9th International Junior Science Olympiad 2012 Iran

IJSO BOOKLET

Ariaian Young Innovative
Minds Institute
AYIMI

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To all the participants from several countries in IJSO 2012:

On behalf of the people of Tehran, the venue of 9th International Junior Science Olympiad (IJSO), we all the board members of Ariaian Young Innovative Minds Institute (AYIMI) would like to extend a very warm and hearty welcome to all of you as the students, team leaders, international honorary guests and ambassadors in IJSO 2012 in Iran.

To achieve optimum synergy in educational community AYIMI as a unique private institute has accepted hosting tournaments such as IJSO and IYPT two years successively in 2011 (with 22 countries) and 2012(with 32 countries) for the first time in Iran. We know these activities play an important role in encouraging students in active learning and making relationships among students around the world from an early age (one of the aims of IJSO too). Although it was so difficult for us as a private institute to organize this great event without any financial support, but we are honored that after these prestigious event we have succeeded to introduce several scientific activities in our country and attract more people to find the relation between science and their real life.

Although our country is in sanction and it causes many economic issues but we have decided to stand against this problem. In IJSO 2012 all the proposed financial supports were rejected at the last moments because of the economic problems but AYIMI accepted to afford the accommodation, tournament venue, discussion and translation rooms, foods, excursions, experimental equipment, medals, certificates and all other expenses. Imam Ali Complex was suggested by the manager, Mrs. Ale Agha at last night of the 9th IJSO and AYIMI would like to give the special thanks to her great efforts in closing ceremony.

The pure sciences always seem to have some relevance to the solution of everyday problems and we should work together to make sure our students if they learn science practically it will help them to live better.

AYIMI Board Members

Welcome Speech

Dear all IJSO Participants, I am sure all of you are so exciting to see Iran for the First time. I myself found out when I visited Tehran for the first time last July, that the Iranian People are so polite, which is the typical of the Asian people. Now you may prove yourself about All News that you have heard about Iran before you arrive in Tehran, the Capital city of Iran. I know that some of leaders were having hard time to convince some of your parents, so that they let you joint the 9th IJSO. I myself as the president of IJSO having a bit hard time to convince all the member of IJSO to join the 9th IJSO. However, not all of IJSO members able to join us here in Iran this year. We clearly state at the statute of IJSO, that IJSO is purely the Science Competition among young students for all countries, but some country still not able to joint us, because they do not have permission from their government.

For all of you who are here in Tehran Iran for the 9th IJSO, I do really appreciate your participation. I am sure, you all will not regret for the decision that you made to join the 9th IJSO. I am sure, the Organizing Committee of the 9th IJSO will make our stay here in Tehran will be as convenient as possible. In this way, you may the witness to tell to your people how truly Iran is, when you all return to your country.

While you stay here, for the sake of the success of the 9th IJSO, I do strongly advise you to obey all the rule of the IJSO, especially the rule that the Organizing Committee of the 9th IJSO produce. Please listen carefully and obey your guides at all time, and also try to enjoy all activities that you are going to do. I wish you all have a good and fair Science Competition and also have a pleasant stay here in Iran.

President of IJSO,
Prof. Dr. Masno Ginting.

Welcome Speech

In the name of God

Thanks Almighty God helps us to consider our real world. It is our duty to care about our planet. Earth is a very important part of our lives. Most of us are polluting our planet by misuse and overuse of our natural resources. As responsible individuals we should at least do what we can to help reduce, reuse, and recycle. All of you as the young scientists can improve the living on Earth by your innovative minds and learning basic sciences practically.International Junior Science Olympiad, IJSO, is one of the activities which engage students in learning science more efficiently. We are delighted to have you here to participate in the 9th International Junior Science Olympiad, IJSO, hosted by Ariaian Young Innovative Minds Institute, AYIMI, regardless of race or creed. Our mission is to provide an attractive environment among junior students to compete with each other in a friendly manner.We are honored to have professors and teachers as leaders, observers and visitors from around the world with us today which all of them are specialists in teaching young children. On behalf of the Ariaian Young Innovative Minds Institute, AYIMI, I would like to thank all the universities, schools, organizations and also parents of the young scientists for their step by step assistance and also by sending their delegates and participants from several countries to provide challenged, excited and inspired competition. Although organizing this great event is very hard but gives the chance to introduce host countries' culture and tradition to other countries and also it helps more scientific organizations attract to activities such as IJSO. The Iranian plateau today is a land surrounded by high mountains and spotted by warm lowlands. The capital city of Iran is Tehran, a diverse and wonderful city that offers everything from traditional Iranian culture and architecture to modern services and buildings.Museums and Bazar in Tehran are some of the places for sightseeing during IJSO 2012 and we hope you all enjoy. I want to say once more on behalf of the organizing committee, welcome. It's a pleasure to see so many of you here in December 1-10, 2012.

Dr. Dina Izadi
Head of IJSO 2012 Local Organizing Committee
Ariaian Young Innovative Minds Institute, AYIMI, President

Welcome Speech

In the Name of God,
the Compassionate, the Merciful

The 21st century is facing a number of challenges among which Science and Technology, Future and the Strategies issues are the most significant ones.
Science and Technology related issues and strategies have enormous impact on the socio-economic development of many nations. Especially developing countries, that is why these topics have been the focus on areas of attention for researchers and policy makers during the last decades. In view of successful outcomes of the 8th previous International Junior Science Olympiad (IJSO) on physics, chemistry and biology, and considering the mandate of I.R. of Iran, Ariaian young Innovative Minds Institute (AYIMI), preparations are made for the 9th IJSO in Dec. 2012.

I would like to take this opportunity to thank all the countries, whose contribution added to the enhancement of this Olympiad. I must also thank all my dear colleagues in scientific and organizing committee. The Olympiad could not have been organized without the contribution of the organizations and their contributed support is gratefully acknowledged.
I hope that holding the 9 IJSO can be a great step towards dissolving the difficulties by science deficiency in our Islamic beloved country.

Dr. Masoud Torabi Azad
Associate Prof. Islamic Azad University North Tehran Branch
Ariaian Young Innovative Minds Institute, AYIMI, Vice President

Welcome Speech

In the name of God

Thanks God permit us to educate our children what we learned. Thanks God taught us how to improve science and knowledge in order to live better and enjoy our life The International Junior Science Olympiad (IJSO) is an outstanding event and we are glad to host in Islamic Republic of Iran in 2012. Greetings to all young scientists, team leaders, team members, honorary guests, Executive Committee members and all the organizers. We welcome all of you and congratulate you as young scientists have been succeeded to present your knowledge as the delegate from your country. Participating in this great Olympiad assist you to find the best way in your future career and is the key to progress in your life. Team leaders support young researchers by their experience which acquires skills that may be of great benefit to all young students.

