GOVERNMENT OF KARNATAKA

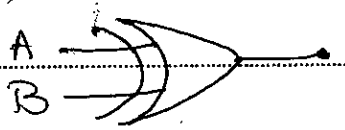
KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD

II YEAR PUC EXAMINATION

SCHEME OF VALUATION (OS)

Subject Code : 33 Subject : PHYSICS

Qn. No.		Marks
	Any other Correct answer to be considered.	
I.	PART – A	
1.	The dispersive power of a medium for a pair of colours is the ratio of the angular dispersion between them to the mean deviation.	1
2.	Polarization of light could not be directly explained; The existence of ether medium was disproved (any one)	1
3.	i) by increasing the refractive index of the medium; ii) by decreasing the wavelength of light used (any one)	1
4.	90°	1
5.	$C = 4\pi\epsilon_0 r$	1
6.	Gray	1
7.	The induced current is always in such a direction as to oppose the cause which is producing it.	1

Qn. No.		Marks
8.	To determine the nuclear magnetic moment ; To study chemical structures, as MRI etc (any one)	1
9.	Pauli	1
10.		1
	PART-B	
11.	Prisms made of different angles/ different dispersive powers	1
	Reflecting angles point in opposite directions	1
12.	Each correct difference (any one) carry 1 mark	1+1
13.	$n = \frac{c}{v}$; $E = mc^2$; $\nu = \frac{c}{\lambda}$; $m = \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}$ (any two)	2
14.	$F = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{d^2}$	1
	Arriving at $d = 3m$	1
15	Statement	1
	Explanation	1
16.	Declination at a place is the angle between geographic meridian and the magnetic meridian	1
	Dip at a place is the angle between the	

Qn. No.		Marks
	earth's total magnetic field and the horizontal	1
17.	for ideal ammeter — 0	1
	for ideal voltmeter ∞	1
18.	A.C can be stepped up or stepped down; A C can be easily converted into dc; power dissipation is less; Transmission of electrical power is more efficient (any two)	2
19.	(a) Line emission spectrum	1
	(b) band emission spectrum	1
20.	Expression	1
	Explanation of symbols	1
21	Each distinction carry 1 mark	1+1
22.	Systems in which dispersed phase is a gas while dispersion medium is a liquid	1
	Frothy, whipped cream, soap lather (anyone)	1
	PART – C	
III	Diagram	1
23.	Expression for refraction at 1st surface	1
	" " at 2nd surface	1
	Explanation of virtual object and –ve sign	1
	Arriving at final equation	1

Qn. No.		Marks
24	Definition	1
IV	Four correct uses	4
25	Diagram	1
	$B = \frac{\mu_0 n I}{2r}$	1
	$B = B_H \tan\theta$	1
	Arriving at $I = \frac{2r B_H}{\mu_0 n} \tan\theta$	1
	Definition of reduction factor	1
26.	Phasor diagram	1
	$V^2 = V_R^2 + (V_L - V_C)^2$	1
	$V_R = IR$; $V_L = IX_L$; $V_C = IX_C$	1
	Arriving at $Z = \sqrt{R^2 + (X_L - X_C)^2}$	1
	$I_{rms} = \frac{V_{rms}}{\sqrt{R^2 + (X_L - X_C)^2}}$	
	(Or) $I = I_0 \sin(\omega t \pm \phi)$	1
27.	Definition of PEE	1
	4 Observed facts	4
V	Definition of amu	1
28.	$E = mc^2$	1
	Substitution and calculation for 1 amu = 931 MeV	2
	(E.g) fission; fusion; B.E (any one)	1

Qn. No.		Marks
29	Definition of radioactivity	1
	Statement of Soddy's law for α decay	1
	Equation for α decay	1
	Statement of Soddy's law for β decay	1
	Equation for β decay	1
30	Definition of junction diode	1
	Circuit diagram	1
	Explanation of +ve half cycle	1
	Explanation of −ve half cycle	1
	Drawing waveforms	1
VI		
31	$n = \frac{\sin i}{\sin r}$	1
	Calculation by substitution	
	$\frac{\sin 30}{\sin r} = 1.532$	
	$\sin r = 0.3264$	
	$r = 19^\circ 3'$	1
	$L_s = \frac{t \sin(i-r)}{\cos r}$	1
	Substitution $L_s = \frac{0.04 \sin 10^\circ 57'}{\cos 19^\circ 3'}$	1
	Arriving $L_s = 0.008$ m	1

