

## Mathematics

Internal Exam for Sem - II Session (2019-22)

Loose Paper - III

F.M. - 15

Answer any three ques but Q.N.01 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.

## Mathematics

Internal Exam for Sem-II

Session-2017-22

Core paper - IV

F.M. - 15

Answers any three ques but Q.N. 01 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  $m \neq n$ .

## Mathematics

Internal Exam for Sem II

Session 2019-22

Paper = GE

F.M. - 15

Answer any three ques. but Q.No.1 is compulsory.

(1) (a) Define linear differential eq<sup>n</sup> of 1st order.

(b) Define Wronskian of  $n$  functions.

(c) Define linear eq<sup>n</sup> with constant coefficient.

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

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

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

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

(4) solve by method of variation of parameters

$$\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$$

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

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