## Why do a spatiales have high 6102 gapawers abordonate a (a)

## **PHYSICS**

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Full Marks : 70 to most full add at tertw

Pass Marks: 21

Time: Three Hours and \*Fifteen Minutes

(\*15 minutes are given as extra time for reading questions)

Attempt all questions.

The figures in the right margin indicate full marks for the questions.

Question Nos. 1 to 10 are 'Very Short Answer' type questions carrying 1 mark each.

- 1. Define electric potential at a point.
- 2. What is meant by drift velocity of the free electron?
- 3. A carbon resistor of  $42M\Omega \pm 20\%$  is to be marked with rings of different colours for its identification. Write the sequence of colours.
- 4... What is the value of  $\mu_a$  in SI unit? To some this to strike our substitution in I

5. Why alkali metals are most suitable for photoelectric emission?		
6.	Why do $\alpha$ -particles have high ionizing power?	
7.	What is meant by doping? (VIGORIT)	
8.	What is the full form of LED? Salas Market 1154	
9.	Draw the symbol for the NOR gate, most sould a set I	
10.	What is broadcast communication?	
Question Nos. 11 to 20 are 'Short Answer Type-II' questions carrying 2 marks each.		
11.	A uniformly charged conducting sphere of $0.7m$ diameter has a surface charge density of $100 \ \mu Cm^{-2}$ . Calculate the charge on the sphere and total electric flux passing through the sphere.	
12.	Show that the electric field is always directed perpendicular to an equipotential suraface.  **mortuals and all a privates first and more at mall.** 2	
13.	The length of a conducting wire is $60m$ and its radius is $0.5cm$ . A potential difference of $5V$ produces a current of $2.5A$ in the wire. Calculate the resistivity of the material of the wire.	
14.	Give two points of difference between the magnetic properties of steel and soft iron.	
22 P	hy (T) 16/16 -2 - Contd.	

15.	No induced e.m.f. is produced in a conductor moving parallel to a magnetic	
ę.	field. Explain why?	
	behind the applied $e$ of $E$ by a phase angle of $\frac{\pi}{2}$ . What is its inductive	
16. The Sun looks reddish at Sunrise and Sunset. Give reasons.		
17.	What are isotopes and isotones?	
	An alternating $C$ and $E = E_0$ where is appoint notices a pure collection of	
18.	Give any two points of difference between nuclear fission and nuclear fusion.	
	* Team's mention the appropriation to by a printing angle of the season to be expended as a supplementary of the season of the s	
	26. State the laws of photoelectric emission.	
19.	What is space wave propagation? Give two uses of it in communication	
	system.	
£	27. Explain the working of a transistor as a switch,	
20.	Write two important needs for Modulation.	
Nen.	Ducklourion 24 to 34 to 5 to 100 January Blow Grasholm and China 2 marks of	
Que	stion Nos. 21 to 27 are 'Short Answer Type-I' questions carrying 3 marks	
each	i. A. Derryr, an expression for the tengue experienced on a current-case	
21.	Deduce an expression for electrical potential energy of a system of two	
	point charges.	
22.	Give any two points of difference between EMF of a cell and potential	
11000	difference between two points of an electric circuit.	
23.	Write three properties of electromagnetic waves.	
22 P	hy (T) 16/16 -3 - P.T.O.	
WOMEN SHIP		

- 24. Give three advantages of reflecting type telescope over refracting type telescope.

  25. Draw the ray diagrams to show a right-angled prism to turn the rays through
  - (i) 90°

and

2-1-1

- $E = \frac{1}{2}I + \frac{1}{2}I_{\text{env}}$  new points of difference between nuclear fission and m 081s (ii) ston
- 26. State the laws of photoelectric emission.
- What is space wave propagation? Give two uses of it in communication

What are isotopes and isotopes ?

Write one important elects for Modulation,

27. Explain the working of a transistor as a switch.

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Question Nos. 28 to 30 are 'Long Answer Type' questions carrying 5 marks each.

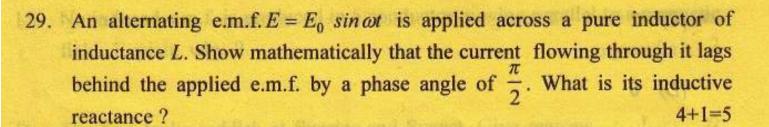
28. Derive an expression for the torque experienced on a current carrying rectangular loop kept in a uniform magnetic field. Under what condition is this torque maximum?

4+1=5

OR

Derive an expression for the torque experienced on a magnetic dipole placed in a uniform magnetic field. Under what condition is this torque maximum?

4+1=5



If y is the polarizing angle, thereine refractive index of the materials

An alternating e.m.f.  $E = E_0 \sin \omega t$  is applied across a pure capacitor of capacitance C. Show mathematically that the current flowing through it leads behind the applied e.m.f. by a phase angle of  $\frac{\pi}{2}$ . What is its capacitive reactance?

30. Derive the lens maker's formula in case of a double convex lens.

OR

Derive an expression for fringe width using Young's double slit method for interference of light.

Question Nos. 31 to 34 are 'Multiple Choice Type' questions carrying 1 mark each. Choose the correct answer out of the four alternatives and rewrite the correct answer.

- 31. The peak value of a.c. is 2 A, the effective value of a.c. is
  - (A) 1
  - (B)  $\sqrt{2}$  in the state of electronic magnetic w

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- 2491 Minductance L. Show mathematically that the current flowing through it lags behind the applied e.m.f. by a phase angle of  $\frac{\pi}{2}$ . What is 10 i(G) etive resonance 2
- 32. If  $\theta$  is the polarizing angle, then the refractive index of the materials is
- An alternating o.m.f.  $E = E_0$  sin or is applied across a pure capacitor of capacitance C. Show mathematically that the carriest flowing through it leads behind the applied c.m.f. by a phase angle of  $\frac{\pi}{2}$ . What is its capacitive reactance?  $\frac{\pi}{2}$  what is its capacitive  $\frac{\pi}{2}$  what is  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  are capacitive  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  what is  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  are capacitive  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$ 
  - (C) tan θ sees a formula in case of a double covered strader of the series of the seri
  - (D) cot θ
- 33. Mass is converted into energy according to the relation

Charles shall be not a mar shall be not shall

- $(A) \quad E = mc^2$
- (B) E = mgh
- (C)  $E = \epsilon \frac{1}{2} mc^2$  to subsymptotic and A. S. at 10.8 to pulsy Alsoq only
- (D)  $E = m/c^2$

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- (A) a photodiode in reverse bias
- (B) a photodiode in forward bias
- (C) LED in reverse bias
- (D) LED in forward bias