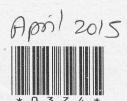
रवजिना - 022



Seat Number

PHYSICS PAPER - II : PHY - 122 **Theoretical Physics** (12126)

P. Pages: 3

Time: Two Hours

Max. Marks: 40

Instructions to Candidates:

- 1. Do not write anything on question paper except Seat No.
- 2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
- 3. Students should note, no supplement will be provided.
- 4. All questions are compulsory and carry equal marks.
- 5. Figures to the right indicates full marks.
- 6. Draw neat diagrams whenever necessary.
- 7. Use of logarithmic tables or simple electronic calculator is allowed.
- 8. Symbols have their usual meanings.
- 1. Attempt any eight of the following, select correct option.

- What is the addition of the complex numbers 6-5i and 3-i
 - a) 9-6i

9 + 6ib)

c) 3 + 6i

- d) 9 - 9i
- The differential equation dF = M(x, y)dx + N(x, y)dy is exact differential equation, if it is satisfies the condition.....
 - a) $\frac{\partial^2 x}{\partial y^2} = M(x, y) + N(x, y)$ b) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$

c) $\frac{\partial f}{\partial v} = \frac{\partial^2 f}{\partial x^2}$

- d) none of the above
- iii) $\overline{A} \cdot (\overline{B} \times \overline{C}) = \dots$
 - a) $\overline{A} \cdot \overline{B} + \overline{A} \cdot \overline{C}$

b) $\overline{B} \cdot \overline{C} + \overline{A} \cdot \overline{C}$

c) $\overline{A} \times \overline{B} + \overline{C}$

d) none of the above

	iv)		tor product of two paralle zero ∞	b)	1 none of the above
	v)	a)	(x, y, z) be a differential s $\nabla \phi$ $\nabla \times \phi$	calar b) d)	field, then gradient of ϕ is $\nabla^2 \phi$ none of the above
	vi)	a)	$\overline{V} \times \overline{V} \neq 0$, then vector field \overline{V} irrotational Non solenoidal	is b) d)	rotational none of the above
	vii)	The a) c)	e divergence of curl of \overline{A} 1 ∞	is b) d)	0 100
	viii)	a)	a of parallelogram whose $\overline{A} \times \overline{B}$ $\overline{A} \cdot (\overline{A} \times \overline{B})$	e side b) d)	es are $\overline{A} \& \overline{B}$ is given by $\overline{A} \cdot \overline{B}$ none of the above
	ix)	a)	= 1 k	b) .	ĵ 0
	x)	a)	= $f(x, y)$, then the total of $F_x dx + F_y dy$ $x^2 dx + y^2 dx$		ential dF = F _y dx+F _x dy none of the above
2.	Att	ttempt any four of the following.			
	a)	Define vector triple product of three vectors.			
	b)				
	c)				
	d)	State Euler's Formula.			
	e)	e) If $F(x, y) = x^3y^2 - e^{xy}$, then find F_x .			
	f)	Sta	ate Geometrical interpreta	ation	of scalar triple product.

3. Attempt any two of the following.

8

- i) If $\overline{A} = 2\hat{i} + 2\hat{j} \hat{k}$ and $\overline{B} = 6\hat{i} 3\hat{j} + 2\hat{k}$, then calculate.
 - a) $\overline{A} \cdot \overline{B}$

- b) $\overline{A} \times \overline{B}$
- c) Area of parallelogram whose sides are $\overline{A} \& \overline{B}$
- ii) Using idea of total differential, find the approximate value of $\sqrt{(4.98)^2 + (12.02)^2}$
- iii) Prove that $\overline{\nabla} \cdot (\phi \overline{A}) = \phi \overline{\nabla} \cdot \overline{A} + \overline{A} \cdot \nabla \phi$
- 4. a) Attempt any two of the followings.

6

- i) Find constants 'a', 'b' & 'c', so that $\overline{A} = (2x + y + az)\hat{i} + (bx y 3z)\hat{j} + (2x + cy + z)\hat{k}$ is irrotational.
- ii) Express $\left(\frac{9-7i}{2-3i}\right)$ in the form of x+iy.
- iii) If $u = e^{x} \cdot \cos y$ then show that $\frac{\partial^{2} u}{\partial x \, \partial y} = \frac{\partial^{2} u}{\partial y \, \partial x}$
 - **2**
- b) Determine constant 'a' so that vectors $\overline{A} = 3\hat{i} + 2\hat{j} a\hat{k}$ and $\overline{B} = 2\hat{i} + \hat{j} 2\hat{k}$ are parallel.

8

- 5. Attempt any one of the following.
 - Define curl of vector field, explain its physical significance and hence state the condition for rotational and irrotational vector field.
 - ii) What is Argand diagram? Explain addition, substraction, multiplication and division of two complex numbers by using Argand diagram.