We will do everything possible to hold a successful Olympiad in Physics, Chemistry and Biology in our country.

I hope the IJSO 2012 will be a fantastic event and unforgettable stay for all the participants and wish the best of luck for the competitors.

Dr. Farshad Ebrahimpour
Payame Noor University Tehran, PNU, President
Ministry of Science , Research & Technology

Welcome Speech

In the name of GOD which gave us a clear mind to help each other in learning and educating.

On behalf of the National Institute for Genetic Engineering and Biotechnology (NIGEB) I would like to extend a warm invitation to you to attend the 9th International Junior Science Olympiad, IJSO, in Tehran, capital of Islamic Republic of Iran.

The previous IJSO have witnessed the development of a relatively new area of interest in learning basic sciences such as Physics, Chemistry and Biology. Various aspects of biology and genetic process are performing in the National Institute for Genetic Engineering and Biotechnology (NIGEB) and we are glad to host IJSO in Islamic Republic of Iran in 2012. Greetings to all the team members and participants from around the world are going to take part in this great event. We welcome all of you and will do everything possible to hold a successful Olympiad in Physics, Chemistry and Biology in our country.

During this competition and social-cultural events, please take time to get to know friends and enjoy your stay in Iran. We hope that you will join us in making this event another great success.

Prof. Abbas Sahebghadam Lotfi
Director General
NIGEB
Ministry of Sciencem Research & Technology

Professor Maciej Kolwas
Institute of Physics,
Polish Academy of Science,
European Physical Society

International Junior Science Olympiad 2012 took place in Teheran hosted by Ariaian Young Innovative Minds Institute under supervision of Dr. Dina Izadi. The competition was organized at National Institute of Genetic Engineering and Biotechnology (NIGEB), modern scientific institution providing technical assistance. We and students had spent there a lot of time. We were discussing problems and tests then students were solving them. The conditions for preparation of meetings were of basic value since they made it possible effective work and discussions.The discussions conducted by Iranian scientists were very detailed and in reality had lead not only to good formulation of problems to be solved later by students but (what is very important) to consolidate society of teachers, coaches and scientists participating in the meeting. The social program of the Olympiad served to this consolidation as well. Visiting of historically interesting places in Teheran make possible to discuss in relaxed atmosphere problems of teaching science, promotion of science and cooperation between teachers and scientists, to motivate pupils to study science and engineering.

The ancient Olympic Games were a series of athletic competitions among representatives of various city-states of Ancient Greece. Our Junior Olympiad differs a little bit – participants compete in scientific knowledge rather than in sport. But the rest of principles were similar to ancient ones:

- Rivalry was honest and friendly.
- The participants were competing only during competi tion. During free time they made friendships – international and national as well. This was extremely important. I would say that these friendships were more important even than results of competition

One can ask - why friendship is more important than competition. There are many reasons:

First -because in densely populated world only cooperation can lead to success in any action.

Second- the advancement in science and technology is so complex, that only cooperation several scientists having different abilities and skills are really necessary for further development. And further development is really necessary to face World grand challenges – lack of energy, environment protection, health protection, aging of the human population etc.

Third reason for friendly relations is following: the strongest driving force for development of mankind is the beauty of science and pleasure of creativity. But the passion of knowledge should be shared with other people just for effectiveness of work and protection of scientific culture. I wish all participants to preserve the curiosity of World and passion for knowledge, together with creativity in the entire life.

I think that IJSO in Teheran served very well to reach these goals. Additionally we all were very satisfied because of the opportunity to meet each other and to visit Teheran, to meet there very open, friendly and nice people and to enjoy commonly spent time

Thank you very much for this possibility, efficient work of organizers leading to the success of the meeting and good luck for everyone!!!

Prof dr hab. Maciej Kolwas
Institute of Physics, Polish Academy of Science,
European Physical Society

IJSO Executive Committee Members

	Professor Masno Ginting from Indonesia as the President of IJSO		Dr. Michael Cotter from Ireland as the Treasurer of IJSO
	Dr. Paraic James from Ireland as the Vice President of IJSO for EUROPEAN REGION		Ms. Sophia Aworti from Ghana as the Secretary General of IJSO
	Professor San Cheon Lee from South Korea as the Vice President of IJSO for ASIAN REGION		Dr. Heide Peters from Germany as the Public Relation Office of IJSO
	Mrs. Carola Graziosi from Argentina as the Vice President of IJSO for AMERICAN REGION		Mr. Antoine from Australia as the Vice President of IJSO for AUSTRALASIA REGION
	Professor Robin Powles from Africa as the Vice President of IJSO for ZIMBABWEAN REGION		

IJSO 2012 Local Organizing Committee

Dr. Dina Izadi	Chairwoman of IJSO 2012 LOC , AYIMI president
Dr. Masoud Torabi Azad	IJSO 2012 LOC , AYIMI Vice president
Dr. Ramin Zibaseresht	IJSO 2012 LOC, AYIMI Board Member
MSC. Nona Izadi Panah	IJSO 2012 LOC, AYIMI Board Member
MSC. Hassan Bagheri Valoojerdi	IJSO 2012 LOC , AYIMI IT manager
Dr. Aria Ashja Ardalan	IJSO 2012 LOC, AYIMI Board Member
Dorna Izadi Panah	IJSO 2012 LOC, AYIMI Board Member
Amin Canaan	IJSO 2012 LOC , AYIMI Grafist & Designer
Hamidreza Izadi panah	IJSO 2012 LOC, AYIMI Financial Manager
PhD. Zahra Gholami	IJSO 2012 LOC

The IJSO is organised in late November or early December by the National Organising Committee (OC) of one of the participating countries on behalf of its National Government, its Ministries or its official Institution(s). The competition has to be conducted on the territory of this nation. The duration of the Olympiad (including the arrival and departure days) should not be less than 9 days.

English is the working language of the IJSO and competition problems and their solutions should be presented to the IJSO International Board (IB) and team leaders in English.

The Organising Committee (OC) of the IJSO must be completely independent and separate from the local Country Coordinator (loc CC) responsible for the selection and training, etc, of the Host Country Team. The appropriate Governmental Department or Institution(s) of the host country on whose territory the competition takes place appoints the Organising Committee (OC) to run the IJSO on behalf of the host country. The OC should produce a set of "Organisation Rules" based on the statutes. These must be sent to the delegation leaders of the participating countries in good time. These Organisation rules shall give details of the IJSO not covered in the statutes including the names and addresses of the institutions and persons responsible for the IJSO. The OC shall provide a detailed program for the competition including the schedule, program of excursions, etc, which is sent to the delegation leaders of the IJSO. The OC is obliged to publish the IJSO proceedings in English. Each participant should receive one copy of the proceedings free of charge not later than one year after the competition.

