An incidence structure is a triple $\sigma = (\mathcal{P}, \mathcal{L}, \mathcal{I})$ in which $\mathcal{I}$ has the relation...
   a) $\mathcal{I} = \mathcal{P} \times \mathcal{L}$ b) $\mathcal{I} \subseteq \mathcal{P} \times \mathcal{L}$
   c) $\mathcal{I} \neq \mathcal{P} \times \mathcal{L}$ d) $\mathcal{I} \simeq \mathcal{P} \times \mathcal{L}$

2. Let a and b points includes the possibility that....
   a) $a \not> b$ b) $a \neq b$
   c) $a = b$ d) $a > b$

3. Real affine plane is also called...
   a) Affine plane b) Extended plane
   c) Projective plane d) Euclidean Plane

4. The principle of duality holds in the class of ...
   a) Projective plane b) Real Affine Plane
   c) Plane d) Affine Plane

5. Desargues's triangle theorem state that...
   a) Two points determined a line.
   b) Every central couple is axial.
   c) Two lines always meet.
   d) Every affine plane contains four point.

6. If F is a field, then...
   a) π_F is a projective plane
   b) π_F is a affine plane
   c) π_F is a pappian plane
   d) π_F is a desagusian plane

7. Two triangle Δabc and Δa'b'c' is said to form a couple...
   a) a, a', b, b', c and c' are concurrent on p
   b) a, a', b, b', c and c' are parallel on p
   c) a, a', b, b', c and c' are distinct on p
   d) a, a', b, b', c and c' are at on p

8. The tactical configuration of four-point plane has form...
   a) $(6_2, 4_3)$ b) (7_3)
   c) $(4_3, 6_2)$ d) (9_3)

9. Which of the following statements is true?
   a) An affine plane contains a set of three non-collinear points
   b) A Euclidean plane contains a set of three non-collinear points
   c) A projective plane contains a set of three non-collinear points
   d) An affine plane contains a set of four non-collinear points

10. A configuration is a plane $\sigma = (\mathcal{P}, \mathcal{L}, \mathcal{I})$ in which $\mathcal{P} \cup \mathcal{L}$ ...
    a) $\mathcal{P} \cup \mathcal{L}$ is finite b) $\mathcal{P} \cup \mathcal{L}$ is infinite
    c) $\mathcal{P} \cap \mathcal{L}$ is finite d) $\mathcal{P} \cap \mathcal{L}$ is infinite

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End Semester Exam-2082

Level: B.Ed. / V Semester FM: 60

Time: 3 hrs PM: 30

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

Attempt All the Questions.

Group 'B' **$6 \times 5 = 30$**

1. Define incidence structure and incidence relation. Let $\sigma = (\mathcal{P}, \mathcal{L}, \mathcal{I})$ with $\mathcal{P} = \{c, l, b\}$, $\mathcal{L} = \{C, L, B\}$, then justify why incidence structure is the Cartesian product of $\mathcal{P}$ and $\mathcal{L}$.

2. Prove that any plane is isomorphic to a plane whose lines are sets of points.

3. Construct an incidence structure of four-point plane with its incidence table and tactical form.

   Or

   State 'Desargues Triangle Theorem' and explain on couple, central and axial with figures.

4. If σ is a tactical configuration with form (m_n), with $m = n^2 - n + 1$ and $n \geq 3$. Then prove that σ is a projective plane.

5. Define triangle in π_c . Prove that: $|f|f^{-1} = |A|F$.

6. Explain affine plane with example. Prove that the points $[x_1, x_2, x_3]$, $[y_1, y_2, y_3]$ and $[z_1, z_2, z_3]$ in π_R are collinear iff $\begin{vmatrix} x_1 & x_2 & x_3 \\ y_1 & y_2 & y_3 \\ z_1 & z_2 & z_3 \end{vmatrix} = 0$.

Or

Verify that the real projective plane π_R is projective plane.

Group 'C' **$2 \times 10 = 20$**

7. Define isomorphism and isomorphic of planes with example. Prove that any plane is isomorphic to a plane whose lines are sets of points.

8. Prove that if D is a division ring, then prove that is a desarguesian plane.

   Or

   Explain the Pappus line of triples. Prove that if F is a field, then π_F is a Pappian plane.

THE END