



ALLAMA IQBAL OPEN UNIVERSITY

Level: F. Sc

Semester: Spring 2015

Paper: Physics-III (385)

Total Marks: 30

Time Allowed: 2.30 Hours

Note: Section B and C comprises questions therein are to be answered on the separately provided answer book. Attempt all questions from section B and two questions from Section C. Use supplementary answer sheet i.e., B if required. Write your answers neatly and legibly.

SECTION – B (20x3=60 marks)

NOTE: Attempt ALL the questions. The answer to each question should not exceed 3 to 4 lines.

- Q.1. How many times per second will a lamp reach maximum brilliance when connected to a 50 Hz source?
- Q.2. Explain the conditions under which electromagnetic waves are produced?
- Q.3. What is Modulation?
- Q.4. Define modulus of elasticity
- Q.5. Find capacitance for a resonance circuit of $f=1000\text{kHz}$ with an inductor $L=5\text{mH}$
- Q.6. Which material is known as solid liquid?
- Q.7. Distinguish between crystalline and amorphous solids
- Q.8. Does the induced emf always act to decrease the magnetic flux through a circuit?
- Q.9. What is meant by hysteresis loss?
- Q.10. What do you mean by Rectification?
- Q.11. Draw the Truth table and diagram of XOR gate.
- Q.12. How a photodiode works?
- Q.13. An electron is accelerated through a potential difference of 50V. Calculate its de Broglie wavelength
- Q.14. What is the net charge on an n-type or p-type substance?
- Q.15. Will higher frequency light eject more electrons than low frequency from a metal surface?

P.T.O.



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- Q.16. When a solid is heated and begins to glow, why does it first appear red?
- Q.17. Write some applications of lasers in daily life.
- Q.18. Why are heavy nuclei unstable?
- Q.19. What do you mean by radiography?
- Q.20. What are the advantages of laser over ordinary light?

SECTION - C

(Marks: 20)

Note: Answer any Two of the questions.

- Q.1. Describe the process of Modulation and Demodulation. What is the difference between A.M & F.M also define carrier signal (10)

(OR)

Describe the formation of energy bands in solids. Explain the difference amongst electrical behavior of conductors, insulators and semi conductors in terms of energy band theory. (10)

- Q.2 Write a detailed note on i) Pair Production ii) Annihilation of Matter iii) Compton Effect (3+3+4)

(OR)

What are inner shell transitions? Explain with the help of diagram that how X-rays are produced and what are its characteristics? (10)

- Q.3 State and explain Faraday's Law of electromagnetic induction. Also explain what is motional emf? (10)

(OR)

What is nuclear fission reaction? Also explain fission chain reaction, how it can be controlled? (10)



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Semester: Spring 2015

Centre No: _____

Total Marks: 100

Passing Marks: 40

Registration No. _____

Roll No. _____

Roll No. (in words) _____

Answer Sheet No. _____

Signature of Candidate: _____

Signature of Invigilator: _____

Marks: 20

Note: Section A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 30 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q-I Insert the correct option i.e. A/B/C/D in the empty box opposite each part. Each part carries one mark.

- i) * PN junction diode works as an insulator if connected.
- | | | |
|--------------------|--------------------|--------------------------|
| A. To AC source | B. In forward bias | <input type="checkbox"/> |
| C. In reverse bias | D. All of these | |
- ii) Majority carriers in a N type substance are
- | | | |
|-------------|--------------|--------------------------|
| A. Protons | B. Electrons | <input type="checkbox"/> |
| C. Neutrons | D. Holes | |
- iii) In AC inductor circuit; current _____ voltage.
- | | | |
|------------------------|----------------------|--------------------------|
| A. Lags | B. Leads | <input type="checkbox"/> |
| C. Has same phase with | D. Out of phase with | |
- iv) Inductive reactance is given as
- | | | |
|-----------------------|------------------------------|--------------------------|
| A. $X_L = T/\omega L$ | B. $X_L = L V \sin \omega t$ | <input type="checkbox"/> |
| C. $X_L = \omega L$ | D. None of these | |
- v) Minority carriers in a P-type semiconductor are
- | | | |
|-------------|--------------|--------------------------|
| B. Protons | B. Electrons | <input type="checkbox"/> |
| D. Neutrons | D. Holes | |
- vi) A two inputs NAND gate has output 0 if
- | | | |
|---------------------|---------------------|--------------------------|
| A. A is zero | B. B is zero | <input type="checkbox"/> |
| C. Both A & B are 1 | D. Both A & B are 0 | |
- vii) The process of converting AC into DC is called
- | | | |
|---------------|------------------|--------------------------|
| A. Modulation | B. Amplification | <input type="checkbox"/> |
| C. Biasing | D. Rectification | |
- viii) In conductors conduction band is
- | | | |
|--------------------------|---------------------|--------------------------|
| A. Filled with electrons | B. Empty | <input type="checkbox"/> |
| C. Not exist | D. Partially filled | |
- ix) Wave nature of light is approved by
- | | | |
|---------------------|-------------------------|--------------------------|
| A. Polarization | B. Black body radiation | <input type="checkbox"/> |
| C. Compton's effect | D. Photoelectric effect | |
- x) Photodiode operates in _____ condition.
- | | | |
|--------------------|--------------------|--------------------------|
| A. Forward biased | B. Without biasing | <input type="checkbox"/> |
| C. Reversed biased | D. Both A & C | |



ALLAMA IQBAL OPEN UNIVERSITY

Level: F. Sc

Semester: Autumn 2018

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Total Marks: 80

Time Allowed: 2.30 Hours

Note: Section B and C comprises questions therein are to be answered on the separately provided answer book. Attempt all questions from section B and 2 questions from Section C. Use supplementary answer sheet i.e., B if required. Write your answers neatly and legibly.