IJSO 2012 Scientific Committee

 **Dr. Mohammad Rabani**	PhD: Analytical Chemistry , Salford University, Manchester, England, 1988- 1992 IJSO 2012 Chemistry Scientific Committee Member	 **Dr. Mahmoud Vahdat Roshan**	PhD : Radiation measurements and applications, Fusion Researches, Nanyang Technological University, Singapore ,2010 IJSO 2012 Physics Scientific Committee Member
 **Dr. Mozhgan Emtyazjoo**	PhD: marine biology Science and Research Branch ,Islamic Azad University,Tehran–Iran, 2000 IJSO 2012 Biology Scientific Committee Member	 **M.Sc. Farzin Ghafarnezhad**	M.Sc: Theoretical Physics, University of Tabriz, Iran IJSO 2012 Physics Scientific Committee Member
 **Dr. Maryam Zoghi**	PhD: Medical radiation Engineering, Polytechnique University, Tehran, Iran. IJSO 2012 Physics Scientific Committee Member	 **Dr. Maryam Ghasemloo**	PhD: Atomic and Molcular physics (hot Plasma), Islamic Azad University IJSO 2012 Physics Scientific Committee Member

IJSO 2012 Scientific Committee

 **M.Sc. Payam Behzadi**	PhD student of Molecular Biology Molecular Biology Research Center, Baghiyatollah University ofMedical Sciences, Tehran IJSO 2012 Chairman and Biology Scientific Committee Member	 **Dr. Shahla Mohammad Ganji**	PhD: Molecular Genetics , Naional institute of genetic Engineering and Biotechnology IJSO 2012 Biology Scientific Committee Member
 **Dr. Mehdi Hosseini-Mazinani**	PhD: Genetic Biochemistry, Hokkaido University, Japan 1995 IJSO 2012 Biology Scientific Committee Member	 **MSc. Mohammad Hashemzadeh**	MSC. Sharif University IJSO 2012 Chemistry Scientific Committee Member IJSO 2012 Chemistry Scientific Committee Member
 **Ali Asghar Aghajany**	BSc. student (Current) Sharif University IJSO 2012 Chemistry Scientific Committee Member	 **Dr. Kasra Esfahani**	PhD: Molecular Genetics , Naional institute of genetic Engineering and Biotechnology IJSO 2012 Biology Laboratory Coordinator

IJSO 2012 Guides

Seyed Shahrooz Mirjalali
Ehsan Rahmati
Zahra Gholami
Mohammad Tabib Jam
Kiarash Vazirzadeh
Sahar Tavangar
Mehdi Kaji
Saghar Bakhtiari
Seyed Ali Harati
Hossein Ostvar
Saba Asadi
Arsham Ghasemi
Mohsen Shokri
Afsoon Kashkalani
Pooyan Rajabzadeh
Morvarid Ahmad Joshaghani
Moin Nazari
Nikoo Mahammad Alizadeh
Ashkan Abbasi
Yashar Vazirzadeh

IJSO 2012 EC Meeting

Ariaian Young Innovative Minds (AYIMI) invited Professor Masno Ginting , IJSO president (until the end of IJSO 2012) and, Dr. Paraic James, European vice president to attend the annual EC meeting which is held in host country every year.The venue was Hotel Persia. The EC meeting opened on on June 20, 2012 and closed on June 23. They met some of the LOC and SC members of IJSO 2012 and visited a research center which was under reconstruction to accommodate participants in December.

Saad Abad Museum was a part of city sightseeing in Tehran that AYIMI provides them as one of the most beautiful museums in Iran.

Participants in IJSO 2012:

Flag	Countries	Participants	Flag	Countries	Participants
	**Afghanistan**	Musa Ausar(Leader) Mohammad Javad Mohammad Asef (Student) Abdul Qahar Valadsarwarkhan(Student) Firoz Sayed Rahaim(Student)		**Cambodia**	HONG KIM SOR(Student) CHAO KEANG YIN(Student) VON VEASNA(Student) PRAK SIVHUO(Student)
	**Azerbaijan**	MEHMET METE CALISKAN(IOC) ELMADDIN MEHRALIYEV(Leader) IZZAT MAMMEDOV (Student) TURAL ALIEV(Student) NIZAMI HASHIMLI(Student) CAVID AHMADOV(Student) ELMAR MAMMADLI(Student) ELMAR MAMMADLI (Student)		**Croatia**	Planinka Pecina(leader) Nikola Herceg(Student) Domagoj Bradac(Student) Matej Rafaj(Student)
	**Brazi**	Ronaldo Fogo (IOC) MarcioDalla Valle Martino(leader) HugoCangussu Marrochio(leader) Pedro Jorge Luz Alves Cronemberger(Student) Gabriel Queiroz Moura (Student) Matheus Evangelista de Souza(Student) Felipe Brandao Forte(Student) Rubens Martins Bezerra Farias(Student) Matheus Henrique Camacho(Student) Antonino Fontenelle Barros Junior(Observer) Herbert José Aquino Sousa(Visitor)		**Chinese Taipei**	I-JY Middle (IOC and leader) YUNG-TA CHANG(Leader) KWOK-TUNG LU(Leader) YUNG-TA CHANG (Observer) YANG,CHIN-HSIANG(Student) CHANG,LAI-HO(Student) YANG,CHE-NING(Student) LAI,KUN-WEI(Student) TSAI,KUN-LIN(Student) HSU,NAI-WEI(Student)
	**Cambodia**	NGOR PENGLONG(IOC and leader) PEN SAMPHEA(Leader) HOUR KHIM(Leader) KIM KINAL(Student)		**Cyprus**	DIMITRAKIS DIMITRIOU (IOC & Leader) NIKOS COSTA AVGOUSTOU (Leader)

Participants in IJSO 2012:

