
SLR-TX - 11

Seat	0-4	
No.	Set	

F.E. (Part – I) (CGPA) (Old) Examination, 2018 ENGINEERING PHYSICS

Day and Date: Wednesday, 12-12-2018	Max. Marks : 70
T: 10.00 1.00	

Time: 10.00 a.m. to 1.00 p.m.

- *Instructions*: 1) Make suitable assumptions, *if necessary*.
 - 2) Figures to the right indicate full marks.
 - 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

Constants: 1) Avogadro's no., $N = 6.02 \times 10^{26}$ / k.mol.

- 2) Velocity of light, $c = 3 \times 10^8 \text{m/sec.}$
- 3) Charge of electron, $e = 1.6 \times 10^{-19} \text{ C}$.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

			SECTIO	N – I		
1.	Ch	oose the correct an	swer:			(14×1=14)
	1)	Acceptor type sem a) 3	iconductor is form b) 4	ned by adding c) 5	impurity of valer d) 2	ncy
	2)	The number of die crystal are				a cubic
	3)	a) 4 The Miller indices a) (0 0 1)	b) 6 of the plane parall b) (0 1 0)	-		
	4)	The audible range a) 20 KHz to 20 M c) 200 Hz to 200 M	Hz	b) 200 KHz t d) 20 Hz to 2		
	5)	Reverberation time a) directly proporti c) independent		o/of volume of b) inversely p d) none of th	oroportional	
	6)	The inertial frame a) An accelerated c) A rotating	of reference is	b) Non-accel d) None of th		

- 7) The Lorentz transformation equation for x' co-ordinate from s to s'
 - a) $x' = (x + vt) / \sqrt{1 v^2/c^2}$
- b) $x' = (x ct) / 1 v^2/c^2$
- c) $x' = (x vt) / \sqrt{1 v^2/c^2}$
 - d) $x' = x vt (\sqrt{1 v^2/c^2})$

- 8) The resolving power of a grating having N slits in nth order will be
 - a) (n+N)
- b) (n N)
- c) n/N
- d) n.N
- 9) The substances that rotate the plane of polarization are said to be
 - a) opaque

b) optically inactive

c) optically active

- d) polaroid
- 10) Stimulated emission process is represented by equation
 - a) $A^* + h\gamma \rightarrow A + 2h\gamma$

b) $A + h\gamma \rightarrow A^*$

c) $A^* \rightarrow A + h\gamma$

- d) $A^* + h\gamma \rightarrow A + h\gamma$
- 11) The hologram records _____ of the object.
 - a) Only intensity variation
 - b) Only phase distribution
 - c) Both intensity variation and phase distribution
 - d) None of these
- 12) In total internal reflection phenomenon the light ray incident from
 - a) Rarer to denser

b) Rarer to rarer

c) Denser to denser

- d) Denser to rarer
- 13) Energy released per fission of a 99 U²³⁵ nucleus is nearly
 - a) 200 eV

b) 20 eV

c) 200 MeV

- d) 20 MeV
- 14) The chirality of armchair CNT is
 - a) (a, b)
- b) (a, 0)
- c) (a, a)
- d) (0, b)



Seat	
No.	

F.E. (Part – I) (CGPA) (Old) Examination, 2018 ENGINEERING PHYSICS

Day and Date: Wednesday, 12-12-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Make suitable assumptions, if necessary.

2) Figures to the **right** indicate **full** marks.

SECTION - I

2. Attempt any five of the following:

15

- a) Describe in brief the formation of energy bands in solids.
- b) Calculate no. of atoms per unit cell for SC, BCC and FCC crystal.
- c) Explain the various requirements of a good auditorium.
- d) Deduce an expression for length contraction.
- e) Obtain the relativistic formula for the addition of velocities.
- f) A hall with volume of 1000 m³ has a sound-absorbing surface of area of 400 m². If the average absorption coefficient of the hall is 0.2 sabines, what is the reverberation time of the hall?
- g) A rocket ship is 100 meter long on the ground. When it is in flight, its length is 99 meters to an observer on the ground. What is its speed?
- 3. a) What is Hall effect? Obtain an expression for Hall voltage and Hall coefficient.

