

General instructions for Theory

Before the exam

- You must not open the envelopes containing the problems before the sound signal indicating the beginning of the competition. You can open the envelopes five minutes before the scheduled time i.e. @11:55 IST. The beginning and end of the examination will be indicated by a sound signal.
- There will be announcements by the supervisor at 16:30 IST (half an before the end of the examination) and at the end of the exam at 17:00 IST.

During the exam

- Dedicated answer sheets are provided for writing your answers. Write your answers into the appropriate tables, boxes or graphs on the corresponding answer sheet (marked A). For every problem, there are extra blank working sheets for carrying out detailed work (marked W). Be sure to always use the working sheets that belong to the problem you are currently working on (check the problem number in the header). If you have written something on any sheet which you do not want to be graded, cross it out. Only use the front side of every page.
- In your answers, try to be as concise as possible: use equations, logical operators and sketches to illustrate your thoughts whenever possible. Avoid the use of long sentences.
- Please give an appropriate number of significant figures when stating numbers.
- Often, you may be able to solve later parts of a problem without having solved the previous ones.
- A list of physical constants is given on the next page.
- You are not allowed to leave your working place without permission. If you need any assistance, please draw the attention of a team guide by raising one of your placard ("Bio-break/washroom").

At the end of the exam

- At the end of the examination you must stop writing immediately.
- For every problem, sort the corresponding sheets in the following order: answer sheets (A), working sheets (W).
- Put all the answer sheets and working sheets belonging to one problem into the envelope for that question, including any blank working sheets. Also, put the Cover Sheet, Question papers and general instructions (G) into the remaining separate envelope. You are not allowed to take any sheets of paper out of the examination area.
- Leave your writing equipment on the table.
- Wait at your table in silence until your envelopes are collected. Once all envelopes are collected your guide will escort you out of the examination area.

Physical constants

Acceleration due to gravity	g	$=$	$9.81m \cdot s^{-2}$
Boltzmann constant	k_B	$=$	$1.38 \times 10^{-23} J \cdot K^{-1}$
Current Mass of the Sun	M_s	$=$	$2.00 \times 10^{30} kg$
Current Radius of the Sun	R_s	$=$	$7.00 \times 10^8 m$
Magnitude of the electron charge	e	$=$	$1.60 \times 10^{-19} C$
Mass of the electron	m_e	$=$	$9.11 \times 10^{-31} kg$
Mass of the proton	m_p	$=$	$1.67 \times 10^{-27} kg$
Mass of the neutron	m_n	$=$	$1.67 \times 10^{-27} kg$
Permeability of free space	μ_0	$=$	$1.26 \times 10^{-6} T \cdot m \cdot A^{-1}$
Permittivity of free space	ϵ_0	$=$	$8.85 \times 10^{-12} F \cdot m^{-1}$
Planck's constant	h	$=$	$6.63 \times 10^{-34} J \cdot s$
Avogadro Constant	N_A	$=$	$6.02 \times 10^{23} mol^{-1}$
Speed of light in vacuum	c	$=$	$3 \times 10^8 m \cdot s^{-1}$
Stefan-Boltzmann constant	σ	$=$	$5.67 \times 10^{-8} W \cdot m^{-2} \cdot K^{-4}$
Universal gas constant	R	$=$	$8.31 J \cdot mol^{-1} \cdot K^{-1}$
Universal Gravitational constant	G	$=$	$6.67 \times 10^{-11} N \cdot m^2 \cdot kg^{-2}$
Wien's constant	b	$=$	$2.90 \times 10^{-3} m \cdot K$
In 2	\approx	$=$	0.69
In 3	\approx	$=$	1.10
In 10	\approx	$=$	2.30
Base of the Napierian logarithm e	\approx	$=$	2.72