Flag	Countries	Participants	Flag	Countries	Participants
	Cyprus	CONSTANTINOS PHANIS(Leader) ANNA TAPANI(Student) ANDREAS GEORGIOU(Student) GEORGIOS XADJIVASSILIOU(Student) ANDREAS XYDAS(Student) ANTIGONI AVRAAM(Student) PANTELIS GREGORIOU (Student)		**Hungary**	Peter Mihalicz(Student) Hanga Reka Horvath(Student) Daniel Takacs(Student)
	**Estonia**	Siiri Velling(IOC & Leader) Mihkel Pajusalu(Leader) Rudolf Bichele(Leader) Eva-Maria Tonson(Student) Elo Maria Pauman(Student) Oliver Nisumaa(Student) Oliver Kahre(Student) Taavet Kalda(Student) Oskar Voldemar Lahesoo(Student)		**I. R. Iran**	mohammad kashani (Leader) Reza Samadi (Leader) raana alamdaran (Student) zeinab asadi lari(Student) yasaman Keshmiri (Student) Amin Mehdi Ansari Mohseni(Student) Alireza Darzi Ramandi(Student) Mohsen Ghalambor Dezfouli(Student) Keyvan Jahanfar(Student)
	**Hong Kong**	Kin Tak LEUNG (IOC and Leader) Wai Shing CHEUNG (Leader) Wing Yee YAU (Leader) Ching Lok CHONG (Student) Sui Chun Sampson KWAN (Student) Chun Ting LAU (Student) Sik Chi Jonathan LEUNG (Student) Suet Ying Florence TSANG (Student) See Ip YU (Student)		**I. R. Iran**	Iman Karimi Nouri(Student) Saeed Khosh manzar (Student) Mohammadrahim Masoumi(Student) amir Reza Moradi Pour(Student) Amir Reza Salahi(Student) Ahmadreza sazegarnezhad(Student) Seyed Mohamad Bagher Seyedin(Student) Mahdiyar Zamanifar(Student)
	**Hungary**	Attila Villanyi(IOC and Leader) Attila Gyertyan(Leader) Tamas Voros(Leader) Botond Zsolt Oreg(Student) Aron Ricardo Perez-Lopez(Student) Luca Szabo(Student)		**India**	Paresh Krishnakumar Joshi(IOC and Leader) Smita Shyam Marathe(Leader) Prakash K Nawale(Leader) Charles Rajan(Student) Kushal Babel(Student)

Participants in IJSO 2012:

Flag	Countries	Participants	Flag	Countries	Participants
	India	Nikhil Kumar Lakumarapu(Student) Bhavya Choudhary(Student) Pratyush Rajput(Student) Swati Gupta(Student) Deepak Mathur(Observer) Vijay Awadesh Singh (Observer)		**Indonesia**	Tarmidi Ismail Adam (visitor) Ramlin (visitor)
	**Indonesia**	Yasman (leader) Budhy Kurniawan (leader) Agustino (leader) Kevin Limanta (student) Steven Sebastian (student) Viriyadhika Putra (student) Timothy Antoni (student) Dennis Deviandoni (student) Rahmat Waluyo (student) Indonesian Guest Team Mufti Petala Patria (team leader) Djoko Triyono (leader)		**Ireland**	Michael Anthony COTTER (IOC and Leader) Breda Cotter(Leader) Paraic JAMES(Leader) Liz Devine(student) Joshua Mathew(student) Conor David(student) Caroline Anne(student) Jack Angus(student) Neil Joseph(student)
	Indonesia	Rahmat Wibowo (leader) Muhammad Alfiyandi Hariansyah (student) Fienny Angelina (student) Muhammad Mahendra Subrata (student) Tohari Catur Pamungkas (student) Hana Nurhidayati Utami (student) Roihan Mohammad Iqbal (student)		**Kazakhstan**	Yernur Burkitbayevich Rysmagambetov(IOC and Leader) Alexandr Alndreyevich Myagkiy(Leader) Alexandr Khudyakov(student) ZhanarTanirbergenova(student) NazerkeSharauova(student) Daulet Kurmantayev(student) Akan Kadyrbekov(student)
	Indonesia	Supriano (observer) Muhammad Sopian Alibasa (observer) Keri Suprapto (visitor)		**Kuwait**	Abdullah mohammad Aljuwaiser(IOC and Leader) Ahlam Mohammad Behbehani(Leader)

Participants in IJSO 2012:

Flag	Countries		Flag	Countries	Participants
	Kuwait	Abdulwahab abdullatif Alshatti(student) Lojaine taleb Allanqawi(student) Maryam nawaf Alsulaili(student) Shareefa abdulrahman Al-kandari(student) Fareeda Henry(Visitor)		**Myanmar**	Mehmet Koylu(IOC and Leader) IMRAN ESACK DAWOODJEE(student) PYAE HEIN HTET(student) KEVIN KONIKKARA SOJAN(student)
	**Lithuania**	Paulius Lukas Tamosiunas(IOC and Leader) Lukas Taujenis Tomas Kivaras(Leader) Marius Kluonis(student) Dovydas Drakšas(student) Jonas Viršilas(student)		**Netherlands**	Johannes Razenberg(Leader) Emericus de Kleijn(Leader) Anneke Steegh (Leader) Kimberly van Adrichem(student) Susan Bergamin(student) Michael Daas(student) Dylan Keijsper(student) Jelle Soons(student) Jeroen Winkel(student) Johannes Marijnissen (G)
	**Mexico**	Cesar Eduardo Mora Ley		**Nigeria**	KINGSLEY IMADE(IOC and Leader) Felix Aliyu Fus(Leader) Oluwatope Abiodun Adeniran(Leader)
	**Moldova**	VICTOR PAGINU(IOC and Leader) Igor Evtodiev(Leader) Silvia Evtodiev(Leader) Alexandru Cotos(student) Gleb Vizitiv(student) Eugeniu Dimitriu(student) Dionisie Raileanu(student) Vladlena Sure Hornet(student) Stanislav Fridman(student)		**Nigeria**	AnthonyIkechukwuOkonkwo(student) Olumide DamilolaAkinmoju(student) Patrick ChibuikemUdochukwu (student) Augusta UjunwaOnyema(student) Ofure Marion Ewalefo(student) Gracious Ogunkolade(student)

Participants in IJSO 2012:

Flag	Countries	Participants	Flag	Countries	Participants
	**Poland**	Maciej Kolwas		**Serbia**	StanislavTodorovic(student) Nikola Samardzic(student) Janko Randelovic(student) Nikola Spasic(student)
	**Romania**	DANIELA BOGDAN(IOC and Leader) TRAIAN SAITAN(Leader) VICTOR PAUNESCU(Leader) DAN MIRCEA MIREA(student) DIANA ANDREEA CATANA(student) RUXANDRA TESLOIANU(student) ADRIAN MIHAI RADU (student TIBERIU ALEXANDRU PANA(student) ANDREI ILIESCU(student)		**Slovakia**	Frantisek Kundracik(IOC and Leader) Renata Dornhoferova (Leader) Zuzana Coculova(Leader) Martin Plesch(Leader,S) Juraj Jonak(student) Natalia Ruzickova(student) Monika Hruska(student) Veronika Kovacova(student) Gabriela Krajcirova(student) Stefan Kristof(student)
	**Russia**	Valery Slobodyanin(IOC and Leader) Elena Snigireva(Leader) Igor Kiselev(Leader) Pavel Semenenko(student) Mikhail Beliakov(student) Maxim Didin(student) Anton Maksimov(student) Arsenii Sorokin(student) Daniil Rabinovich(student) Alexandr Kobyakin(student)		**South Africa**	Sooklachar (Robin) Naidoo(IOC and Leader) Ronel Marlene Mitchell(Leader) Ugur Hulusi Patli(Leader) Ehsaan Rajak(student) Shivanan Swamivel Pillay(student) Luthando Mdadane(student) Yaseen SayedIsmail(student) Imraan Salot(student) Sankaran Reddy(student)
	**Serbia**	Mico Mitrovic(IOC and Leader) Maja Milenko Stojanovic(Leader Branislava MiroslavMisailovic(Leader) Nikola Milenic(student) Miloje Djukanovic(student)		**Sri Lanka**	Chaminda Mahesh Edirisinghe(IOC and Leader) Sockalingam Harishankar(Leader) Chandana Pushpalal Gallage(Leader) Renuka Sanjewanee Pitadeniya(observer)

