

Mid-West University
Examinations Management Office

End Semester Exam-2081

B.Ed. Level /V Semester

Sub: Projective Geometry (MATH454)

Roll No.

Group 'A'

10×1=10

Tick (✓) the Best Answer.

1. Which of the following is not a correct statement?
 - a. A finite Desarguesian plane is pappian.
 - b. If π is a pappian plane then $D\pi$ is a field.
 - c. A pappian plane is Desarguesian.
 - d. Every desarguesian plane is pappian.
2. We abbreviate $(9_3, 9_3)$ to...
 - a. (9_3)
 - b. $(3_9, 3_9)$
 - c. (2_7)
 - d. (12)
3. A configuration is a plane $\sigma = (\mathcal{P}, \mathcal{L}, \mathcal{I})$ in which $\mathcal{P} \cup \mathcal{L} \dots$
 - 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
4. The tactical configuration of fano plane has form ...
 - a. $(6_2, 4_3)$
 - b. (7_3)
 - c. $(4_3, 6_2)$
 - d. (9_3)
5. Desargues's triangle theorem stated 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. The principle of duality holds in the class of ...
 - a. Projective plane
 - b. Real Affine Plane
 - c. Plane
 - d. Affine Plane
8. A non-singular point conic may contain ...
 - a. at least two points of a given range.
 - b. at least two points of a given pencil.
 - c. at most two points of a given range.
 - d. at most two points of a given pencil.
9. Two triangle Δabc and $\Delta a'b'c'$ 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 (d_Γ, D_Γ) is a metric on π_c , if p, q and r are non-isotropic points. Then ...
 - a. $d_\Gamma(q, p) = -d_\Gamma(p, q)$
 - b. $d_\Gamma(q, p) = d_\Gamma(p, q)$
 - c. $d_\Gamma(q, p) = -d_\Gamma(q, q)$
 - d. $d_\Gamma(q, p) = d_\Gamma(p, p)$

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Level: B.Ed. / V Semester

Time: 3 hrs

FM: 60

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 × 5 = 30

1. Why incidence structure is subset of Cartesian product of set of points and set of lines? Justify with an example.
2. Define configuration and tactical configuration. Construct a configuration of a Fano Configuration with its incidence table.
3. If F is a field, then prove that π_F is a Pappian plane.

Or

Prove that S is a cofactor matrix of P , so that $S = |P|(P^{-1})^T$

4. 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

$$\begin{vmatrix} x_1 & x_2 & x_3 \\ y_1 & y_2 & y_3 \\ z_1 & z_2 & z_3 \end{vmatrix} = 0$$

5. Verify that the real projective plane π_R is projective plane.
6. State and prove "Pascal's Theorem".

Or

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

Group 'C'

2 × 10 = 20

7. (a) 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.
(b) State Desargues triangle theorem. If D is a division ring, then prove that is a Desarguesian plane.
8. What do you mean by duality? Explain about duality with any two examples. Prove that the principle of duality holds in the class of projective planes.

Or

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

THE END