5

OR

- b) Discuss the various types of symmetry elements and symmetry operations present in a cubic crystal.
- 4. Attempt any two of the following:

8

- a) Explain effect of impurity on Fermi level in p-type and n-type semiconductor.
- b) Define atomic radius and obtain its values for SC, BCC and FCC crystals.
- c) Explain acoustic diffraction method for determination of wavelength of ultrasonic waves.
- d) Deduce the expression for relativistic mass variation, to show $m = m_0/(1 v^2/c^2)^{1/2}$.

Set P

Attempt any five of the following	5.	Attempt	any	five	of the	following
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15

- a) Distinguish between Fresnel and Fraunhoffer class of diffraction.
- b) Define:
 - i) Spontaneous emission
 - ii) Stimulated emission
 - iii) Stimulated absorption
- c) Explain with neat diagram basic concept and structure of optical fiber.
- d) Explain with diagram types of carbon nano tubes.
- e) Explain Proton Proton cycle.
- f) A fiber cable has an acceptance angle of 30° and core index of refraction 1.4. Calculate the cladding index of refraction.
- g) Calculate power output of a nuclear reactor. Which consumes 20.4 Kg of U 235 in 1000 hours of operations. Assume that energy released per fission of U 235 is 200 MeV.
- 6. a) Define optical activity. Explain construction and working of Laurent's half shade polarimeter.

OR

b) Describe He-Ne laser with its construction and working.

7. Attempt any two of the following:

8

5

- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) Explain the construction and reconstruction of hologram with neat diagram.
- c) Explain the fiber optics communication system with block diagram.
- d) Write a note on: Classification of nuclear reactor.

Set P

1.

a) 3

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Seat	0-4	
No.	Set	Q

F.E. (Part – I) (CGPA) (Old) Examination, 2018 ENGINEERING PHYSICS

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- 3) Charge of electron, $e = 1.6 \times 10^{-19} \text{ C}$.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

Ol-							
Cn	oose the correct an	swer:					
1)	The Miller indices	of the plane para	llel to	o y and z axes a	are		
	a) (0 0 1)	b) (0 1 0)	c)	(1 0 0)	d)	(11	1)
2)	The audible range	of frequency is					
,	a) 20 KHz to 20 M	. ,	b)	200 KHz to 20	0 MI	Hz	
	c) 200 Hz to 200 M	ИHz	ď)	20 Hz to 20 KH	łz		
3)	Reverberation time	e is	to/of	volume of the l	hall.		
-,	a) directly proporti			inversely propo			
	c) independent		,	none of these			
4)	The inertial frame	of reference is	,	frame of	refe	eren	ce
٠,	a) An accelerated		b)	Non-accelerate			
	c) A rotating		,	None of these			
E١	,	armatian aguatia	,		f" ~ ~		/
5)	The Lorentz transf	•					J S
	a) $x' = (x + vt) / \sqrt{1}$,	x' = (x - ct) / 1 -			
	c) $x' = (x - vt) / \sqrt{1-vt}$	$- v^2/c^2$	d)	$x' = x - vt (\sqrt{1} - v)$	$- V^2/$	C^2	

6) Acceptor type semiconductor is formed by adding impurity of valency

c) 5

b) 4

d) 2

 $(14 \times 1 = 14)$

R-T	X – 11		-2-	
7)	The number of crystal are	died axes sym	metry elements th	nat are present in a cubi
	a) 4	b) 6	c) 8	d) 10
		SE	ECTION – II	
8)	Stimulated emission a) $A^* + h\gamma \rightarrow A$ c) $A^* \rightarrow A + h\gamma$	+ 2hγ	s represented by ϵ b) A + h γ – d) A* + h γ	→ A*
9)	a) Only intensitb) Only phase	y variation distribution y variation and	of the object	
10)	In total internal a) Rarer to den c) Denser to de	iser .	omenon the light r b) Rarer to d) Denser	rarer
11)	Energy release a) 200 eV c) 200 MeV	d per fission of	a ₉₂ U ²³⁵ nucleus is b) 20 eV d) 20 MeV	nearly
12)	The chirality of a) (a, b)	armchair CNT i b) (a, 0)	s c) (a, a)	d) (0, b)
13)	The resolving p a) (n+N)	_	ng having N slits ir c) n/N	n n th order will be d) n.N
14)	The substances a) opaquec) optically acti		plane of polarizat b) optically d) polaroid	



