



آغا خان یونیورسٹی ایگزامینیشن بورڈ  
AGA KHAN UNIVERSITY EXAMINATION BOARD

## Teachers' Handbook

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# How to Conduct Science Practical Examinations?

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## 1. Introduction

The Aga Khan University Examination Board (AKU-EB) is a Board of Intermediate and Secondary Education established with the ordinance of Government of Pakistan, in response to the demand from schools for more appropriate assessments and transparency in school examinations. AKU-EB was founded in August 2003 to offer examination services for both Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC) qualifications throughout Pakistan. With a commitment to make examinations in Pakistan more reliable, efficient, and secure, AKU-EB offers high quality public examinations using modern methods of assessment to assess all of the achievements specified in the framework of the trans-national and national curricula of Pakistan and international standards, so as to have a significant impact on the quality of education.

AKU-EB's SSC and HSSC qualifications are designed to better prepare students for success in their adult lives by promoting active learning processes with a focus on thinking, investigation, and application of knowledge.

To find out more about our products and services please visit our website <https://examinationboard.aku.edu/>.

AKU-EB has produced this document to facilitate how science practical examinations are administered and assessed at affiliated schools/ colleges.

## 2. Science Practical Examinations

AKU-EB strongly believes that it is important for students to have hands-on experience of performing laboratory experiments in their classes as a part of their routine teaching and learning. Therefore, the laboratory work is a pre-requisite of students' assessment. The laboratory performance is based on the idea that science focuses on hands-on, minds-on observational activities, and that these activities will help students in understanding concepts and making connections between the sciences and their daily lives. If students are to make science an important experience in their lives, they must actively participate in the process of science by learning how to:

- make observations
- collect data
- formulate hypotheses
- conduct experiments using appropriate equipment
- analyse the results obtained
- and draw conclusions

## 3. Objective of Science Practical Examinations

Science practical examinations for SSC and HSSC qualifications are conducted in the school's/ college's own laboratories. The relevant subject teachers of the schools/ colleges are required to conduct the final practical examinations of AKU-EB.

During the course of science practical examinations, students will be required to demonstrate the following abilities:

- use of appropriate instruments, devices and apparatus for a given problem

- accurate observation relevant to the experiment being performed
- description of various objects and scientific phenomena
- performance of relevant and basic laboratory techniques
- safe handling of chemicals, apparatus, biological material and devices
- drawing of conclusions based on experiments, observations and programming

## 4. Administration of Practical Examinations

Instructions for Setting up Science Laboratory will be sent to schools/ colleges several weeks in advance before the start of the examination session by AKU-EB. Practical examinations must be carefully planned according to the laboratory instructions to ensure that students are able to perform effectively. A proper and comfortable environment for the exam performance is a major consideration requiring the full cooperation of the head teacher/ Principal.

In order to safeguard the security of the practical examination material and maintain integrity of the examination environment, the staff involved should have a clear understanding of the rules and regulations governing the conduct of science practical examinations and should be able to implement these on the day of the examination. These rules and regulations will be covered in detail throughout this document. However, if the school still have any queries, can contact AKU-EB via email at [examination.board@aku.edu](mailto:examination.board@aku.edu).

### 4.1 Shift System

If the number of candidates entered for a practical examination is greater and cannot be accommodated at one time, then AKU-EB will pre-assign candidates into multiple shifts according to the capacity of the laboratories. The pre-assigned candidate shift schedule will be sent to schools/ colleges several weeks in advance before the start of the examination session by AKU-EB.

- The pre-assigned shift schedule also ensures that almost every candidate in a shift receives a separate and distinct booklet, as there are usually a few stages having a number of possible tasks in each stage that are examined in any given practical. This minimises the risk of cheating and increases the ability of students to work independently.
- All students must take the practical exam on the same day and there is a specified interval of 25 minutes between the shifts.
- Careful arrangements must be made to keep the groups apart until all candidates have completed the practical examination in the allocated time.

### 4.2 Before the Examination

#### 4.2.1 Responsibility for Setting up the Science Laboratory

To facilitate the setting up of the laboratory, AKU-EB will provide the following resources in advance of the science practical examination:

- Instructions for Setting up Science Laboratory
- Candidates' Shift Schedule
- Admit Cards for each candidate

Based on the Instructions for Setting up Science Laboratory, the examiners with the support of the head teacher/ Principal will be responsible for ensuring that all the required materials and software are available to facilitate the conduct of the practical examinations.

