B1902
FINAL SCHEME FOR VALUATION
Scheme/ Answer Key for Valuation

Scheme of evaluation (marks in brackets) and answers of problems/key

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: PH100

Course Name: ENGINEERING PHYSICS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 2 marks.

		Marks
1	Quality factor definition ----1 mark, factors (frequency and relaxation time)---1 mark Equation alone(Q = ω τ) ----$\frac{1}{2}$mark	(2)
2	y = 5x10^{-2} sin$\frac{2\pi}{3}(x + 1500t)\ m$ or similar form($y = 5\times10^{-2}\sin 2\pi\left(\frac{x}{3}+\frac{t}{0.002}\right)$ m Obtain the equation from standard wave equation -----2 marks	(2)
3	Condition for minimum intensity (2μt cos r=nλ)---- 1 mark Explanation based on cosine law ---- 1 mark	(2)
4	Definition ----- 1 $\frac{1}{2}$ marks . Any relevant point -----$\frac{1}{2}$ mark.	(2)
5	Definition of plane of vibration ----- 1 mark Definition of Plane of polarization -----1 mark	(2)
6	Show that susceptibility for superconductors = **-1** ----- 2 marks	(2)
7	Four characteristics(finite, single-valued, continuous ,vanish at infinity, square integrable ....) ----- 2 marks	(2)
8	Correct steps for arriving at ΔV = h^{f} or h^{3} mentioning Uncertainty principle ----- 2 marks	(2)
9	Definition for absorption coefficient ---1 $\frac{1}{2}$ marks ,Equation or explanation ---- $\frac{1}{2}$ mark	(2)
10	Definition ----1 mark, use----1 mark	(2)
11	Spontaneous emission ---- 1 mark Stimulated emission ---- 1 mark	(2)
12	Definition ---1 mark Two examples ---- 1 mark	(2)

PART B

Answer any 10 questions, each carries 4 marks.

13 Condition ($k=\omega_0$)--- 1 mark ,Starting from general solution find expression for displacement and give explanation of variation of amplitude with time ---3 marks. (4)

14 Fundamental frequency $\gamma = \frac{1}{2l}\sqrt{\frac{T}{m}}$ ---1mark,finding linear density(m)= 5.56×10^{-4}kg/m ----1 mark, Substitution and result with unit (T = 288.2 N)----2marks (4)

15 $D_n^2 = \frac{4Rn\lambda}{\mu}$ ------(1 mark)
Substitution & Calculation ------ 2 marks
Answer with Unit (R=1.99 m) ----- 1 mark (4)

16 Any four points for each -- --- 4 marks ,
Any four points about grating spectra only----3marks. 4)

17 $t = \frac{\lambda}{2(\mu_e - \mu_o)}$, Formula -----2 marks , Substitution- 1 mark
Answer with unit (t = 27.47 μm) ----- 1 mark (4)

18 Correct explanation ----- 4 marks (4)

19 Momentum operator $\mathbf{p} = -i\hbar\frac{\partial}{\partial x}$ ---- 2 marks
Energy operator $\mathbf{E} = i\hbar\frac{\partial}{\partial t}$ ----2 marks (4)
(Obtaining Hamiltonian operator---1 mark only)

20 Any four postulates ---- 4 marks (4)

21 Equation $T = 0.163\frac{V}{A}$ ----1 mark, finding T_1& T_2(A_1 =100,A_2=180)---2 marks,
Answer = $T_1 - T_2$ =4.89 - 2.72 =2.17 s ---1 mark (4)

22 Equation, [$f=\frac{1}{2l}\sqrt{Y/\rho}$)] ---- 1 mark, Substitution & calculation --- 2 marks
Answer with unit [2.75 mm]---- 1 mark. (4)

23 Definition of resonant cavity with figure ---- 2 marks
Role in production of laser light(to achieve desired intensity and directionality) -2 marks (4)

24 Definition of LED --- 1 mark
Explanation of its working with figure --- 2 marks, Two uses ---- 1 mark (4)

PART C

Answer any three questions, each carries 6 marks.

25 Expression for restoring force, damping force and external driving force --1 mark

Frame differential equation----1 mark, Obtaining the solution ---- 4 marks (6)

26 Figure ----1 mark , explanation and derivation of path difference ---- 2 marks, Obtaining conditions for max.& min. intensities----2 marks, Explanation of colours in thin films ----1 mark (6)

27 Graphs -$\frac{1}{2}$ mark each, Any three comparisons ---- 2 marks.

One example for each --- 1 mark, Brief explanation of BCS theory ---- 2 marks (6)

28 Correct Statement of Uncertainty principle -----1mark

Mathematical expression $\Delta x\, \Delta p \geq \frac{h}{4\pi}$ (or $\frac{h}{2\pi}$)----1mark

Substitution -----1mark

Result with proper units($\Delta p = 1.05X10^{-20}$Kg m/s)--- 1mark

Equation for Energy T= pc ---- $\frac{1}{2}$ mark

Result with proper units(T=20 Mev) ---- $\frac{1}{2}$ mark

Explanation ------1mark (6)

PART D

Answer any three questions, each carries 6 marks.

29 Write any six Factors affecting acoustics of buildings and their remedies- --1mark each . (6)

30 Definition of ultrasonic waves--1 mark, explain NDT--- 1 mark, Explain how the ultrasonic pulse technique is used for non-destructive testing of materials.--- 4 marks. (6)

31 Explanation of construction with figure ----- 2 marks

Labelled Energy level diagram--- 2 marks , Explanation of working---- 2 marks. (6)

32 Figure ---1 mark, Derivation of NA ----3 marks, Four applications- ---2 marks (6)

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