# POLICY GUIDELINES FOR SCIENCE SUBJECTS PAPERS

Paper Pattern and Distribution of Marks
Biology, Physics, Chemistry SSC-I

The question paper is organized into **FOUR** sections, namely: "Section A, B, C & D". Questions posed may be text based or derived/unseen but in similar pretext and difficulty level as per the lessons taught in the course. Distribution of the questions with respect to cognitive domain within each section shall roughly be around 30 percent Knowledge (K), 50 percent Understanding (U) and 20 percent Application (A).

The Questions in these subjects will be designed in such a manner that no pet-definitions are required from the candidates to be reproduced. Moreover the questions will be designed keeping in consideration the time for thought-process (particularly in U and A Cognitive Domain questions) and the length of the subsequent text (if any) to be produced by the candidates.

## SECTION — A

This section consists of 12 compulsory structured part questions - Multiple Choice Questions (MCQs) of one mark each. These MCQs will preferably be designed in such a way to cover the whole course taught. These MCQs objectively test the knowledge, understanding and comprehension of the concepts of the candidates in these subjects.

## SECTION — B

This section consists of question number two (02) with preferably **EIGHT** part questions – Short Response Questions (SRQs) of three (03) marks each. The candidates are required to attempt (respond to) any **SIX** SRQs for a maximum total of 18 marks in this section.

## SECTION — C

This section consists of question number three (03) with preferably **SEVEN** part questions – Short Response Questions (SRQs) of three (03) marks each. The candidates are required to attempt (respond to) any **FIVE** SRQs for a maximum total of 15 marks in this section.

## SECTION — D

This section consists of three (03) Extended Response Question (ERQs) of 10 marks each. Candidates are required to attempt (respond to) any two of these ERQs as per their choice and convenience for a maximum of 20 marks. These questions may comprise of two or more part questions each if deemed necessary by paper setter in order to balance out the distribution various concepts and knowledge areas from different Cognitive Domains taught in course. However none of the part questions shall be of less than 4 Marks.

# Annexure for Policy Guidelines for Paper Setting
Definitions and Disclaimer

Policy guidelines for paper setting vide Notification No.6-8/FBISE/RES/CC/SSC/823 dated 8 June 2019 have been conveyed for general information. Definitions of some terminologies and disclaimers are given in this annexure.

## 1. Definitions

### I. Cognitive Domains
Cognitive domain refers to development of mental skill and acquisition of knowledge.

In the questions papers developed by Federal Board of Intermediate & Secondary Education, Islamabad from hereon will be intended to test the following cognitive domains of the candidates:

- Knowledge:       Approximately 30% Question in each section
- Understanding:   Approximately 50% Question in each section
- Application:     Approximately 20% Question in each section

#### i. Knowledge (K)
Knowledge refers to the ability of the candidates to recall the learned or memorized information or data.

**Examples**
- A child reciting the alphabets of English
- Memorization and reproducing the dates and other facts etc.
  - e.g.     Pakistan came into being on 27th Night of Ramadan-ul-Mubarak.

**Related Verbs (Command Words)**
Arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, reproduce, state etc.

#### ii. Understanding (U)
Understand (also called Comprehension) refers to ability of the candidates to comprehend (a set of) information and/or situation and provide his/her response to it accordingly.

**Examples**
- Performing analyses and illustrating the observations
- Comprehending the concepts of Social, Natural and Physical Sciences
  - e.g.     Discuss different types of noise and their impact on human health briefly.

**Related Verbs (Command Words)**
Classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate, rephrase, differentiate, compare etc.

#### iii. Application (A)
Application refers to the ability to use learned material in new and concrete situation to solve problems and/or to design a schedule or task.

**Examples**
- Performing analyses and illustrating the observations
- Comprehending the concepts of Social, Natural and Physical Sciences
  - e.g. Illustrate the similes and metaphors given in the poem Daffodils.

**Related Verbs (Command Words)**
Apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, write etc.

### II. Sections of Paper
There are three or four (03 or 04) sections in each question paper:

i. **Section-A**
Contains Multiple Choice Questions (MCQs). All questions are compulsory without any external or internal choice. Usually comprises of 20% of total marks of the (theory if applicable) paper.

ii. **Section B**
Contains Short Response Questions (SRQ). Candidates may have external choice up to 33%. In addition to that internal choice may also be offered based upon model, content and/or nature of the subject.
- This section may contain approximately 50% of total marks in some of subjects of the (theory if applicable) paper.

iii. **Section C**
This section usually contains Extended Response Questions (ERQ). Candidates may have external choice in the questions. In addition to that internal choice may also be offered based upon model, content and/or nature of the subject. For ERQs it may contain approximately 30% of total marks in some subjects of the (theory if applicable) paper.

## III. Choice

Sometimes the candidates are required to attempt a certain number of questions from a given pool or group of questions, it is commonly known as choice in questions.
There are two types of choices

i. **External Choice**
Whenever the candidates are required to solve (respond to) a certain number of questions from a given pool it is called external choice. This choice may be around 33% in a section.

e.g. 1. Answer any six parts in about 30-40 words each.
(Out of eight questions)
2. Attempt any eight questions from the following.
(Out of eleven questions)

ii. **Internal Choice**
Whenever the candidates have to solve (respond to) a question mandatorily but they have an option within the question it is called internal choice.

## 2. Disclaimers

I. The cognitive levels and categories written in sample model paper are for explanation purpose only. In the actual question papers administered during examination shall not contain description of these cognitive domains.

II. Association of the cognitive domains is solely based on subject expert's judgment and may be subject to errors and/or omissions.