Upon receiving the Candidates' Shift Schedule (See Appendix A), it is the responsibility of the school to ensure that all candidates are notified of the time that they are expected to arrive on the day of the exam. The Candidates' Admit Cards (See Appendix B) will also reflect the pre-assigned shift timing.

When setting up the laboratory for the conduct of the science practical examinations, it is vital to have sufficient human as well as material resources. Successful administration of the practical examination requires the support of relevant subject teacher(s) [who act as examiner(s)], laboratory assistant(s), school-appointed invigilator(s), and other administrators, including the head teacher/ Principal.

The **examiners** will be responsible for:

- setting up the laboratory for the relevant examination according to AKU-EB's instructions
- ensuring the supply of the required material and availability of software on the day of the examination
- collecting the School's/ College's Laboratory Record (portfolio/ practical journal) of each candidate as they enter the laboratory on the day of the exam
- taking candidates' attendance
- completing the candidates' assessment sheets by allocating appropriate marks
- collecting and securing the storage of the examination material from the allocated room in the school/ college

The **laboratory assistants** will help the examiner(s) to:

- set up the laboratory before and after each shift
- ensure all charts and any pertinent information regarding practical activities are covered that could assist students in their performance. For example, periodic tables, diagrams of different human systems, circuit diagrams, safety symbols, flow charts, entity relationship diagrams and other relevant material
- provide technical assistance as well as supply the required material to students during the practical examination
- deal with any emergencies such as accidents arising during the conduct of practical activities

The **school-appointed invigilators** will be responsible for:

- maintaining discipline in the laboratory while ensuring that candidates do not communicate, seek or give assistance, or disturb other candidates once the examination has started
- attending to the candidates' needs
- ensuring the security of the examination material
- maintaining the integrity of the examination environment

### **4.2.2 Collection of Papers**

The school will receive a consignment from AKU-EB which contains the practical exam material (exam boxes - See Appendix C). A nominated person from the school will collect the practical exam material (exam boxes) to safely store them in a lock & key facility. The school authorities will ensure that the practical exam material should not be damaged or opened by any means.

According to the practical exam's timetable, the appointed person at the school is responsible to collect practical exam material (exam boxes) available at a lock & key facility to conduct practical examinations.

The AKU-EB consignment (exam boxes) will contain:

- Personalised Examination Booklets (packed according to the candidate shift schedule)
- Marking Schemes
- Candidate Assessment Sheets (to be used to record candidate attendance and assessment)
- Spare Examination Booklets
- Address Labels (for the return consignment to be sent back to AKU-EB)

### **4.2.3 Instructions for Candidates**

The following rules must be enforced by all the participating schools/ colleges to ensure a fair and consistent exam experience for the students:

- all candidates must arrive at the school at least 45 minutes before the scheduled shift start time
- all candidates must bring their admit cards, transparent stationery pouches, relevant calculators (simple for SSC and scientific for HSSC) and their School's/ College's Laboratory Records (portfolios/ practical journals)
- all candidates must be in full school uniform (except private candidates)
- all candidates should wear laboratory safety coats in science practical examinations
- entry into the science laboratory is only permitted to candidates whose admit cards match the appropriate examination shift schedule

## **4.3 On the Examination Day**

Ideally, for every 15-20 candidates, there should be at least one subject teacher (examiner), one laboratory assistant, and two invigilators. The school/ college staff should ensure the availability of a functional clock in the science laboratories. Clock should be visible to all the candidates while their exam is in progress.

Prior to the candidates' arrival for the examination, school appointed staff (as mentioned above) should ensure that everything is placed in an orderly manner. The staff should wear venue staff ID cards. They should ensure that informative signages inside and outside the laboratories must be strategically and visibly placed for the convenience of the candidates.

It is extremely important to begin and end each examination shift on time, so that each following shifts are not affected.

