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Mathematics
Internal exam session 19-22 Maths

Sem - II Paper - III Core

Answer any three ques. but Q.N.1 is compulsory

- ① (a) Define bounded set
- (b) Define greatest lower bound.
- (c) Define open set.
- (d) Define close set
- (e) Define compact set
- ② Prove that every convergent sequence is bounded.
- ③ State & prove ratio test.
- ④ State & prove cauchy's root test.
- ⑤ Define countable and uncountable sets. Prove that the set of all rationals is countable.

Internal exam 19-22. math.
 Sem - II Paper - IV case

Answer any three ques but a. n. 1 is compulsory.

- ① (a) solve $(x+y)dy - (x-y)dx = 0$
- (b) write the Legendre's diff. equation.
- (c) Define Laplace transform.
- (d) Define singular solution.
- (e) solve: $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 2y = 0$

② Solve: $(1+xy)ydx + (1-xy)x dy = 0$

③ solve $y = (1+p)x + ap^2$

④ solve $\frac{d^2y}{dx^2} + a^2y = \sec ax$

⑤ Prove that $\int_{-1}^1 P_m(x) P_n(x) dx = 0$
 if $m \neq n$.

(3)

Internal Exam. 19-22 Maths

Sem-II Paper - GE

Answer any three ques. but Q.N.1 is compulsory.

(1) (a) Define linear diff. eqn of 1st order.

(b) Define the Wronskian of n functions.

(c) Define linear eqn with constant coefficient.

(d) solve: $yzp + zxq = xy$

(e) solve: $p^2 + q^2 = 1$

(2) solve: $y = p^2y + 2xp$ where $p = \frac{dy}{dx}$

(3) solve: $y = 2xp + p^2$ where $p = \frac{dy}{dx}$

(4) solve by the method of variation of parameters

$$\frac{d^2y}{dx^2} + y = \cos \sec x$$

(5) solve: $(x^2 + y^2)(p^2 + q^2) = 1$