REV-01 BSP/02/05

a. Q/Eo

c. E./Q

for BSC

B.SC. PHYSICS SECOND SEMESTER PHYSICS- II

BSP - 721 OLD COURSE [REPEAT]

Duration: 3 hrs. (Objective) Time: 30 min.

Marks: 20

Choose the correct answer from the following:

	•		
1.	The imaginary loop around an electrical a. Gaussian loop	conductor is called b. Amperian loop	
	c. Closed loop	d. None	
2.	According to Amperian circuital law	1. (- N.H IX	
	a. IclosedB.dl=µo/1	b. $\int_{closest} B.dI = \mu_0.12$	
	c. ∫ _{closed} B.dl=l/μο	d. l _{closed} B.dl=μ _o .l	
3.	The pressure of a gas is numerically equitranslation of a unit volume of the molecular	al to of the mean kinetic energy of the search wiles.	
	a. 1/3 th	b. 2/3 th	
	c. 1/4th	d. 2/5 th	
1.	Theory of Equipartition of energy says that the energy associated with each degree of freedom is		
	a. 3kT	b. 3/2kT	
	c. 1/2kT	d. None	
5.	In an isochoric process, remains constant.		
	a. Temperature	b. Volume	
	c. Pressure	d. Both A and C	
5.	The flux of the electric field E through any closed surface equals times the total charge enclosed by the surface is		
	a. Co, Faradays law	b. 1/Co, Faradays law	
	c. 1/C _a , Gauss law	d. None	
7.	The electric charges is equal to the amou		
	a. Single proton	b. Single electron	
	c. Single neutron	d. Both proton and electron	
8.	The kinetic energy of a molecule is direct	tly proportional to the of a gas.	
	 a. Absolute temperature 	b. Volume	
	c. Pressure	d. All of the above	

1

b. QC.

d. 1/Q

The flux of the electric field through any surface enclosing a piont charge Q is

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Full Marks: 70

 $1 \times 20 = 20$

10.	The unit of electric flux is a. Nm ² /C	b. Nm ²	
	c. Nm/C	d. Nm/C ²	
11.	The electric field between two large papermittivity is given by	rallel plates, where σ_{\parallel} is charge density and ϵ_{\parallel}	
	a. Ε=ε/σ	b. Ε=ε.σ	
	c. $E=\varepsilon/\sigma^2$	d. $E=\sigma/\varepsilon$	
12.	. The path covered by a molecule between any two consecutive collisions is a and is called		
	a. Straight, free path	b. Straight, mean free path	
	c. Curved, free path	d. Curved, mean free path	
13.	. The plane in which vibrations of electric field vectors are restricted in one direction perpendicular to the direction of propagation is		
	a. Plane of polarization	b. Plane of paper	
	c. Plane of vibration	d. None	
14.	In lens every distance is measured from	n the	
	a. focus	b. Optical centre	
	c. object	d. None	
15.	Angle of deviation is inversely proportional to		
	a. Frequency	b. Refractive index	
	c. Wavelength	d. Size of the lens	
6.	The efficiency of the Carnot's engine working between 127°C and 27°C		
	a. 15%	b. 40%	
	c. 25%	d. 30%	
17.	+ = Achromatic combination		
	 a. Convex lens, concave lens 	b. Convex lens, convex lens	
	c. Concave lens, concave lens	d. None	
18.	Ruby LASER is a		
	a. Gas LASER	b. Liquid LASER	
	c. Semi conductor LASER	d. Solid state LASER	
9.	For stimulated emissions the number of electrons in the excited state should be than that in the ground state.		
	a. Less	b. More	
	c. Equal	d. None	
20.	The state of the s		
	a. Direction	b. Frequency	
	c. Velocity	d. Phase	

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Descriptive

Time: 2 hrs. 30 min. Marks: 50

[Answer question no.1 & any four (4) from the rest]

- Discuss Rayleigh- Jean's law of black body radiation. How did Planck remove the shortcomings of this law?
- 2. State Ampere's law.

 Using Ampere's law calculates the magnetic field at a point inside a long current carrying solenoid.

 2+4+4
 =10

Also prove that if the magnetic field induction \overrightarrow{B} is not a function of time,

$$\operatorname{curl} \overrightarrow{B} = \mu_0 \overrightarrow{J}$$

Where symbols have usual meaning.

- 3. a. Write the limitation of first law of thermodynamics and also state the second law of thermodynamics.
 - **b.** A system is taken from A to B along the path ACB when 60 Joules of heat enter into it and system does 25 Joules of work.
 - i. How much heat will enter into the system along the path ADB when the work done along the path is 10 loule?
 - When the system returns from state B to A along path BA work done is 15 Joule. Calculate the amount of heat transfer.
- 4. a. Find an expression for the energy of a gas on kinetic theory of gases.
 - **b.** What do you mean by *mean free path* and *mean free time* of a gas molecule?
 - **c.** Show that mean free path of the molecules of a gas is inversely proportional to the density of the gas.

5.	a. Define capacitance and the unit to measure it.	
	b. Derive an expression for the capacitance of a parallel plate capacitor.	
	c. A potential difference of <i>3000V</i> is applied across the two plates of a parallel plate capacitor separated by a distance of <i>2cm</i> and area <i>4m</i> ² . The potential falls to <i>1000V</i> when a sheet of dielectric is introduced. Determine electric field and capacity with air a dielectric.	
6.	a. Define and explain interference of light with mathematical derivation.	6+4=10
	b. Explain how interference fringes are produced by Fresnel's biprism.	
7.	a. Describe the experimental arrangement to produce Newton's rings.	5+5=10
	b. How is plane polarized light produced by a Nicol's prism?	
8.	a. What are spontaneous and stimulated emissions? Explain.	
	b. Describethe working of a He- Ne laser with an appropriate figure.	