Total No. of Questions – [5] Total No. of Printed Pages: 04

G.R. No.	

Paper code:- U17-105A (RE-FS&F)

DECEMBER 2017 / ~~ENDSEM~~ RE-EXAM

F. Y. B. TECH. (COMMON) (SEMESTER - I)

COURSE NAME: ENGINEERING PHYSICS

COURSE CODE: ES10175A

(2017 PATTERN)

Time: [**2 Hours**] [Max. Marks: **50**]

Instructions to candidates:
1) **Answer Q.1 OR Q.2, Q.3 OR Q.4 and Q.5**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed.**
4) **Use suitable data wherever required.**

Q.1) a) With the help of neat diagram, discuss the construction and working of Carbon di-oxide Laser. [6]

b) Explain the following terms as building blocks of a Laser. [6]
i)Active medium.
ii)Pumping mechanism.
iii)Optical cavity.

c) For some optical fiber the refractive index of the core and cladding is 1.65 and 1.45, respectively. Calculate the numerical aperture, acceptance angle and critical angle. [4]

OR

Q.2) a) Explain the following terms as characteristics of Laser : [6]

i)Monochromaticity.

ii)Coherence.

iii)Directionality.

b) State different applications of Laser and explain any one mechanical industry application of Laser. [6]

c) Explain the difference between Spontaneous emission and Stimulated emission. [4]

Q.3) a) Obtain energy and wave function of a particle trapped in rigid box. [6]

b) What is Q-value of nuclear reaction? How it can be calculated in terms of [4]

energies of the particles?

c) Let the average energy released per fission of U^{235} be 200MeV. [4]
If 100gm of U^{235} undergoes fission, calculate the energy generated.
(Given: Avogadro's no. = 6.023×10^{23} atoms/gm mole)

OR

Q.4) a) With the help of neat diagram explain the construction and working of nuclear fission reactor. [6]

b) Draw BE curve. Explain its significance with respect to nuclear fission and nuclear fusion. [4]

c) You are given the following atomic masses: [4]
i) U^{238} : 238.05079 a.m.u.
ii) Th^{234} : 234.04363 a.m.u.
iii) He^4 : 4.002604 a.m.u.
Calculate the energy released during the alpha decay of U^{238}.

Q.5) Attempt following multiple choice questions: [1x20=20 marks]

a) Loudness of sound depends on _____. [1]
i)velocity. ii)frequency.
iii)wavelength. iv)intensity.

b) Which of the following cause focusing of sound in a hall? [1]
i)Curtains. ii)Convex walls.
iii)Concave walls. iv)Flat walls.

c) Ultrasonic waves show_____. [1]
i)reflection ii)interference
iii)diffraction iv)all the above

d) Ultrasonic waves are used in the industry for _____. [1]
i)Cleaning of machine parts ii)drilling
iii)welding iv) all the above

e) Which of the following is an application of echo sounding? [1]
i)Flaw detection. ii)SONAR.
iii)Sonography. iv)all the above.

f) Interference is constructive if the path difference is ___. [1]
i)$n\lambda$ ii)$(2n-1)\lambda$
iii)$(2n+1)\lambda$ iv)$(2n-2)\lambda$

g) An excessively thin film illuminated by white light appears _____ in the reflected system. [1]

i)uniformly bright ii)coloured

iii)dark iv)red

h) If the angle of wedge is increased, the fringe width _____. [1]

i)increases ii)decreases

iii)remains same iv) first increases then decreases

i) For a single slit if the width is double of the wavelength of the light used, the first minimum will be obtained at ____. [1]

i)30^0 ii)45^0

iii)15^0 iv)60^0

j) In case of grating the quantity (a + b) is called _____ . [1]

i)width of the grating ii)grating element

iii)power of grating iv) none of the above

k) An electron can exist in _____. [1]

i)valance band ii)conduction band

iii)forbidden band iv)both i) and ii)

l) Energy bands are formed in_____. [1]

i)solids ii)liquids

iii)gases iv)all the above

m) The Fermi function for $E=E_F$ at $T > 0K$ is_____. [1]

i) 1 ii)1/2

iii) 0 iv)2/3

n) Ohm's law relates to the electric field E, conductivity σ and current density J as- [1]

i) $J = E/\sigma$. ii)$J = \sigma E^2$.

iii)$J = \sigma/E$. iv) $J = \sigma E$.

o) The forbidden gap in an insulator is of the order of _____. [1]

i)0eV ii)1eV

iii)6eV iv) none of the above

p) Generation of e.m.f. across an open circuited P-N junction when light is incident on it is known as _____ effect. [1]

i)photovoltaic ii)photoconductive

iii)photoelectric iv)none of the above

q) When light is incident on a solar cell , the electron-hole pairs get separated due to_____. [1]

i)applied voltage ii)incident light

iii)electric field in depletion region iv)all the above

r) The ideal power of the solar cell is given by_____. [1]

i)Vm.Im ii)Voc.Isc

iii)Voc/Isc iv) Vm/Im

s) The Fill factor of the solar cell is given by – [1]

i)Vm.Im/Voc.Isc ii)Voc.Isc/Vm.Im

iii)Vm.Im iv)Voc.Isc

t) To increase current o/p from an array of solar cells, they are to be connected [1]
in _____.

i)series ii)parallel

ii)both i) and ii) iv)none of the above