Participants in IJSO 2012:

Flag	Countries	Participants	Flag	Countries	Participants
	Sri Lanka	Chandana Pushpalal Gallage(observer) Ushani Madushika Pitadeniya(student) Rathnayake Mudiyanselage Nethmini Nirasha Ratnayake(student) Pathmanathan Meshihan(student) Dalumura Hettige Shane Kavinda Amabhashana(student) Nadun Anjanaka Gallage(student) Nethsara Upeksha Kekulawala(student)		**Turkmenistan**	Halit Coskun(Leader) Orazgeldi Gurbanov(Leader) Davutmuhammet Atamuhammedov(student) Atamyrat Bashimov(student) Merdan Jepbarov(student) Mekan Charyyev(student) Sapargeldi Amangeldiyev(student)
	**Thailand**	CHATCHAWAN CHAISUEKUL(IOC and Leader) ASAWIN SINSARP (Leader) PORNPIMOL PRAYONGPAN(Leader) NANTAWAN CHUENCHOMKUNATORN(Observer) WORANUSH RUNGRUENGCHAROENKUL(Visitor) SIRACHAT CHAROENKASEMWIT(student) CHITIPAT PHETMUNEE(student) SIRADANAI RIMSAKORN(student) ABHIJATMEDHI CHOTRATTANAPITUK(student) CHONLANAT PUETPAIBOON(student) VEERAPATR YOTAMORNSUNTHORN(student)		**Zimbabwe**	**Johan Muller(IOC and Leader)** **Robin James Powles (Leader)** **Federico Bescotti (student** **Skye Janine Davidson(student)** **Uzayr Ahmed Alarakha(student)** **Kumbirai Dominic Mubayiwa(student)** **Sander Salah Modiba Post(student)** **Timothy Craig Hodgson(student)**

IJSO 2012 Schedule December 2012

12/01	Arrival/Registration 18:00-20:00 / Opening Ceremony Welcoming dinner 21:00-23:00 IOC meeting	
	Students	**Leaders/Observers/Visitors**
12/02	7:30-8:30 Breakfast 9:30-16:30 Saad Abad Museum Visit & Tour 19:00- 20:00 Dinner 20:30 All the teams stay at their specific rooms	6:30-7:30 Breakfast 9:00-13:00 Discussion and Translation 13:00-14:30 Lunch 14:30-20:30 Discussion and Translation 20:30 21:30 Dinner 21:30 Discussion and Translation
12/03	6:30-7:30 Breakfast 9:00-13:00 1st Competition 13:30-14:30 Lunch 15:00- 17:00 Science Talk/ game 19:00 20:00 Dinner 20:00- 21:00:free time with leaders 21:00 :All the teams stay at their specific rooms	7:30-8:30 Breakfast 9:30-16:30 Saad Abad Museum Visit & Tour 19:00 20:00 Dinner with students 20:00 – 21:00 Free time with students 21:00-23:00: IB/EC Meeting (on Request)
12/04	7:30-8:30 Breakfast 9:30-16:30 City tour 19:00 -20:00 Dinner 20:30 All the teams stay at their specific rooms	6:30-7:30 Breakfast 9:00-13:00 Discussion and Translation 13:30-14:30 Lunch 14:30-20:30 Discussion and Translation 20:30 21:30 Dinner 21:30 Discussion and Translation
12/05	6:30-7:30 Breakfast 9:00-13:00 2nd Competition 13:30-14:30 Lunch 15:00- 17:00 Science Talk	7:30-8:30 Breakfast 9:30-16:30 Botanic Garden Visit & Tour 19:00 20:00 Dinner with students 20:00 – 21:00 Free time with students

IJSO 2012 Schedule December 2012

	19:00 -20:00 Dinner 20:00 - 21:00: free time with leaders 21:00: All the teams stay at their specific rooms	21:00-23:00: IB/EC Meeting (on Request)
12/06	7:30-8:30 Breakfast 9:30-16:30 Botanic Garden Visit & Tour 19:00 20:00 Dinner 20:30 All the teams stay at their specific rooms	6:30-7:30 Breakfast 9:00-13:00 Discussion and Translation 13:30-14:30 Lunch 14:30-20:30 Discussion and Translation 20:30 21:30 Dinner 21:30 Discussion and Translation
12/07	6:30-7:30 Breakfast 9:00-13:00 3rd Competition 13:30-14:30 Lunch 15:00- 17:00 Science Talk/game 19:00 20:00 Dinner 20:00 - 21:00 free time with leaders 21:00 All the teams stay at their specific rooms	7:30-8:30 Breakfast 9:30-16:30 Bazaar /shopping 19:00 -20:00 Dinner with students 20:00 – 21:00 Free time with students 21:00-23:00: IB/EC Meeting (on Request)
12/08	7:30-8:30 Breakfast 10:00-12:00 game 13:00-14:00 Lunch 15:30- 17:30 game 19:00 20:00 Dinner 20:30 All the teams stay at their specific rooms	7:30-8:30 Breakfast 10:00-13:00 Modification and Moderation 13:00-14:00 Lunch with students 15:00- 17:30 Modification and Moderation 17:00 19:00 IOC meeting 19:00 20:00 Dinner with students
12/09	7:30-8:30 Breakfast 9:30- 12:00 free time	12:00-13:00 Lunch 18:00-22:00Cosing ceremony / Farewell Dinner
12/10	Departure	

IJSO Syllabus

Syllabus for International Junior Science Olympiad (IJSO)
(Adapted from International Baccalaureate Program)

1. Science Skills and Safety :

Understanding scientific methods and working in the laboratory.
Identify and use basic laboratory equipment
Draw scientific diagrams of apparatus
Follow intructions inthe laboratory
Follow safety techniques when using equipment
Measure temperature and volume
Make observations using the five senses
Make inferences based on observations
describe the scientific method
record a science experiment using standard headings
collect, represent and interpret data in tables and graphs
use scientific language

2. Pushes and Pulls :

Understanding of what forces are and what they can do
Describe what forces are and what they can do
Measure forces using a spring balance
Carry out experiments with friction, graity and density
Calculate the density of an object
Explain the difference batween mass and weight
Explain things in terms of the pull of gravity
Say what friction is and explain how it can be helpful or a nuisance.