### **4.3.1 Identity Check and Deposit of Belongings**

There must be a separate room where all candidates check in for their examination at least 45 minutes before the start of their shift. One of the two invigilators should be present there at all times throughout the day to check each candidate's ID using the student's admit card before they are allowed to enter the science laboratory. The candidates must be isolated so that there is no communication between the candidates while entering for the examination and those who are leaving after finishing their examination.

Examiners and invigilators must ensure that the candidates should not bring any unauthorised materials such as mobile phones, bags, books, handwritten notes, and file covers inside the laboratory.

### **4.3.2 Candidates' Portfolios**

The School's/ College's Laboratory Record (portfolio/ practical journal) is the collection of practical work that each candidate has completed throughout the academic year. The candidates should bring their portfolios and submit them to the examiner as they enter the laboratory on the day of the examination.

### **4.3.3 Starting the Practical**

Examination booklets must be unsealed in the presence of any two candidates at the beginning of each shift.

Once all the candidates for the shift are inside the laboratory, the examiner should open the sealed booklets, remove the Candidates' Assessment Sheets (CAS) (See Appendix D), and circulate these to each candidate to sign. After all candidates in the shift have signed, the examiner should distribute the booklets.

## **4.4 During the Examination**

During the practical examination, it is recognised that some movements by candidates and spoken instructions may be necessary; these must be limited to those which are essential to achieve the objectives of the examination and must not compromise the integrity of the exam environment.

Examiners and laboratory assistants should limit their interactions with the candidates in providing technical assistance and supply of apparatus.

Examiners should at this time also be circulating amongst their assigned students to allocate marks stage-wise as the practical activities are being performed rather than leaving the assessment until the end of the practical, as assessment at the end, dependent upon memory, is extremely difficult.

Examiners should also periodically remind candidates of the time remaining to finish their examination, especially taking care to announce when there are five minutes remaining to ensure the timely completion of the practical.

#### 4.4.1 Use of Spare Booklet

Spare examination booklets with separate marking schemes will be provided for use in emergency cases, for instance if a candidate's original examination booklet is damaged beyond use due to a laboratory accident. All cases of unsealing a spare examination booklet must be justified in writing with a reasonable cause.

#### 4.4.2 Late Arrivals

In case, a candidate is unable to reach the centre on time for the shift, but there is at least fifty percent (50%) time remaining, the candidate may attempt the examination without any extra time allowance.

Where the candidate comes after 50% of a shift is over, he/she should be marked **absent** and will appear in the Re-sit Examinations.

#### 4.4.3 Attending to Candidates' Requests

During the examination, supporting staff such as school-appointed invigilators should attend to the candidates' needs regarding, water, medical help, etc.

They should never attempt to interpret the examination questions for the candidate or assist in solving a question, identifying an apparatus, or pointing out where a named piece of apparatus is kept.

No candidate should be allowed to leave the laboratory during the conduct of the science practical exams.

#### 4.4.4 Spot Checks by AKU-EB Appointed Vigilance Team

Please note that all affiliated schools/ colleges will receive one or more spot check visits by representatives of the Board; these will be unannounced. AKU-EB nominated vigilance personnel will be visiting schools to ensure that transparent and reliable practical examinations and assessments are conducted. Failure to abide by prescribed rules and regulations for conducting practical examinations may cause AKU-EB to withhold candidate results and initiate disciplinary action against the school's administration.

During their visits, AKU-EB vigilance personnel will focus on the following aspects of conducting examinations that:

- the candidate's identity matches his or her admit card issued by AKU-EB
- the students are wearing appropriate attire (lab coats) as per the given instructions
- only the examination material for the current and completed shifts has been opened
- the examination booklets are opened shift-wise in the presence of the candidates
- the school has provided the appropriate apparatus/ devices along with installation of required software and other materials to enable the proper conduct of the practical activities
- the assessment of candidates is carried out while the candidates are performing the practical examination



- the marks on School's/ College's Laboratory Records (portfolios/ practical journals) are allocated accurately on the day of the examination and the work is retained by the school for AKU-EB's reference until after the release of results
- the previous day's practical examination booklets are stored in the head teacher's/ Principal's safe custody
- the security and integrity of the examination environment is not compromised in any way

#### **4.5 Ending the Examination Shift**

Remain vigilant and collect all booklets before departure of the candidates once the examination is over. Ensure that no materials are taken out of the laboratory. Also ensure that there is no contact between the candidates leaving the examination and those entering for the next shift(s).

