



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

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

Constants: Charge of an electron $e = 1.6 \times 10^{-19} \text{ C}$, Planck's constant $h = 6.625 \times 10^{-34} \text{ Js}$, velocity of light $c = 3 \times 10^8 \text{ m/s}$, mass of an electron $m = 9.1 \times 10^{-31} \text{ kg}$

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 $100 \times 10^{-5} \text{ N/kg}$ in the presence of a damping/unit mass of $0.01 \times 10^{-3} \text{ rad/s}$. 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 $6 \times 10^5 \text{ m/s}$, 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

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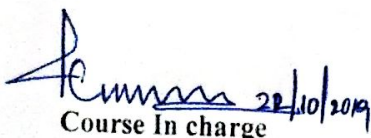
Degree : B.E
Branch : CSE/C.V/EEE
Course Title : Engineering Physics
Duration : 90 Minutes

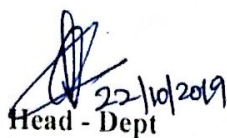
Semester : I
Date : 24-10-2019
Course Code : 18PHY12
Max Marks : 30

Constants: charge on an electron $e=1.6 \times 10^{-19} \text{C}$, Planck's constant, $h=6.625 \times 10^{-34} \text{Js}$, velocity of light $c=3 \times 10^8 \text{m/s}$, mass of an electron, $m=9.1 \times 10^{-31} \text{kg}$, Boltzmann constant $k=1.38 \times 10^{-23} \text{J/K}$

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 $1 \mu\text{m}$. 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
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III SESSIONAL TEST QUESTION PAPER 2018 – 19 ODD SEMESTER

SET-A

USN									
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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 $e = 1.6 \times 10^{-19} \text{C}$, Planck's constant $h = 6.625 \times 10^{-34} \text{Js}$, velocity of light $c = 3 \times 10^8 \text{m/s}$,
mass of an electron $m = 9.1 \times 10^{-31} \text{kg}$

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 $40 \mu\text{m}$ 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 $0.0425 \times 10^{-2} \text{m}$, through an angle $(\pi/45)$ radian, if the value of rigidity modulus of its material is $8.3 \times 10^{10} \text{N/m}^2$.	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 $0.013 \times 10^{-2} \text{m}$ due to a force of 14.7N applied along its length. Given, $Y = 2.1 \times 10^{11} \text{N/m}^2$	5	Applying K3	CO4
(c)	Explain the different types of optical fibers with suitable diagrams.	5	Understand K2	CO5

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