## Why do a spatiales have high 6100 gapweed aborbox seq as

## **PHYSICS**

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Full Marks : 70 | 10 mme) full out at tertif

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  $\mu_{\alpha}$  in SI unit?

5. 3EN	Why alkali metals are most suitable for photoelectric emission?	
6.	Why do $\alpha$ -particles have high ionizing power?	
7.	What is meant by doping? (Theory) ? gaiqob yat is meant by doping?	
8.	What is the full form of LED? 1	
9.	Draw the symbol for the NOR gate, most south a	
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.  **Transaction** and the private first and transaction** 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	by (T) 16/16 -2 - Contd.	

15.	No induced e.m.f. is produced in a conductor moving parallel to a magnetic	
g	field. Explain why? mathematically that the current (lowingsqueelate 1.2)	
	behind the applied $e$ in $E$ by a phase angle of $\frac{\pi}{2}$ . What is its inductive	
16. The Sun looks reddish at Sunrise and Sunset. Give reasons.		
	And the second s	
17.	What are isotopes and isotones?	
	An alternating exact $E=E_0$ cance is appoint season a pure collector of	
18.	Give any two points of difference between nuclear fission and nuclear fusion.	
	turits behind the applicational by a pileto angle of the sense is not appreciate.	
	26. State the laws of photoelectric emission.	
19.	What is space wave propagation? Give two uses of it in communication	
14.	system.	
£	27. Explain the working of a transistor as a switch.	
20.	Write two important needs for Modulation.	
Man.	Question rios 28 to 34 nr Tong starner Hope quiestions, carried to market	
Question Nos. 21 to 27 are 'Short Answer Type-I' questions carrying 3 marks		
each	A. Derrye an expression for the tengue symmetrement on a current eggs	
SKIN	CONTRACTOR OF THE RESIDENCE OF THE PROPERTY OF	
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	
	difference between two points of an electric circuit.	
23.	Write three properties of electromagnetic waves.	
22.0	by (T) 16/16 -3 - P.T.O.	
44 F	thy (T) 16/16 - 3 -	

- 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

- $E = \frac{1}{2}I + \frac{1}{2}I_{\text{env}}$  near points of difference between nuclear fission and m 081n (ii) ston
- 26. State the laws of photoelectric emission.
- 27. Explain the working of a transistor as a switch.

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

Write two important needs for Modulation.

What is space wave propagation? Give two uses of it in communication

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?

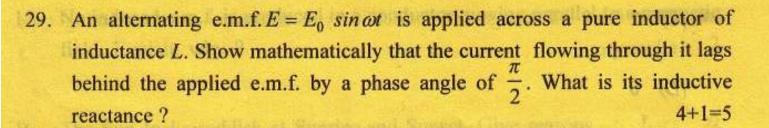
4+1=5

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

3



If y is the polarizing angle, thereigh 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) J

22 Phy (T) 16/16

- 2001 An afternating caret. Explanate is applied account a part 2nd (2) or of a linductance L. Show mathematically that the current flowing throughfur lags behind the applied c.m.f. by a phase angle of \(\frac{\pi}{2}\). What is 10 i(d) or iversione the container the current of the applied c.m.f. by a phase angle of \(\frac{\pi}{2}\). What is 10 i(d) or iversione the container that the current container that the container than the container that the container than t
- 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 our est 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  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  what is its capacitive  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  where  $\frac{\pi}{2}$  is capacitive  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  or  $\frac{\pi}{2}$  and  $\frac{\pi}{2}$  its capacitive reactance?
  - (C) tan θ sensi notice is formula in case of a double control in the least sensitive and sensitive in the least se
  - (D)  $\cot \theta$
- 33. Mass is converted into energy according to the relation
  - $(A) \quad E = mc_{\text{motorship}}^2 \text{ which is the ship is the state of the soft means that it is the soft means the soft means that it is the soft means the soft means$ 
    - (B) E = mgh
    - (C)  $E = e^{\frac{1}{2}} mc^2$  to subsymptotic and A. S. et al. as To putsy Alsoq and
    - (D)  $E = m/c^2$

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