#### **4.6 Between Shifts**

Once the allocated time period is over for one shift, the examiner should complete any remaining portions of the Candidate Assessment Sheet for that shift during the 25-minute interval before the next shift begins. Remarks where required should truly represent the candidates' performance of the task. The bubbles in the assessment sheet should be shaded in pencil.

This is also the time when the examiner reviews and assesses the candidates' School's/ College's Laboratory Records (portfolios/ practical journals) allocating appropriate marks on the Candidate Assessment Sheet (CAS). In order to ensure that the School's/ College's Laboratory Records (portfolios/ practical journals) are not used or reproduced by any other candidate, the examiner must strike through the pages.

Examiners must retain all School's/ College's Laboratory Records (portfolios/ practical journals) until AKU-EB releases the examination results for the year and be ready at any time to produce a candidate's School's/ College's Laboratory Record (portfolio/ practical journal) to a member of the AKU-EB vigilance team if he/ she wishes to verify it.

#### **4.7 Preparing for the Next Shift of Candidates**

While the examiner is filling in the candidates' assessment sheets, the laboratory assistants should be cleaning and replacing used apparatus and making laboratory arrangements for the next shift. The laboratory must again be prepared for the examination according to the Instructions for Setting up Science Laboratory sent earlier.

#### **4.8 Handling Emergencies**

Supporting staff should always be physically and mentally prepared to handle emergency situations such as sudden illness, fire or any other accidents, as they can occur at any time without warning.

With the assistance of the support staff in each laboratory, the emergency should be handled with as little disruption during the examination as possible. One laboratory assistant should take the injured candidate outside of the laboratory for treatment. Depending on the severity of

the injury, the candidate should be either sent back to the laboratory to complete his or her examination or sent home and asked to appear in the next examination session.

#### **4.9 Packing the Examination Booklets**

Great care must be taken while packing the examination booklets. Examiners should not bend the examination booklets and assessment sheets. They are required to sign all Candidates' Assessment Sheets (CAS) before packing them. They must also count and ensure that all examination booklets are packed according to shifts in the transparent polybag provided, along with the assessment sheets and any absentee's booklet. The transparent polybag should be sealed after each shift.

At the end of the day, all of the transparent polybags should be returned inside the opaque and white centre pack. The sealed centre pack should then be labelled with the return information sticker provided inside it and handed over to the head teacher/ Principal to be stored in a safe place.

After the completion of practical exams, the school will seal all the exam material boxes in a pre-provided sack and keep in safe custody until the TCS (courier service) representative collects it.

TCS will collect the sealed sacks during specified dates from the school for onwards delivery to AKU-EB. The school should only provide the exam material to the TCS staff when they produce "AKU-EB's Authority Letter".

### **5. Conclusion**

Since practical are part of school-based assessment, the success ultimately depends on how well the schools'/ colleges' administrations understand their roles and responsibilities during the examinations. It is therefore highly imperative that they completely understand their role and obligations at the examination centre.

AKU-EB expect that this informative document will assist the schools/ colleges greatly in understanding their role and responsibilities in conducting the science practical examinations and that they would be able to perform their responsibilities efficiently. Nonetheless, if the school still have any queries, can contact AKU-EB via email at [examination.board@aku.edu](mailto:examination.board@aku.edu).

**APPENDICES****Appendix A: SHIFT SCHEDULE**

AGA KHAN UNIVERSITY EXAMINATION BOARD CANDIDATE PRACTICAL SHIFT SCHEDULE SSC PART I ANNUAL EXAMINATION 2015					
School Code: 0068					
School Name: Ghulaman-e-Abbas School					
Exam Date	Subject Name	Shift ID	Time Duration	Candidate ID	Candidate Name
06-Apr-2015	Physics	1	8:45:00 AM to 9:25:00 AM	01867 01868 01869 01870 01871 01872 01873 01874 01875 01876	ASAD ALI SAKHIRANI ASHIQ ALI DANIYAL-UL-HASAN FAIZYAB ALI FARAZ AHMED GHULAM BAQIR GHULAM MUSTAFA HAIDER ALI HAIDER ALI HASNAIN ABBAS
		2	9:50:00 AM to 10:30:00 AM	01877 01878 01879 01880 01881 01882 01883 01884 01885 01886	HUSSAIN ABBAS IMRAN AHMED KASHIF ALI KUMAIL RAZA MAZHAR ABBAS MOHAMMAD ASKARI MOHAMMAD MEHDI MOHAMMAD WASIF MOHAMMAD WASIF MOHAMMAD ZEESHAN