III. In the class rooms and during teaching the candidates (students) need to be taught about the time management in accordance with allocation of marks to the questions.
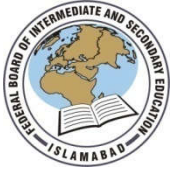
# Federal Board SSC-I Examination
## Physics Model Question Paper

### SECTION – A

Time allowed: 20 minutes

Marks: 12

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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 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

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**Q.1** **Encircle the correct option i.e. A / B / C / D. All parts carry equal marks.**

i. A refrigerator works mainly on the principle of:
   A. Thermodynamics
   B. Electricity
   C. Mechanics
   D. Solid state physics

ii. If a body starts from rest then which of the following is correct?
   A. $v_f = v_i$
   B. $v_i = -at$
   C. $v_f = at$
   D. $v_f - v_i = t$

iii. A stone is dropped from a certain height distance covered by it in one second is:
   A. $4.9m$
   B. $1m$
   C. $10m$
   D. $9.8m$

iv. The expression of "$g$" in Atwood machine is:
   A. $g = \dfrac{(m_1 + m_2)}{(m_1 - m_2)}a$
   B. $g = \dfrac{(m_1 m_2)}{(m_2)}a$
   C. $g = \dfrac{(m_1 - m_2)}{(m_1 + m_2)}a$
   D. $g = \dfrac{(2m_1 m_2)}{(m_1)}a$

v. Which surface offers the least amount of friction?
   A. Concrete
   B. Ice
   C. Grass
   D. Water

vi. If a body remains in its new position when disturbed from its previous position, it is said to be in:
   A. Stable equilibrium
   B. Unstable equilibrium
   C. Neutral equilibrium
   D. Dynamic equilibrium

vii. GPS consists of _____ earth satellites.
   A. 2
   B. 12
   C. 20
   D. 24

viii. Water reaches to the magma that changes water into steam. The steam contains:
   A. Geothermal energy
   B. Chemical energy
   C. Nuclear energy
   D. Electric energy

ix. According to Archimedes, upthrust is equal to:
  A. Weight of displaced liquid    B. Volume of displaced liquid
  C. Mass of displaced liquid    D. Density of the displaced liquid

x. A fan in a vacuum cleaner:
  A. Lowers the pressure in the bucket
  B. Increases the pressure in the bucket
  C. Lowers the pressure in the surrounding
  D. Maintains constant air pressure in bucket

xi. Evaporation takes place from the surface of a liquid at:
  A. Low temperature only    B. High temperature only
  C. Room temperature only    D. All temperatures

xii. Greenhouse effect is due to presence of _____ in earth's atmosphere.
  A. $O_2$ and $N_2$      B. $CO$ and $N_2$
  C. $CO_2$ and water vapours    D. $O_2$ and water vapours

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**For Examiner's use only:**

| | |
|---|---|
| **Total Marks:** | 12 |
| **Marks Obtained:** | |

Time allowed: 2.40 hours                                                    Total Marks: 53

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Note: Answer any six parts from Section 'B' and attempt any five parts from Section-C. Attempt any two questions from Section 'D' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly.

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## SECTION – B (Marks 18)
### (Chapter 1-5)

Q.2    Attempt any **SIX** parts from the following. All parts carry equal marks.    ($6 \times 3 = 18$)

   i.    Differentiate between axis of rotation and line of action of a force with the help of figure.

   ii.   A pencil is just balanced at its tip, what is its state of equilibrium? Give answer with reason.

   iii.  Write three advantages and disadvantages of friction. (Definition of friction is not required)

   iv.   Speed of a train increases from 36km/h to 72km/h in 10 minutes. Find distance covered by the train during this time.

   v.    Describe the factors on which the accuracy of a measurement depends?

   vi.   Why is it assumed that a gravitational field exists all around the Earth?

   vii.  For a body of Mass 'm' moving in a circle of radius 'r' if its velocity is halved, what will be the effect on the value of centripetal force?

   viii. At what altitude the value of 'g' would become one fourth (¼)of the surface of the earth?

## SECTION – C (Marks 15)
### (Chapter 6-9)

Q.3    Attempt any **FIVE** parts from the following. All parts carry equal marks.   ($5 \times 3 = 15$)

   i.    State the reason, why does a bimetallic strip bend on heating and/or cooling?

   ii.   How much power is used by a 40 Kg athlete in climbing a 10m high ladder in 10s?

   iii.  When a person takes a bucket to some distance, work done by him is zero, why?

   iv.   How effectiveness of a small force is increased when action area of force is reduced?

   v.    Why we feel cool after perspiration/sweating?

   vi.   Prove that $K.E = \frac{1}{2}mv^2$

   vii.  What are the factors on which rate of flow of heat in solids depends?

# SECTION – D (Marks 20)

**Note:** Attempt any **TWO** questions. All questions carry equal marks. (2 × 10 = 20)

**Q.4**  **a.**  Is there any absolute rest or motion? Describe the types of motion with one example for each type. (6)

**b.**  Recoil of a rifle is –0.4ms$^{-1}$ having mass 5 kg. What is the velocity of the bullet, if mass of the bullet is 20 g? (4)

**Q.5**  **a.**  Derive an expression for orbital speed of an artificial satellite also calculate the value of orbital speed of a satellite close to earth. (5)

**b.**  Describe and explain Hooke's law graphically. (5)

**Q.6**  **a.**  Calculate the latent heat of fusion of ice experimentally. (The specific heat of water is 4200 JKg$^{-1}$K$^{-1}$). (6)

**b.**  How much heat is lost in an hour through a glass window measuring 2.0 cm by 2.5 cm when inside temperature is 298K and that of outside is 278K. The thickness of glass is 0.8cm and the value of K for glass is 0.8Wm$^{-1}$K$^{-1}$? (4)

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