3. Survival in the Enveronment :

Understanding of how physical and behavioural adaptations help animals survive.
List characteristics that help an organism survive
Define the terms habitat and adaptation
distinguish between an animal›s living ang physical environment
listthe physical conditions that affect aquatic animals
classify adaptations as structural or behavioural
make inferences from observations
research, carry out and write up a study of a particular environment

4.Solid, Liquids & Gases:

Understanding of the differences between solids, liquids and gases.
describe the three states of matter
recall the boiling point of water and the melting point of ice
measure the temperature of melting ice
draw simple graphs
measure mass using a balance
calcute the density of materials
use a particle model

5. Responding:

Understanding of how our bodies senses help us respond to our environment.
describe the various senses in our body
define the terms stimulus and respond and how they relate
describe how nerves carry massages
explain how muscles move arms and legs
investigate the senses
investigate how fast our muscles react

6. Energy:

Understanding of the different types of energy and energy changes.
describe what energy is and where it comes from
indentify and describe the various forms of energy
understand how sound is caused
explain the difference between stored energy in action
explain everyday happenings in terms in energy changes
understand that fossil fuels are a non-renewable resource
conduct an experiment involving energy changes
use different forms of energy to make an object move

7. How Life Begins:

understanding of how new life is created in humans.
describe the diffrences between animal and plant cell
describe the sex cell of humans
describe the human reproductive organs
understand the changes that take place in boy›s and girl›s bodies during puberty
observe the development of a baby during pregnancy

8. Solving Problems in Science:

understanding the scientific method.
describe the scientific method
write up report of experiments
write hypotesis
design an experiment using the scientific method
test a hypotesis by doing an experiment

9. Acids and bases:

understanding what are acids and bases.
describe the properties of acids and bases
understand ph and its practical uses define neutralisation
use and make indicators
use ph paper to check acidity
use acids and bases safely
apply knowledge of acids and bases to everyday situations
to be aware of the formation and effect of acid rain

10. interdiciplinary «Space» Studying the Universe:

understanding aour solar system and space exploration.
know the order of the planets
describe key features of each planet
distinguish between comet, asteroids and meteors
describe spiral, elliptical and irregular galaxies
explain the significance of star color
indentify major constellations
be aware of the impact of spsce exploration
make scale model of planets
design and make a space mobile or building from recycled materials
plot posisitions of stars

11. Materials from the Earth:

Understanding natural resources, where they are found and what they are used for.
name useful substances made from natural materials eg glass and concrete
anderstand what natural resources are
find out whether or not natural resources are renewable
present information on renewable resources
understand how fossil feuls, uranium and water are used to provide energy
understand how materials and rocks are mined and how they are used
map the locations ofe various mineral resources around the world

12. Science & Technology:

Understanding of how technology has been used to solve probem.
explain the the difference between science and technology
find out about some inventors and inventions
be aware of inventions
design a test to solve an everyday problem
carry out a science fair experiment
research to fined relevant information

13. Keeping Healthy:

Understanding the digestive and circulatory systems.
explain what the part of the digestive system do during digestion
use the model to explain how food passes from the small intestine to the bloodstream
describe the importance of fibre in the diet
describe how the blood carries food and oxygen to the body cells
understand the effect of exercise on pulse and breathing rates

investigate the structure and care of teeth
describe the structure of the heart and how to take care of it

14. Batteries and Bulbs:

Understanding of batteries› concept and circuits.
make simple circuits
draw circuit diagrams
know the difference between series and parallel circuits
describe the properties of conductors and insulators
understand about resistance and short circuits
explain how electrical safety device work (fuses and earths)
understand the rules for using electrical safely
know the component of electrical plug

15. Atoms and molecules:

Understanding of atoms, molecules, elements and compounds.
describe the practical theory to explain the properties of solids, liquids and gases
explain that matter is made of atoms and molecules
know the name of some commmon molecules
understand the basic structure of the atom
describe what elements and componds are
explain the difference between elements and compounds in termof atoms and molecules
know the first twenty elements and their symbol from the periodic table
know about some of the people who discovered different elements
know the formula of some common compounds
write a simple word equation

16. Cycles in Nature:

Understanding of food chains and webs
use food chains to show the link between animals and plants
describe how bacteria and fungi recycle substances
know the difference between scavengers and decomposers
construct food webs

17. What are Things made of:

Understanding ofe the concept of the periodic table and the elements covered in Year 2 Atoms and Molecules
review particle theory, atoms, molecules, elements and compounds
understand basic patterns of the periodic table
learn the first 20 elements by symbol and name
learn to write simple equation
know the basic structure of the atom, protons, neutrons, electrons
look at where metals and other important materials come from and what they are used for
know about alloy

Statutes of the International Junior Science Olympiad

Ratified at the 8th IJSO in Baku, Azerbaijan 2009

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Ratified at the 8th IJSO in Baku, Azerbaijan 2009
Contents Page

INTRODUCTION

§ 1 (Definition)

The International Junior Science Olympiad (IJSO) is an annual in

dividual and team competition in the Natural Sciences for students who are fifteen years or younger on 31st December of the competition year. It has been established in recognition of the significance of the Natural Sciences in the general education of young people and in all aspects of their lives. It is a purely educational event.

§ 2 (Preamble)

No country may have its delegation excluded from participation on political grounds, lack of diplomatic relations, lack of recognition by the government of the organising country, imposed embargoes or similar reasons. When difficulties preclude the formal invitation of the delegation representing a country, students from such a country should be invited to participate as individual delegations. Religious or political propaganda against any person or country or disruption of any aspect of the IJSO is strictly forbidden. Participation in the IJSO either by a host country, a delegation or an observer signifies acceptance of the statutes and all other aspects of the IJSO.

§ 3 (Aims & Objectives)

The aims of the IJSO are

• to promote and reward the pursuit of excellence in scientific endeavour.

• to challenge and stimulate gifted science students to develop their talents.

• to select the top young science student teams at the annual IJSO.

• to encourage the continued participation in the study of the Natural Sciences.

• to create friendship and relationships among students around the world from an early age.

The objectives of the IJSO are

• to stimulate the active interest of students in the Natural Sciences.

• to promote their careers as scientists.

• to enhance and develop international contacts in the Natural Sciences.

• to promote future scientific collaboration.

• to encourage the formation of friendships within the scientific community.

