

Mathematics

Internal Exam - Session - 2019-22

Sem - VI Paper - 13

Answer any three ques. but Q.N.01 is compulsory.

- ① (a) Define Analytic function.
 - (b) Define bilinear transformation.
 - (c) Define metric space.
 - (d) state cantor's intersection theorem.
 - (e) state Banach fixed point theorem.
- ② Prove that Every open sphere in a metric space is an open set.
- ③ P.T. In a metric space, every closed sphere is a close set.
- ④ P.T. every convergent sequence is bounded.
- ⑤ state & prove sufficient condition for a function $f(z)$ to be analytic.

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Sem VI paper - 14

Answer any three ques. but Q. No. 01 is compulsory.

- ① (a) Define principal ideal ring.
- (b) Define Euclidean ring.
- (c) Define content of a polynomial.
- (d) Define primitive polynomial.
- (e) Define Normal vector space.
- ② Show that every field is a Euclidean domain.
- ③ Prove that Every Euclidean domain is Principal ideal.
- ④ Show that Euclidean ring posses unit element.
- ⑤ State and prove Eisenstein's theorem for polynomials.

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Sem - VI paper - DSE-3

Answer any three ques. Q.N. 01 is compulsory.

① (a) Define polynomial and give an example.

(b) Define symmetric function.

(c) Define Reciprocal equations.

(d) state Descartes's rule of sign.

(e) Find cube roots of unity.

② One of the roots of the eqn $x^3 + x^2 - x + 15 = 0$ is -3 . Find the other roots.

③ Find the condition that the roots of the eqn $ax^3 + 3bx^2 + 3cx + d = 0$ are in G.P.

④ If α, β, γ be the roots of an eqn $x^3 + 3x + 9 = 0$. Find the value of $\alpha^9 + \beta^9 + \gamma^9$.

⑤ Calculate the values of the symmetric function for cubic eqn $x^3 + px^2 + qx + r = 0$, whose roots are α, β and γ

(i) $\sum \alpha^2 \beta^2$

(ii) $\sum \alpha^2 \beta$

(iii) $\sum \alpha^3$

(iv) $\sum \frac{\beta^2 + \gamma^2}{\beta\gamma}$

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Sem-VI Paper - DSE-4 Mechanics

Answer any three ques. but Q.N.01 is compulsory.

- ① (a) Define Poinsot's central axis.
 - (b) Define screw.
 - (c) Define catenary.
 - (d) Define Simple Harmonic motion.
 - (e) State Kepler's third law.
- ② Find the intrinsic equation of common Catenary.
- ③ Prove that the period of simple harmonic motion is independent of amplitude.
- ④ Find the equation of central axis of any given system of force.
- ⑤ A particle moves in a plane with an acceleration P towards a fixed point O in the plane. Find the equation of the path in polar form.