Seat	
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F.E. (Part – I) (CGPA) (Old) Examination, 2018 ENGINEERING PHYSICS

Day and Date: Wednesday, 12-12-2018 Marks: 56

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Instructions: 1) Make suitable assumptions, **if necessary**.

2) Figures to the **right** indicate **full** marks.

SECTION - I

2. Attempt any five of the following:

15

- a) Describe in brief the formation of energy bands in solids.
- b) Calculate no. of atoms per unit cell for SC, BCC and FCC crystal.
- c) Explain the various requirements of a good auditorium.
- d) Deduce an expression for length contraction.
- e) Obtain the relativistic formula for the addition of velocities.
- f) A hall with volume of 1000 m³ has a sound-absorbing surface of area of 400 m². If the average absorption coefficient of the hall is 0.2 sabines, what is the reverberation time of the hall?
- g) A rocket ship is 100 meter long on the ground. When it is in flight, its length is 99 meters to an observer on the ground. What is its speed?
- 3. a) What is Hall effect? Obtain an expression for Hall voltage and Hall coefficient.

5

OR

- b) Discuss the various types of symmetry elements and symmetry operations present in a cubic crystal.
- 4. Attempt any two of the following:

8

- a) Explain effect of impurity on Fermi level in p-type and n-type semiconductor.
- b) Define atomic radius and obtain its values for SC, BCC and FCC crystals.
- c) Explain acoustic diffraction method for determination of wavelength of ultrasonic waves.
- d) Deduce the expression for relativistic mass variation, to show $m = m_0/(1 v^2/c^2)^{1/2}$.

Set Q



5.	Attempt	any	five	of the	following	:
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15

- a) Distinguish between Fresnel and Fraunhoffer class of diffraction.
- b) Define:
 - i) Spontaneous emission
 - ii) Stimulated emission
 - iii) Stimulated absorption
- c) Explain with neat diagram basic concept and structure of optical fiber.
- d) Explain with diagram types of carbon nano tubes.
- e) Explain Proton Proton cycle.
- f) A fiber cable has an acceptance angle of 30° and core index of refraction 1.4. Calculate the cladding index of refraction.
- g) Calculate power output of a nuclear reactor. Which consumes 20.4 Kg of U 235 in 1000 hours of operations. Assume that energy released per fission of U 235 is 200 MeV.
- 6. a) Define optical activity. Explain construction and working of Laurent's half shade polarimeter.

5

OR

- b) Describe He-Ne laser with its construction and working.
- 7. Attempt any two of the following:

- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) Explain the construction and reconstruction of hologram with neat diagram.
- c) Explain the fiber optics communication system with block diagram.
- d) Write a note on: Classification of nuclear reactor.

SLR-TX - 11

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F.E. (Part – I) (CGPA) (Old) Examination, 2018 ENGINEERING PHYSICS

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Time: 10.00 a.m. to 1.00 p.m.

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- 2) Velocity of light, $c = 3 \times 10^8 \text{m/sec.}$
- 3) Charge of electron, $e = 1.6 \times 10^{-19} \text{ C}$.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

			SECTION	JIV – I			
1.	Ch	oose the correct an	swer:				(14×1=14)
	1)	Reverberation time a) directly proporti c) independent			ely proportio	nal	
	2)	The inertial frame a) An accelerated c) A rotating	of reference is		frame of refe ccelerated of these	erence	
	3)	The Lorentz transf a) $x' = (x + vt) / \sqrt{1}$ c) $x' = (x - vt) / \sqrt{1}$	$-v^2/c^2$	b) x'= (x	ordinate from $-$ ct) $/1 v^2/c$ $-$ vt ($\sqrt{1} v^2/c$,2	
	4)	Acceptor type sem a) 3	niconductor is form b) 4	ned by add c) 5	ling impurity d)	_	СУ
	5)	The number of die crystal are a) 4	ed axes symmetry b) 6	c) 8	that are pre d)		a cubic
	6)	The Miller indices a) (0 0 1)	of the plane paral b) (0 1 0)	•		(1 1 1)	