• to offer the opportunity to compare the syllabi and educational trends in science education within the participating countries

ADMINISTRATION OF THE IJSO

§ 4 (Organisations)

The IJSO is organised in late November or early December by the National Organising Committee (OC) of one of the participating countries on behalf of its National Government, its Ministries or its official Institution(s). The competition has to be conducted on the territory of this nation. The duration of the Olympiad (including the arrival and departure days) should not be less than 9 days.

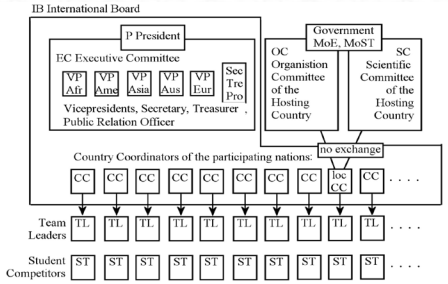
English is the working language of the IJSO and competition problems and their solutions should be presented to the IJSO International Board (IB) and team leaders in English. The organisers may also prepare these documents in other languages.

English is the working language of the IJSO and competition problems and their solutions should be presented to the IJSO International Board (IB) and team leaders in English. The organisers may also prepare these documents in other languages.

Within five years of its entry in the competition a country should declare its intention to be the host of a future IJSO so that the order of countries willing to arrange the IJSO can be compiled. A country that refuses to commit to organise the competition may be barred from participation, even if delegations from that country have taken part in previous competitions.

In the event of the IJSO being cancelled all participating countries including those countries that had agreed to send an observer will be invited to send full delegations to the following IJSO.

The administration of the IJSO is fulfilled by the organisation of the IJSO as follows:



Structure of the IJSO Organisation.

§ 4.1 (The President)

The President shall be elected by the IB and shall serve a three-year term. He/She may be re-elected by the IB for only one additional term.

He/She shall be an ex-officio member of all IJSO committees and shall receive an official invitation from the host country of the IJSO. All costs incurred for inviting the president is the obligation of the Organising Committee (OC). He/She shall be invited to deliver a speech at the opening and closing ceremonies.

The President shall ensure that the IJSO constitution is upheld and shall chair the IB meeting where changes to the constitution are being discussed (§ 4.7).

His/Her duty is also to chair the IB meeting where medal allocations are determined.

The signature of the President should be on all certificates.

In the case that the IJSO is not taking place or in danger of not taking place in any year, the IJSO President has the authority to invite the IB of the previous year to remain in office and manage the affairs of the IJSO until a new host country is accepted.

The president has to be supported by the IJSO office at his/her local secretary bureau, which expenses must be covered by the participating countries (§ 7).

§ 4.2 (Vice Presidents)

Vice Presidents shall be ex-officio members of all IJSO committees and shall act with responsibility to the continent, which they are representing.

They shall be elected by the IB of the relevant continent. They shall help the president with his/her tasks. They shall serve a three-year term and may be re-elected by the IB for only one additional term. The VPs shall promote and encourage countries in his/her region to participate in IJSO.

§ 4.3 (Duties of President and Vice Presidents)

The President/Vice Presidents can be citizens of the host country. They have the authority to and must ensure that

- the OC and the Local Country Coordinator (loc CC) are completely separate and independent to the satisfaction of the IB. No person may serve on both committees.
- the deliberation of the Scientific Committee (SC) is kept secret from the national delegation.
- no advantage whatsoever is given to the national delegation.

§ 4.4 (Executive Committee)

The long-term work of the IJSO is coordinated by the Executive Committee (EC). It consists of the President, Vice Presidents, Secretary, Treasurer, and Public Relations Officer. The IB elects the EC for a period of three years and may be re-elected for one additional term only. Vacancies occurring within the three year period will be filled by the IB through election to complete the term. The members serve in a voluntary capacity and will not receive a stipend. Member/s of EC that is not serving as one of the team leader or observer of his/her country will not be charged the registration fee and may apply for support from the hosting country for example: the transportation costs.

Members of the Executive Committee (EC) can also act as the coun-

try Coordinators for their countries.

§ 4.5 (Organising Committee)

The Organising Committee (OC) of the IJSO must be completely independent and separate from the local Country Coordinator (loc CC) responsible for the selection and training, etc, of the Host Country Team.

The appropriate Governmental Department or Institution(s) of the host country on whose territory the competition takes place appoints the Organising Committee (OC) to run the IJSO on behalf of the host country.

The OC should produce a set of «Organisation Rules» based on the statutes. These must be sent to the delegation leaders of the participating countries in good time. These Organisation rules shall give details of the IJSO not covered in the statutes including the names and addresses of the institutions and persons responsible for the IJSO.

The OC shall provide a detailed program for the competition including the schedule, program of excursions, etc, which is sent to the delegation leaders of the IJSO.

The OC is obliged to publish the IJSO proceedings in English. Each participant should receive one copy of the proceedings free of charge not later than one year after the competition.

§ 4.6 (Scientific Committee)

The OC appoints a Scientific Committee (SC) to manage all the scientific aspects of the IJSO. The SC will provide three tasks, solutions and a marking scheme. The topics for the competition must correspond as far as possible with the science syllabi for thirteen to fifteen-year-old students in the participating countries (IB Syllabus).

The Scientific Committee (SC) has to prepare at least 6 (six) spare problems for task one (two problems for each subject), and one spare problem for task two. These spare problems which will be presented to the International Board if some of the originally presented thirty problems for task one or one of the two or three problems for task two is/are rejected by two thirds of the International Board members. The rejected problem(s) can not be reconsidered.

The SC is responsible for the grading the problem solutions and for Organising and carrying out the moderation process.

§ 4.7 (International Board)

The International Board (IB) is composed of the Executive Committee and the Country Coordinators of the participating countries and is the decision making body and final arbitrator of the IJSO. Decisions of the IB are taken on the basis of a simple majority (unless otherwise stated in the statutes) in the presence of at least 75% of members and are final. Each country has one vote. In the case of equal votes, the president has a casting vote and takes the final decision. The President is the head of the IB meeting. His duties include:

- to declare the meeting open and verify by roll call the names of voting members present.
- to allow equal opportunities to all members to express their points of view.
- to restrict / limit where necessary the contributions of certain members.
- to record the decisions of the IB.
- to complete the agenda of the meeting within the prescribed time.
- to declare the meeting over or deferred.

One of the team leaders will serve as a Country Coordinator (CC) until the next IJSO and as a member of the International Board (IB) of IJSO. IB Members for the new countries joining IJSO, must belong to or have a strong support from their Government, an official Institution, University, or well known organisations/associations.

The duties of the IB are:

- to direct and supervise the IJSO in accordance with the statutes.
- to verify that all members meet all the requirements of the IJSO.

