Level: B.Ed. / V Semester

Sub: Projective Geometry (MATH 454)

Roll No: ....

Group 'A' $10 \times 1 = 10$

Tick ($\checkmark$) the best answers.

1. An incidence structure is a triple $\sigma = (\mathcal{P}, \mathcal{L}, \mathcal{I})$ in which $\mathcal{P}$ and $\mathcal{L}$ are sets then
   a. $\mathcal{P} \cap \mathcal{L} = \emptyset$
   b. $\mathcal{P} \cap \mathcal{L} = \emptyset$ and $\mathcal{I} \subseteq \mathcal{P} \times \mathcal{L}$
   c. $\mathcal{I} \subseteq \mathcal{P} \times \mathcal{L}$
   d. $\mathcal{I} \supseteq \mathcal{P} \times \mathcal{L}$

2. We abbreviate $(10_3, 10_3)$ to...
   a. (10_3)
   b. $(3_{10}, 3_{10})$
   c. (3_{10})
   d. None of above

3. The tactical configuration of Four Point has form:
   a. $(6_2, 4_3)$
   b. (7_3)
   c. $(4_3, 6_2)$
   d. (9_3)

4. The set of all lines on a point p is also called ...
   a. range p
   b. concurrent lines
   c. pencil p
   d. parallel Lines

5. The two lines L and M fails to meet means...
   a. L and M always meet.
   b. L and M determine a line.
   c. L and M are parallel.
   d. L and M are perpendicular.

6. The principle of duality holds in the class of ...
   a. projective plane
   b. real affine plane
   c. plane
   d. affine plane

7. The statement of Desargues's Triangle Theorem is ...
   a. every central couple is axial.
   b. some central couple is axial.
   c. every couple is axial.
   d. some couple is axial.

8. Which one of the followings is not the axiom of projective plane?
   a. If L is a line, then there exists at least three points on L
   b. If L is a line then there exists at least two points on L.
   c. If L is a line then there exists at least one point not a L.
   d. There is at least one line.

9. Two triangle $\triangle abc$ and $\triangle a'b'c'$ 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

10. If F is a field, then
   a. π_F is a Pappian plane.
   b. π_F is a affine plane.
   c. π_F is a projective plane.
   d. π_F is a Desarguisian plane

Mid-West University
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End Semester Examination-2080

Level: B.Ed. / V Semester　　　　　　　　　　FM: 60
Time: 3.00 hrs　　　　　　　　　　　　　　　PM: 30
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Candidates are required to give their answers in their own words as far as practicable.

Attempt All the Questions:

Group "B"　　　　　　　　　6×5 = 30

1. Define incidence structure with its incidence relation. Let $\mathcal{P} = \{e, f, g\}$, $\mathcal{L} = \{E, F, G\}$, then construct a incidence triangle σ.

2. Define projective plane. Prove that a projective plane contains a set of four points, no three of which are collinear.

3. Define isomorphism and isomorphic of planes. Any plane is isomorphic to a plane whose lines are sets of points.

Or

State and prove "Pascal's Theorem"

4. What is the difference between configuration and tactical configuration? Construct a Fano configuration with configuration table.

5. 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.

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

Or

If $\Gamma: xAx^T = 0$ is a point conic, v is a vertex of Γ, and p is a point of Γ, then prove that Γ contains the range of pv.

Group "C"　　　　　　　　　2×10 = 20

7. State "Theorem of Pappus". If F is a field, then prove that π_F is a Pappian plane

8. Define Triangle in π_C. Prove that S is the cofactor matrix of P, so that $S = |P|(P^{-1})^T$.

Or

Define couple, axial and central. Prove that D is a division ring, then π_D is a Desaguesian plane.

THE END