**Appendix B: ADMIT CARD**

**Aga Khan University Examination Board**  
**SSC PART I MAY EXAMINATION 2016**  
**CANDIDATE ADMIT CARD**

**Full Name:** [REDACTED]  
**Daughter of:** [REDACTED] 3AIG  
**Candidate ID:** 01253  
**Subject Group:** Science  
**School Code:** 0004  
**School Name:** NASRA SCHOOL (KORANGI CAMPUS)

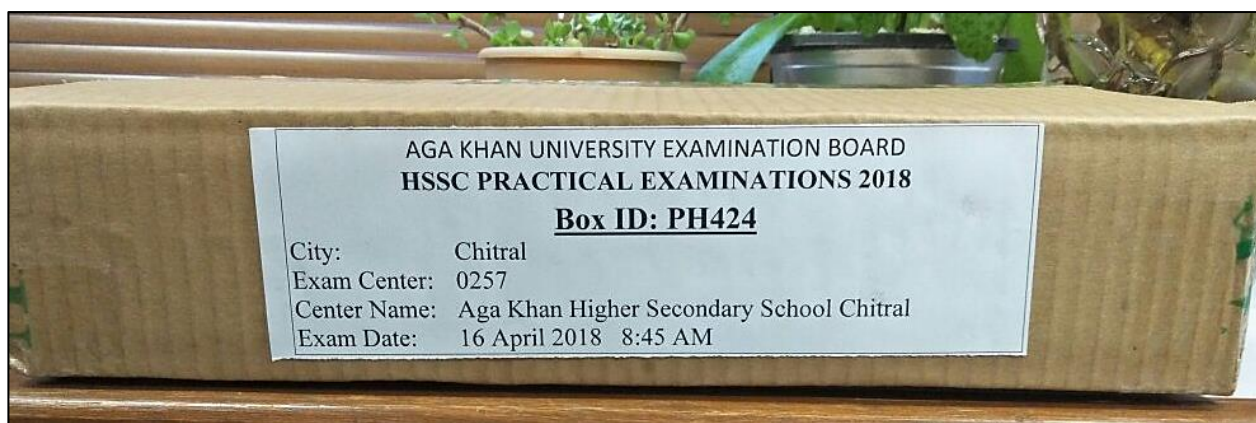
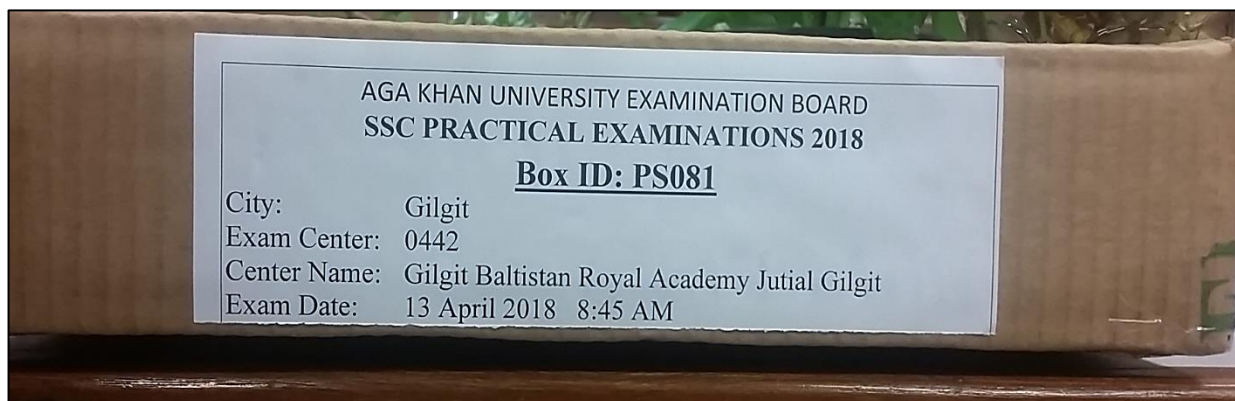
**Practical Exam Centre:** Nasra School (Korangi Campus)  
**Address:** Dar-us-Salam Co-operative Housing Society Ltd., Sector 31, Sub Sector 'F', Korangi, Karachi

