K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE -560109
DEPARTMENT OF SCIENCE AND HUMANITIES
I SESSIONAL TEST QUESTION PAPER 2018 – 19 ODD SEMESTER

SET-B

USN										

Degree	: B.E	**Semester**	: I
Branch	: CSE / CV / EEE	**Date**	: 18-9-2019
Course Title	: Engineering Physics	**Course Code**	: 18PHY12
Duration	: 90 Minutes	**Max Marks**	: 30

Constants: *Charge of an electron $e = 1.6\times10^{-19}$C, Planck's constant $h = 6.625\times10^{-34}$Js, velocity of light c=3x10^{8}m/s, mass of an electron $m = 9.1\times10^{-31}$kg*

Note: Answer ONE full question from each part

Q. No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	**Define** simple harmonic motion. **Derive** the equation of motion for SHM.	5	Applying K3	CO1
(b)	A free particle is executing simple harmonic motion in a straight line. The maximum velocity it attains during any oscillation is 62.8 m/s. **Calculate** the frequency of oscillation, if its amplitude is 0.5 m.	5	Applying K3	CO1
(c)	**Obtain** one-dimensional time-independent Schrödinger wave equation.	5	Applying K3	CO2
	OR			
2(a)	**Define** spring constant. **Derive** the expressions for equivalent force constant for two springs in parallel combination.	5	Applying K3	CO1
(b)	A vibration system of natural frequency 500 cycles/second is forced to vibrate with a periodic force/unit mass of amplitude 100x10^{-5} N/kg in the presence of a damping/unit mass of 0.01×10^{-3} rad/s. **Calculate** the maximum amplitude of vibration of the system.	5	Applying K3	CO1
(c)	**Solve** the Schrödinger's wave equation for the allowed energy values in the case of a particle in a box.	5	Applying K3	CO2
	PART-B			
3(a)	**Obtain** the theory of damped oscillations.	5	Applying K3	CO1
(b)	**Describe** the construction & working of Reddy shock tube with the help of a diagram.	5	Understand K2	CO1
(c)	**Show that** an electron cannot exist within the nucleus of an atom.	5	Applying K3	CO2
	OR			
4(a)	**Obtain** an expression for amplitude of vibration of a body undergoing forced oscillations.	5	Applying K3	CO1
(b)	**Explain** the basic of conservation of mass, momentum and energy.	5	Understand K2	CO1
(c)	In a measurement of position and velocity of an electron moving with a speed of 6×10^5 *m/s*, **calculate** the highest accuracy with which its position could be determined if the inherent error in the measurement of its velocity is 0.01% for the speed stated.	5	Applying K3	CO2

Course In charge 13/9

13/9/19
Head - Dept

Principal

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K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF SCIENCE AND HUMANITIES

II SESSIONAL TEST QUESTION PAPER 2019 – 2020 ODD SEMESTER

SET-A

USN | | | | | | | | | | |

Degree	:	**B.E**	**Semester**	:	**I**
Branch	:	**CSE/C.V/EEE**	**Date**	:	**24-10-2019**
Course Title	:	**Engineering Physics**	**Course Code**	:	**18PHY12**
Duration	:	**90 Minutes**	**Max Marks**	:	**30**

Constants: *charge on an electron $e=1.6\times10^{-19}C$, Planck's constant, $h=6.625\times10^{-34}Js$, velocity of light $c=3\times10^{8}m/s$, mass of an electron, $m=9.1\times10^{-31}kg$, Boltzmann constant $k=1.38\times10^{-23}$ J/K*