- 7) The audible range of frequency is a) 20 KHz to 20 MHz b) 200 KHz to 200 MHz c) 200 Hz to 200 MHz d) 20 Hz to 20 KHz SECTION - II 8) In total internal reflection phenomenon the light ray incident from a) Rarer to denser b) Rarer to rarer c) Denser to denser d) Denser to rarer 9) Energy released per fission of a 90 U235 nucleus is nearly a) 200 eV b) 20 eV c) 200 MeV d) 20 MeV 11) The chirality of armchair CNT is a) (a, b) b) (a, 0) c) (a, a) d) (0, b) 11) The resolving power of a grating having N slits in nth order will be a) (n+N) b) (n - N)c) n/N d) n.N 12) The substances that rotate the plane of polarization are said to be b) optically inactive a) opaque c) optically active d) polaroid 13) Stimulated emission process is represented by equation a) $A^* + h\gamma \rightarrow A + 2h\gamma$ b) $A + h\gamma \rightarrow A^*$ c) $A^* \rightarrow A + h\gamma$ d) $A^* + h\gamma \rightarrow A + h\gamma$
 - a) Only intensity variation
 - b) Only phase distribution
 - c) Both intensity variation and phase distribution

14) The hologram records _____ of the object.

d) None of these



Seat	
No.	

F.E. (Part – I) (CGPA) (Old) Examination, 2018 **ENGINEERING PHYSICS**

Day and Date: Wednesday, 12-12-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Make suitable assumptions, *if necessary*.

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SECTION - I

- 2. Attempt any five of the following:
- 15
 - a) Describe in brief the formation of energy bands in solids.
 - b) Calculate no. of atoms per unit cell for SC, BCC and FCC crystal.
 - c) Explain the various requirements of a good auditorium.
 - d) Deduce an expression for length contraction.
 - e) Obtain the relativistic formula for the addition of velocities.
 - f) A hall with volume of 1000 m³ has a sound-absorbing surface of area of 400 m². If the average absorption coefficient of the hall is 0.2 sabines, what is the reverberation time of the hall?
 - g) A rocket ship is 100 meter long on the ground. When it is in flight, its length is 99 meters to an observer on the ground. What is its speed?
- 3. a) What is Hall effect? Obtain an expression for Hall voltage and Hall coefficient.

OR

- b) Discuss the various types of symmetry elements and symmetry operations present in a cubic crystal.
- 4. Attempt **any two** of the following:

a) Explain effect of impurity on Fermi level in p-type and n-type semiconductor.

- b) Define atomic radius and obtain its values for SC, BCC and FCC crystals.
- c) Explain acoustic diffraction method for determination of wavelength of ultrasonic waves.
- d) Deduce the expression for relativistic mass variation, to show $m = m_0/(1 - v^2/c^2)^{1/2}$.

Set R

5



5.	Attempt	any	five	of the	following	:
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15

- a) Distinguish between Fresnel and Fraunhoffer class of diffraction.
- b) Define:
 - i) Spontaneous emission
 - ii) Stimulated emission
 - iii) Stimulated absorption
- c) Explain with neat diagram basic concept and structure of optical fiber.
- d) Explain with diagram types of carbon nano tubes.
- e) Explain Proton Proton cycle.
- f) A fiber cable has an acceptance angle of 30° and core index of refraction 1.4. Calculate the cladding index of refraction.
- g) Calculate power output of a nuclear reactor. Which consumes 20.4 Kg of U 235 in 1000 hours of operations. Assume that energy released per fission of U 235 is 200 MeV.
- 6. a) Define optical activity. Explain construction and working of Laurent's half shade polarimeter.