SECTION – B (20x3=60 marks)

NOTE: Attempt **ALL** the questions. The answer to each question should not exceed 3 to 4 lines.

- Q.1. A sinusoidal current has rms value of 10 A. What is the maximum or peak value?
- Q.2 Name the devices that will
(a) Permit flow of direct current but oppose the flow of alternating current
(b) Permit flow of alternating current but not the direct current
- Q.3 Define stress and strain. What are their SI units? Differentiate between tensile, compressive and shear modes of stress and strain.
- Q.4 Define modulus of elasticity. Show that the units of modulus of elasticity and stress are the same. Also discuss its three kinds.
- Q.5 How does the motion of an electron in n-type substance differ from the motion in a p-type substance?
- Q.6 What is the net charge on an n-type or p-type substance?
- Q.7 Does the dilation means that time really passes more slowing in moving system or that it only seems to pass more slowly?
- Q.8 What are the measurements on which two observers in relative motion will always agree upon?
- Q.9 When light shines on a surface, is momentum transferred to the metal surface?
- Q.10 Bohr's theory of hydrogen atom is based upon several assumptions. Do any of these assumptions contradict classical physics?
- Q.11 Why do you mean when we say that the atom is excited?
- Q.12 What are isotopes? What do they have in common and what are their differences?
- Q.13 Why are heavy nuclei unstable?
- Q.14 A particle which produces more ionization is less penetrating. Why?
- Q.15 What do you understand by "background radiations"? State the two sources of this radiation.
- Q.16 How can radioactivity help in treatment of cancer?
- Q.17 What do we mean by term critical mass?
- Q.18 What information is revealed by the length and shape of the tracks of an incident particle in Wilson cloud chamber?
- Q.19 Describe a brief account of interaction of various types of radiations with matter.
- Q.20 Why is the base current in a transistor very small?

SECTION – C

(Marks: 20)

Note: Answer **any Two** of the questions.

- Q.1 What is an alternating current generator? Also discuss an dc generator. (10)

(OR)

What is Faraday's law of electromagnetic induction (10)



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Roll. No. (in words) -----

Answer Sheet No. -----

Signature of Candidate: -----

Signature of Invigilator: -----

Section-A

Time Allowed: 30 min

Marks: 20

Note: Section A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 30 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Insert the correct option i.e. A/B/C/D in the empty box opposite each part. Each part carries one mark.

- i. In modulation, low frequency signal is known as:
a) Loaded signal b) Fluctuated signal c) Harmonic signal d) Modulation signal
- ii. At high frequency the reactance of the capacitor is
a) Low b) Large c) Very large d) None of these
- iii. Substances which break just after the elastic limit is reached are called:
a) Ductile substances b) Hard substances c) Soft substances d) Brittle substances
- iv. A diode characteristics curve is a graph plotted between
a) Current and time b) Voltage and time c) Voltage and current d) Forward voltage and reverse current
- v. The forward current through a semiconductor diode circuit is due to
a) Minority carriers b) Majority carriers c) Holes d) Electrons
- vi. The Einstein mass-energy relationship is
a) $E = mc$ b) $E = mc^3$ c) $E = mc^2$ d) $E = m^2c^2$
- vii. The quantized radius of first bohr orbit of H-atom is:
a) 0.053 nm b) 0.0053 nm c) 0.00053 nm d) 53 nm
- viii. The mutual induction between two coils depends upon:
a) Area of the coils b) Number of turns c) Distance between the coils d) All of these
- ix. The behavior of resistance is frequency
a) Dependent b) Independent c) No response d) None of these



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xi) Minimum energy required for pair production is

- A. 939MeV
C. 1.02MeV

- B. 942MeV
D. 0.511MeV

xii) Positron is anti particle of _____.

- A. Neutron
C. Electron

- B. Proton
D. None of these

xiii) In a Hydrogen atom Balmer series electrons fall into

- A. $n=1$
C. $n=3$

- B. $n=2$
D. $n=4$

xiv) Length of first Bohr's orbit is

- A. 0.053nm
C. 5.3nm

- B. 5.3nm
D. None of these

xv) Otto Hahn and Fritz Strassmann discovered _____ reaction.

- A. Fusion
C. Nuclear

- B. Fission
D. All of these

xvi) A transformer converts

- A. High voltage into low voltage
C. Electricity into magnetism

- B. Voltage into Current
D. A, C to D, C

xvii) The most stable state of ruby is

- A. Ground state
C. Higher state

- B. Meta state
D. Excited state

xviii) $1 \mu =$ _____ MeV

- A. 9.315
C. 93.15

- B. 0.9315
D. 931.5

xix) The time in which half of a parent nucleus decay is called

- A. Life time
C. Half life

- B. Time of decay
D. Decay interval

xx) When a nucleus emits β particle its atomic number

- A. Increases
C. Remains Constant

- B. Decreases
D. None of these

For Examiner's use only

Q. No. 1: Total Marks:

20

Marks Obtained: