Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2019-20

EXM/P/09/00

B. Sc-I | School of Science | Sem II

PHS102 | Physics-II | Max Marks: 20

Section- A

Day: Tuesday
Date: 7/1/20

End Semester Examination
Time: 30 minutes

(1/2hr) 10.30am to 11am

Seat No.: | PRN No.: | Student Sign:

Invigilator Sign: | Examiner Sign: | Marks Obtained:

Instructions:

1) All Questions are compulsory.
2) Mark √ to the correct option. Do not circle.
3) More than one options marked will not be considered for assessment.
4) Rough calculations on paper are not allowed.
5) Use non-programmable calculator is allowed.

Q.1	A. Select the correct alternative	Marks	Bloom's level	CO
1.	Curl of any vector function is _____ quantity	01	L1	102.1
a)	scalar	b)	vector	
c)	tensor	d)	All of the above	
2.	Gauss divergence theorem is -------	01	L1	102.1
a)	$\int_V \nabla x \vec{V}\, dv = \oint_l \vec{V}.dl$	b)	$\int_V \nabla.\vec{V}\, dv = \oint_S \vec{V} x d\sigma$	
c)	$\int_V \nabla x \vec{V}\, dv = \oint_S \vec{V}.d\sigma$	d)	$\int_V \nabla.\vec{V}\, dv = \oint_S \vec{V}.d\sigma$	
3.	The cross product of two unit vectors i and k is given by	01	L1	102.1
a)	$\hat{i} \times \hat{k} = \hat{j}$	b)	$\hat{i} \times \hat{k} = 0$	
c)	$\hat{i} \times \hat{k} = -\hat{j}$	d)	$\hat{i} \times \hat{k} = 1$	

Re ESE

4. The potential due to electric dipole is given by 01 L1 102.2

a) $V = \frac{1}{4\Pi\varepsilon_0}\frac{2pcos\theta}{r^2}$ b) $V = \frac{1}{4\Pi\varepsilon_0}\frac{2pcos\theta}{r}$

c) $V = \frac{1}{4\Pi\varepsilon_0}\frac{pcos\theta}{r}$ d) $V = \frac{1}{4\Pi\varepsilon_0}\frac{pcos\theta}{r^2}$

5. The increase in separation between two parallel plates of a capacitor _____ the electric field. 01 L2 102.2

a) Increases b) Decreases

c) Keeps constant d) Exponentially increases

6. Gauss law is given by 01 L2 102.2

a) $\oint E.ds = q/\mathcal{E}o$ b) $\oint E.ds = q\mathcal{E}o$

c) $\oint E.ds = q$ d) $q\oint E.ds = \mathcal{E}o$

7. According to Biot-Savart's law, magnetic produced at distance 'r', is directly proportional to _____ 01 L1 102.3

a) $\frac{1}{r}$ b) $\frac{1}{r^2}$

c) $\frac{1}{r^3}$ d) $\frac{1}{r^4}$

8. The magnetic field B produced by a straight conductor is _____ 01 L1 102.3

a) $\mu_0 nI$ b) $2\mu_0 nI$

c) $\mu_0 n$ d) nI

9. The magnetic field produced by a solenoid is 01 L1 102.3

a) $B = 2\mu_0 ni$ b) $B = \mu_0 ni$

c) $B = 4\mu_0 ni$ d) $B = \frac{1}{2}\mu_0 ni$

10.	The two parallel conductors carrying currents in parallel directions apply following force on each other	01	L1	102.3
a)	Attractive	b)	repulsive	
11.	In vacuum, Maxwell's first equation becomes _____	01	L2	102.4
a)	$\nabla . E = 0$	b)	$\nabla . E = \rho$	
c)	$\nabla . E = \rho/\varepsilon_0$	d)	$\nabla . E = \rho\varepsilon_0$	
12.	If the charge stored in capacitor increases, then its capacitance ____	01	L2	102.4
a)	Increases	b)	Decreases	
c)	Remain constant	d)	Becomes zero	
13.	Which of the following law is applicable in mutual induction?	01	L2	102.4
a)	Gauss law	b)	Ohm's law	
c)	Faraday's law of Induction	d)	Newton's law	
14.	The energy stored in an inductor is given by	01	L1	102.4
a)	$U = \frac{1}{2}LI^2$	b)	$U = \frac{1}{2}LI^3$	
c)	$U = LI^2$	d)	$U = \frac{1}{2}IL^2$	

Q.1	**C. State true or false**	**Marks (6)**	**Bloom's level**	**CO**
a)	In electrostatics, curl of E is zero.	1	L1	102.1
b)	The capacitance of capacitor is independent of the distance between plates.	1	L1	102.2
c)	The hysteresis loop in observed in paramagnetic material	1	L1	102.3
d)	Ferromagnetic materials consist of domains.	1	L1	102.3
e)	In electromagnetics, the divergence of magnetic field is zero	1	L1	102.4
f)	The rate of change of magnetic field with respect to time produces an electric field.	1	L1	102.4

Re ESE

Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2019-20

EXM/P/09/00

B. Sc-I | School of Science | Sem II

PHS102 | Physics-II | Max Marks: 80

Day: Tuesday
Date: 7/1/20

Section B
End Semester Examination
Time: 2 hrs 30 minutes

Time:- 2.5 hrs
9 am to 1.30 pm

Instructions:
1) Questions Q.2, Q.3, Q.4 and Q.5 are compulsory.
2) Rough calculations on paper are not allowed.
3) Use non-programmable calculator is allowed.

Q.2	**Answer the following questions**	**Marks (16)**	**Bloom's level**	**102.1**
a)	State and prove Stokes theorem.	8	L2	
b)	Explain surface integral with proper diagram.	8	L3	
	OR			
b)	What is divergence? Derive the expression divergence of a vector.	8	L3	

Q.3	**Answer the following questions**	**Marks (16)**	**Bloom's level**	**102.2**
a)	State and prove Gauss theorem of an electrostatics.	8	L2	
b)	Obtain relation between the electric field and electric potential.	4	L3	
c)	What are different types of capacitor?	4	L3	
	OR			
c)	Derive the relation for capacitance of a spherical capacitor.	4	L3	

Q.4	**Answer the following questions**	**Marks (24)**	**Bloom's level**	**102.3**
a)	Explain Biot Savart's law. Derive relation for the magnetic field produced by a circular coil.	12	L2	
b)	Elaborate magnetic materials with proper examples.	8	L3	

Re ESE

OR

b)	Explain soft and hard ferromagnetic material using hysteresis loops	8	L3
c)	Obtain the divergence of the magnetic field.	4	L2

Q.5	**Answer the following questions**	**Marks (24)**	**Bloom's level**	**102.4**
a)	State and prove Poynting theorem	8	L3	
b)	Write Maxwell's equations with physical significances.	8	L3	

OR

b)	Obtain continuity equation for charge.	8	L2
c)	Prove that the velocity of an electromagnetic wave in vacuum is 3×10^8 m/s using Maxwell's equations.	8	L2

OR

c)	Obtain electromagnetic wave equation in vacuum.	8	L2

Re ESE