

Roll No :

Total No. of Questions : 11]

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ASP-644

M.A./M.Sc. (Final) Examination, 2021

MATHEMATICS

Paper - Opt.-III

(Mechanics)

Time : 1½ Hours]

[Maximum Marks : 100

Section-A

(Marks : 2 × 10 = 20)

Note :- Answer all *ten* questions (Answer limit 50 words). Each question carries 2 marks.

(खण्ड-अ)

(अंक : 2 × 10 = 20)

नोट :- सभी दस प्रश्नों के उत्तर दीजिए (उत्तर-सीमा 50 शब्द)। प्रत्येक प्रश्न 2 अंक का है।

Section-B

(Marks : 4 × 5 = 20)

Note :- Answer all *five* questions. Each question has internal choice (Answer limit 200 words). Each question carries 4 marks.

(खण्ड-ब)

(अंक : 4 × 5 = 20)

नोट :- सभी पाँच प्रश्नों के उत्तर दीजिए। प्रत्येक प्रश्न में विकल्प का चयन कीजिए (उत्तर-सीमा 200 शब्द)। प्रत्येक प्रश्न 4 अंक का है।

Section-C

(Marks : 20 × 3 = 60)

Note :- Answer any *three* questions out of five (Answer limit 500 words). Each question carries 20 marks.

(खण्ड-स)

(अंक : 20 × 3 = 60)

नोट :- पाँच में से किन्हीं तीन प्रश्नों के उत्तर दीजिए (उत्तर-सीमा 500 शब्द)। प्रत्येक प्रश्न 20 अंक का है।

BI-443

(1)

ASP-644 P.T.O.

Section–A

2 each

1. Attempt all *ten* questions. Answer should not exceed **50** words in each question :
 - (i) Define Moment of Inertia.
 - (ii) Define momental ellipsoid possesses.
 - (iii) Define Impulsive Forces.
 - (iv) Define motion of a rigid body.
 - (v) Write Lagrange's equation of first kind.
 - (vi) Define Poisson's identity.
 - (vii) Define Partial differential equation.
 - (viii) Define Non-homogeneous equation.
 - (ix) Define Wave equations.
 - (x) Define polar form of PDE.

Section–B

4 each

2. State and prove Parallel axis theorem.

Or

Find the product of inertia of a semi-circuits wire about its diameter and tangent at its extremity.

3. Describe motion of a rigid body in two dimensions under finite forces.

Or

Describe Scleronomic and Rheonomic system.

4. Describe Hamilton canonical equation.

Or

Derive Lagrange's equations of first kind.

5. Solve :

$$(x - y) p + (x + y) q = 2xz$$

Or

Solve :

$$y^2 p + x^2 q = x^2 y^2 z^2$$

6. Describe mean value formula for P.D.E.

Or

Describe wave equations of PDE.

Section–C

20 each

7. State and prove D' Alembert's principle.

8. Derive Lagrange's equation of motion of a rigid body in two dimensions.

9. State and prove Jacobi-Poisson theorem.

10. Discuss Transport Equation of PDE.

11. Write short notes on the following :

(i) Mean value formula

(ii) Non-homogeneous wave equations

(iii) Heat equation