Note: Answer ONE full question from each part

Q. No.	Questions	Marks	K Level	CO mapping
	PART-A			
1(a)	**Derive** the expression for energy density of radiation in terms of Einstein's coefficients.	**5**	Applying K3	**CO2**
(b)	**Explain** the assumptions made in quantum free electron theory?	**5**	Understand K2	**CO3**
(c)	**Derive** the expression for Fermi energy in terms of energy gap of an intrinsic semiconductor.	**5**	Applying K3	**CO3**
	OR			
2(a)	A medium in thermal equilibrium at temperature $300K$ has two energy levels with a wavelength separation of $1\mu m$. **Find** the ratio of population densities of the upper and lower levels.	**5**	Applying K3	**CO2**
(b)	**Explain** the variation of Fermi factor with temperature and energy.	**5**	Understand K2	**CO3**
(c)	**Derive** an expression for Fermi energy at Zero Kelvin.	**5**	Applying K3	**CO3**
	PART-B			
(a)	**Explain** the construction and working of CO_2 laser with the help of energy level diagram.	**5**	Understand K2	**CO2**
(b)	**Explain** density of states and fermi factor with equation.	**5**	Understand K2	**CO3**
(c)	**Calculate** the probability of an electron occupying an energy level $0.02eV$ above the fermi level at $400K$ in a material.	**5**	Applying K3	**CO3**
	OR			
4(a)	**Explain** with energy band diagram the construction and working of semiconductor diode laser.	**5**	Understand K2	**CO2**
(b)	**Explain** any 2 major success of quantum free electron theory.	**5**	Understand K2	**CO3**
(c)	**Derive** an expression for electrical conductivity of a semiconductor.	**5**	Applying K3	**CO3**

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K. S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE-560109
DEPARTMENT OF SCIENCE AND HUMANITIES
III SESSIONAL TEST QUESTION PAPER 2018 – 19 ODD SEMESTER

SET-A

USN | | | | | | | | | | |

Degree : B.E
Branch : CSE / CV / EEE
Course Title : Engineering Physics
Duration : 90 Minutes

Semester : I
Date : 9-12-2019
Course Code : 18PHY12
Max Marks : 30

Constants: *Charge of an electron $e = 1.6\times10^{-19}C$, Planck's constant $h = 6.625\times10^{-34}Js$, velocity of light c=3x10^{8}m/s, mass of an electron $m = 9.1\times10^{-31}kg$*

Note: Answer ONE full question from each part

Q. No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	**Explain** Young's modulus and Bulk modulus of elasticity.	5	Understand K2	CO4
(b)	**Derive** the relation between K, Y and σ.	5	Applying K3	CO4
(c)	**Obtain** an expression for the numerical aperture.	5	Applying K3	CO5
	OR			
2(a)	**State** and **explain** Hooke's law with the help of stress-strain diagram.	5	Understand K2	CO4
(b)	**Derive** the expression for bending moment in terms of moment of inertia.	5	Applying K3	CO4
(c)	**Calculate** the V-number for a fiber of core diameter 40μm and with refractive indices of 1.55 and 1.50 respectively for core and cladding when the wavelength of the propagating wave is 1400nm. Also **calculate** the number of modes that the fiber can support for propagation. Assume that the fiber is in air.	5	Applying K3	CO5
	PART-B			
3(a)	**Derive** the relation between K, η and Y.	5	Applying K3	CO4
(b)	**Calculate** the torque required to twist a wire of length 1.5m, radius 0.0425x10^{-2}m, through an angle (π/45) radian, if the value of rigidity modulus of its material is 8.3x10^{10}N/m^2.	5	Applying K3	CO4
(c)	**Discuss** the point to point communication using an optical fiber with the help of a block diagram.	5	Understand K2	CO5
	OR			
4(a)	**Derive** an expression for couple per unit twist of a solid cylinder.	5	Applying K3	CO4
(b)	**Calculate** the extension produced in a wire of length 2m and radius 0.013x10^{-2}m due to a force of 14.7N applied along its length. Given, Y=2.1x10^{11}N/m^2	5	Applying K3	CO4
(c)	**Explain** the different types of optical fibers with suitable diagrams.	5	Understand K2	CO5

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Course In charge 2/12/19

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