

Marks 30

Time -  $1\frac{1}{2}$  hr

1. Define Kronecker Delta. 1
2. Write the geometrical interpretation of vector product of two vectors. 3  
or  
Show that scalar product is invariant under rotation.
3. Describe gradient of scalar function, show that it represents the vector in the dir<sup>n</sup> of greatest rate of change. 5  
or  
Describe the physical interpretation of divergence of a vector field.
4. Represent irrotational and solenoidal vectors using product with ~~data~~ del vector. Show that curl of gradient of a scalar function is zero. 1+1+3 = 5
5. Write the mathematical form of Gauss's divergence theorem and Stokes's theorem. Prove any one of them. 2+2+4 = 8  
or  
Find the divergence of a vector in curvilinear orthogonal coordinate. 8
6. Define order, degree and homogeneous linear differential equation.  
Find the solution of second order homogeneous linear diff. eqn with constant coefficients for the real and equal roots. -1+1+1+5 = 8  
or  
Find the gradient, divergence and curl of a vector / scalar function in cylindrical coordinate system. 2+3+3 = 8

Second Exam, 2019

1st Sem (Physics) (Major)  
Paper - 202 (H), Heat

Time - 45 minutes

Marks - 1 hour

Q:1 Define Law of equipartition of energy. How much energy is associated with 1 vibrational degree of freedom.

1H 2R  
expression for

Q:2 Define mean free path. Find its ~~value~~ expression for gas by approximate method.

1+3 = 4

Q:3 Find the critical values of temp, pressure and volume from Van-der Waal's equation or  
Derive the law of corresponding states and define it.

4

Q:4 Find the expression of displacement for Brownian motion or  
Find the expression for coefficient of viscosity using K.T.

5

Sessional Exam, 2019

B.Sc. 6th sem  
Physics (Major)  
Paper - 604

Time - 1 hour

Marks - 15

Q:1 Write a program to generate integers from 1 to 100 excluding those divisible by 7.

or

Write a program to find the real solutions of the equation  $ax^2 + bx + c = 0$

5

Q:2 Declare one 1-D array with 50 elements and 2-D array with 3 rows and 4 columns of 12 elements  
Write a program using function to find MC.

2+3 = 5

Q:3 Write the C-program for any one of Range-Rutta or Simpson's 1/3 rule for any simple mathematical ~~for~~ equation.

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Root  $y(x) = \int_0^x y(t) dt$   
 $y(0) = 2$   
 $xy'' + y' = 2x$

Sol  $y = \int_0^x 2t dt$