Qn. No.		Marks
32	$C_s = \frac{C_1 C_2}{C_1 + C_2}$	1
	$C_s = \frac{3\Delta b}{9} = 2\,\mu F$	1
	$q = C_s V$	
	$= 2\,\mu F \times 30V$	
	$= 60\,\mu V$ or $60 \times 10^{-6} V$	1
	$V_1 = \frac{q}{C_1}$; $V_2 = \frac{q}{C_2}$	1
	$V_1 = 20V$; $V_2 = 10V$	1
33	$R_p = \frac{R_1 R_2}{R_1 + R_2}$	1
	$R_p = \frac{4 \times 6}{10} = 2.4\,\Omega$	
	$I = \frac{E}{r + R_p}$	1
	$I = \frac{3}{2.4 + 0.6}$	
	$= 1$ amp	1
	$I_1 = \frac{I R_1}{(R_1 + R_2)}$	1
	$I_1 = 0.4\,A$	
	$I_2 = 0.6\,A$	1

Qn. No.		Marks
34	$\frac{1}{\lambda} = R\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$	1
	For longest wavelength	
	$n_1 = 2$; $n_2 = 3$	1
	$\frac{1}{\lambda} = 1.097 \times 10^7 \left(\frac{1}{4} - \frac{1}{9}\right)$	
	$= 1.097 \times 10^7 \times \frac{5}{36}$	
	$\lambda = 6.563 \times 10^{-7}$ m	
	or 656.3 nm	1
	or 6563 A°	
	For shortest wavelength	
	$n_1 = 2$; $n_2 = \infty$	1
	$\frac{1}{\lambda} = 1.097 \times 10^7 \left(\frac{1}{4} - \frac{1}{\infty}\right)$	
	$\lambda = \frac{4}{1.097 \times 10^7}$	
	$\lambda = 3.646 \times 10^{-7}$ m	1
VII		
35 & 36	Circuit diagram	1
	Formula	1
	Procedure	2
	Tabular column / Observations	1

Qn. No.		Marks
VIII		
37.	Shift method	
	$f = \frac{D^2 - S^2}{4D}$	1
	Trial 1	
	$f = \frac{0.8^2 - 0.4^2}{4 \times 0.8}$	
	$= \frac{0.64 - 0.16}{4 \times 0.8}$	
	$= \frac{0.48}{3.2}$	
	$f = 0.15$	1
	Trial 2	
	$f = \frac{0.9^2 - 0.51^2}{4 \times 0.9}$	
	$= 0.153$	
	Average $f = 0.152$ m	1
	$n = 1 + \frac{R_1 R_2}{f(R_1 + R_2)}$	1
	$= 1 + \frac{0.15 \times 0.152}{0.152 \times 0.302}$	
	$= 1.496$	
	$\simeq 1.5$	1

Qn. No.		Marks
38.	$r = R\left(\frac{l_1}{l_2} - 1\right)$	
	or	
	$r = R\left(\frac{l_1 - l_2}{l_2}\right)$	1
	Trial 1	
	$r = \frac{2 \times (0.7 - 0.52)}{0.52}$	
	$= \frac{2 \times 0.18}{0.52}$	
	$= 0.69\ \Omega$	1
	Trial 2	
	$r = \frac{3 \times (0.7 - 0.56)}{0.56}$	
	$= 0.75\ \Omega$	1
	Trial 3	
	$r = \frac{4 \times (0.7 - 0.58)}{0.58}$	
	$= 0.83\ \Omega$	1
	Trial 4	
	$r = \frac{5 \times (0.7 - 0.59)}{0.59}$	
	$= 0.93\ \Omega$	1

Qn. No.		Marks
~~38~~ 39	PART – D	
a	Distance of n^{th} bright fringe	
	$x = \frac{n\lambda D}{d}$	1
	Distance of 5^{th} bright fringe	
	$x = \frac{5 \times 600 \times 10^{-9} \times 0.8}{0.3 \times 10^{-3}}$	
	$= 8 \times 10^{-3}$ m (or) 8 mm	1
	Distance of 2nd dark fringe	
	$x = \frac{3}{2}\frac{\lambda D}{d}$	1
	$= \frac{3}{2} \times \frac{600 \times 10^{-9} \times 0.8}{0.3 \times 10^{-3}}$	
	$= 2.4 \times 10^{-3}$ m (or) 2.4 mm	1
b.	Definition of Electric intensity	1
	⇒ Electric potential	1
	$E = -\frac{dV}{dx}$	1
	Significance of –ve sign	1
c.	(i) spherical wavefronts (or) Cylindrical wavefronts	1
	(ii) Plane wavefront	1

Qn. No.		Marks
40		
a	$\frac{P}{Q} = \frac{R}{S}$	1
	$\frac{P}{Q} = \frac{20}{S}$	
	$\frac{Q}{P} = \frac{5}{S}$	1
	Multiplying $\frac{P}{Q} \times \frac{Q}{P} = \frac{20}{S} \times \frac{5}{S}$	
	$1 = \frac{100}{S^2}$	
	$S^2 = 100$	
	$S = 10\ \Omega$	1
	$\frac{P}{Q} = \frac{20}{10} = 2$	
	$\frac{P}{Q} = 2$	1
b.	Diagram	1
	Construction	1
	Working	2
c.	(i) attractive force	1
	(ii) repulsive force	1