OR

b) Describe He-Ne laser with its construction and working.

7. Attempt any two of the following:

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- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) Explain the construction and reconstruction of hologram with neat diagram.
- c) Explain the fiber optics communication system with block diagram.
- d) Write a note on: Classification of nuclear reactor.



SLR-TX - 11

Seat	0.4	
No.	Set	5

F.E. (Part – I) (CGPA) (Old) Examination, 2018 ENGINEERING PHYSICS

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- 3) Charge of electron, $e = 1.6 \times 10^{-19} \text{ C}$.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) The audible range of frequency is
 - a) 20 KHz to 20 MHz
 - c) 200 Hz to 200 MHz
- 2) Reverberation time is _____
 - a) directly proportional
 - c) independent
- 3) The inertial frame of reference is ____
 - a) An accelerated
 - c) A rotating

- b) 200 KHz to 200 MHz
- d) 20 Hz to 20 KHz
- ____ to/of volume of the hall.
 - b) inversely proportional
 - d) none of these
 - frame of reference
 - b) Non-accelerated
 - d) None of these
- 4) The Lorentz transformation equation for x' co-ordinate from s to s'
 - a) $x' = (x + vt) / \sqrt{1 v^2/c^2}$
 - c) $x' = (x vt) / \sqrt{1 v^2/c^2}$
- b) $x' = (x ct) / 1 v^2 / c^2$ d) $x' = x - vt (\sqrt{1 - v^2 / c^2})$
- 5) Acceptor type semiconductor is formed by adding impurity of valency
 - a) 3

b) 4

c) 5

d) 2

SLR-T	X – 11	-2-				
6)	The number of die crystal are	ed axes symmetry	element	s that are	pre	esent in a cubi
	a) 4	b) 6	c) 8		d)	10
7)	The Miller indices				ıre	
	a) (0 0 1)	b) (0 1 0)	c) (1 0	0)	d)	(1 1 1)
		SECTIO	N – II			
8)	The hologram reco		of the ob	ject.		
	a) Only intensity vb) Only phase dist					
	c) Both intensity v		e distribu	tion		
	d) None of these	Д				
9)	In total internal refl	ection phenomen	on the lig	ht ray incid	den	t from
	a) Rarer to denser		,	r to rarer		
	c) Denser to dens		,	ser to rarer		
10)	Energy released p	er fission of a ₉₂ U ²				
	a) 200 eV c) 200 MeV		b) 20 e d) 20 M			
11)	The chirality of arm	nchair CNT is	u, 20 !!	.01		
,	a) (a, b)	b) (a, 0)	c) (a, a)	d)	(0, b)
12)	The resolving pow	er of a grating hav	ing N sli	ts in n th ord	ler	will be
	a) (n+N)	b) (n – N)	c) n/N		d)	n.N
13)	The substances th	at rotate the plane	-			id to be
	a) opaque		, .	ally inactiv	е	
4.4\	c) optically active		d) pola			
14)	Stimulated emission a) $A^* + h\gamma \rightarrow A + 2$		esented I b) A + I		1	
	c) $A^* \rightarrow A + h\gamma$	-11 <i>1</i>	,	$h\gamma \rightarrow A + h$	1γ	



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SECTION - I

2. Attempt **any five** of the following:

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- a) Describe in brief the formation of energy bands in solids.
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OR

- b) Discuss the various types of symmetry elements and symmetry operations present in a cubic crystal.
- 4. Attempt any two of the following:

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- a) Explain effect of impurity on Fermi level in p-type and n-type semiconductor.
- b) Define atomic radius and obtain its values for SC, BCC and FCC crystals.
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- d) Deduce the expression for relativistic mass variation, to show $m = m_0/(1 v^2/c^2)^{1/2}$.

Set S



5. Attempt any five of the following	5. <i>A</i>	Attempt	any	five	of the	following	:
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15

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OR

b) Describe He-Ne laser with its construction and working.

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- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) Explain the construction and reconstruction of hologram with neat diagram.
- c) Explain the fiber optics communication system with block diagram.
- d) Write a note on: Classification of nuclear reactor.