**Theory Exam Centre:** Habib Public School  
**Address :** (Boys Branch) Moulvi Tamizuddin Khan Road, Sultanabad, Karachi

**Examination Timetable**




Date	Start Time	Subject	Medium	Duration
Mon, Apr 04, 2016	08:45 AM	Chemistry - I (Pr)	English	40 Mins
Wed, Apr 06, 2016	08:45 AM	Physics - I (Pr)	English	40 Mins
Fri, Apr 08, 2016	08:45 AM	Biology - I (Pr)	English	40 Mins
Sat, Apr 30, 2016	09:30 AM	Biology - I (Th)	English	180 Mins
Wed, May 04, 2016	09:30 AM	Mathematics - I	English	180 Mins
Sat, May 07, 2016	09:30 AM	Chemistry - I (Th)	English	180 Mins
Mon, May 09, 2016	09:30 AM	Islamiyat - I	Urdu	120 Mins
Thu, May 12, 2016	09:30 AM	English Compulsory - I	English	180 Mins

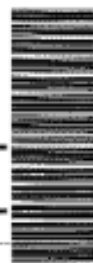
### Appendix C: EXAM MATERIAL BOXES



Note: For SSC, the Box ID starts with **PS**; and for HSSC, it starts with **PH**.

**Appendix D: CANDIDATE ASSESSMENT SHEET (CAS)**

<b>AGA KHAN UNIVERSITY EXAMINATION BOARD</b> <b>SSC Part I Annual Examination 2014</b> <b><u>Candidate Assessment Sheet</u></b> <b>Computer Science - I (Pr) - 11 April 2014</b> <b>Shift-Duration: : 8:45:00 AM to 9:45:00 AM</b>																																											
Supervisor Name: _____ Supervisor Signature: _____																																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Attendance Status</th> </tr> <tr> <td style="text-align: center;">Present <input type="radio"/> P</td> <td style="text-align: center;">Absent <input type="radio"/> A</td> </tr> <tr> <td colspan="2" style="text-align: center;">  </td> </tr> <tr> <td colspan="2" style="text-align: center;">                     Candidate Signature                 </td> </tr> </table>	Attendance Status		Present <input type="radio"/> P	Absent <input type="radio"/> A			Candidate Signature		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">Candidate Name : MIRZA HASSAN BAIG</td> <td colspan="2">Candidate ID : 01189</td> </tr> <tr> <th colspan="4" style="text-align: center;"><u>Marks Detail</u></th> </tr> <tr> <td>Portfolio</td> <td><input type="radio"/> 0</td> <td><input type="radio"/> 1</td> <td><input type="radio"/> 2</td> <td><input type="radio"/> 3</td> </tr> <tr> <td>Stage I</td> <td><input type="radio"/> 0</td> <td><input type="radio"/> 1</td> <td><input type="radio"/> 2</td> <td></td> </tr> <tr> <td>Stage II</td> <td><input type="radio"/> 0</td> <td><input type="radio"/> 1</td> <td><input type="radio"/> 2</td> <td><input type="radio"/> 3</td> <td><input type="radio"/> 4</td> <td><input type="radio"/> 5</td> <td><input type="radio"/> 6</td> </tr> <tr> <td>Stage III</td> <td><input type="radio"/> 0</td> <td><input type="radio"/> 1</td> <td><input type="radio"/> 2</td> <td><input type="radio"/> 3</td> <td><input type="radio"/> 4</td> <td></td> <td></td> </tr> </table>	Candidate Name : MIRZA HASSAN BAIG		Candidate ID : 01189		<u>Marks Detail</u>				Portfolio	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Stage I	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2		Stage II	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	Stage III	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4		
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