• to discuss and approve the tasks, their solutions and evaluation. The IB may change or reject parts of tasks one and two but may not propose new ones. Structural changes may not be made to the experimental task.
• to ensure that no assistance is given to students by way of translations or by any other means.
• to ensure the correct and just classification of the prize winners.
• to establish the winners of the competition and make a decision concerning the presentation of the prizes.
• to review the running of the IJSO.
• to ensure that violations of the statutes are dealt with appropriately
• to approve the countries that will organise future IJSOs.
• to expel countries or individuals from participation in the IJSO for violation of the statutes.
• to accept the decisions of the majority of the members present.

The IB approves

• the final results of the evaluation and decides on the number of Gold, Silver and Bronze medals and other awards to be awarded in accordance with the statutes
• the changes to the IJSO Constitution which come into effect for the following year.
• the expulsion of team leaders or students from the IJSO in the case of a serious breach of the rules.

PARTICIPATION IN THE IJSO

§ 5 (National Delegations)

Participation in the International Junior Science Olympiad signifies acceptance of the present Statutes by the Relevant Ministry of the participating country.

Each participating country that has either participated fully in or sent an observer to the IJSO in one of the previous two years is invited to send a delegation of six students and three team leaders. One team leader acts as the Country Coordinator (CC).

The hosting country has the right to have two national delegations. Countries who want to join the IJSO after it has reached the number of fifty member countries have to start by sending an observer at least once at the IJSO before they participate for the first time.

§ 5.1 (Obligations)

The obligations of the participating countries are to pay the participation fee at the time that the host country decides and to obey all rules of the IJSO statutes and rules made by the Host Country for the ongoing event. Each participating country may submit six multiple choice problem (two for each subject: Physics, Chemistry and Biology) for task one, one theoretical problem for each subject for task two, and one experimental problem for task three to the OC of IJSO. The complete solution of each problem must also be submitted.

§ 5.2 (Competitors)

A normal team consists of six students and three leaders. If a normal team could not be fulfilled, then the minimum team that consists of three students and at least one leader, will also be allowed to participate in the IJSO. Teams consisting of less than three members are not classified for team awards.

The age of the competitors is fifteen years or younger on 31st December of the competition year. As an example students born on or after January 1st, 1994 are therefore eligible for IJSO in 2009.

A student is eligible to represent his/her country if he/she holds a valid passport of that country or is in the education system of that country for at least one academic year.

Students must accept the statutes of the IJSO and the organisation rules provided by the OC.

The use of one's own collections of formulae from mathematics, chemi-stry, physics, etc, during the competition are not allowed.

§ 5.3 (Country Coordinator)

The Country Coordinator is the contact person in each participating IJSO country and must insure that

all registration forms are completed and sent to the Organising Committee (OC) on time.
• guarantee that all delegation member details are in accordance with the rules of the IJSO.
• pay all fees to the OC on time.
• confirm at registration that all delegation member details provided are correct.
• carry out the directions of the IB.

§ 5.4 (Team Leaders)
The Team Leaders must
• preserve complete secrecy of the tasks and the results until publicly announced.
• provide a proper translation of the problems from English (or other languages) to the mother tongue of their participants. The Organisation Committee (OC) will not be responsible for providing the translator for the country delegation.
• grade their students› scripts and participate fully in the moderation process.
• accept the statutes of the IJSO and the Organisation Rules provided by the OC.
• not have contact with their students once the problem discussion has started, and until permission has been granted by the IB.
The IB will disqualify those contestants who do not meet these IJSO conditions. The Team Leaders must ensure that all delegation member details are in accordance with the rules of the IJSO and have been accepted by the OC prior to arrival at the IJSO.
The Team Leaders must cover the costs incurred by a disqualified contestant or contestants where the OC has not accepted the contestant or contestants.
§ 5.5 (Observers)
Observer/s are those people who come to observe the IJSO. They include a representative of a country wishing to join the IJSO and representatives of future host countries and an assistant to the Country Coordinator.
An Observer:
• is regarded in the same way as a team leader.
• is invited to observe all IB meetings and IJSO activities.
• does not have voting rights at the IB and team leaders meeting
• must pay an observer fee determined by the host country

§ 5.6 (Visitors)
A Visitor from a participating country, e.g. the parent of the students, may attend the IJSO. A Visitor
• is invited to join for all excursion programs for leaders only.
• is invited to attend the opening and closing ceremonies.
• Is not allowed to attend any meetings pertaining to IJSO.
• must pay his/her accommodations (hotel, foods, travelling, etc) fully during his/her stay.

• must pay the visitor fee determined by the host country.
§ 5.7 (Guest Delegations)
Under the approval of the EC of IJSO the host country may invite Guest Delegations, but only one Guest Delegation from each participating country, including a Guest Delegation from the host country.
Guest Delegation leaders are not voting members of the IB but their duties are the same as other delegation leaders in all other respects.
The Guest Delegation pays all the expenses related to its participation determined by the host country.
Countries present with Guest Delegations only are not obliged to Organise the IJSO in the future.
Competitors from the Guest Delegations are classified in the same way as the regular delegations. They may receive medals, awards, diplomas and prizes but their names should be associated with the

letter «G» (Guest) in all official documents. Also, the Guest Delegation will not be awarded as the country winner, Best experiment, Best Theoretical winner or overall Winner. The medals, awards, diplomas and prizes awarded to the guest teams are in addition to the 60% allocated awards.

HOSTING THE IJSO

§ 6.1 (Duties of the Host Country)

The host country must ensure or prove that

• the IJSO is conducted in accordance with the statutes.

• a Logo of the IJSO is used in all banners, documents, etc.

• the budget to host the IJSO is sufficient, at least 6 months prior to the date of the event must be approved by the EC of IJSO.

• each relevant Ministry and Country Coordinator receives an official letter of invitation for a delegation (six students) and three team leaders (physics, chemistry, and biology) to the IJSO. The letter designated for the relevant Ministry must clearly mention the person who will acts as the Country Coordinator for his/her country.

• all Ambassadors or Government Representative of the participants' countries may be invited to attend the Opening and Closing Ceremonies.

• a high ranking Government Official (at least Minister or Deputy Minister) is invited to declare the Opening and Closing Ceremonies of IJSO.

• an official staff of OC will be at the airport to welcome all participants on the arrival day and to transport them to their hotels provided and return transport to the airport on the departure date.

• suitable accommodation and subsistence is provided for each delegation. If possible, all students should stay at the same hotel and leaders at a different hotel.

• a daily News Letter or leaflet of the event is published.

• proceedings will be published and delivered to the participant countries at the latest on the next IJSO.

• the event of IJSO is made known publically as widely as possible through news at TV/Radio Broadcasts, Newspapers, etc.

• sufficient banners posted at least around the competition sites, such as: hotels for leaders and students, examination sites, excursion sites and also on the excursion buses.

• sufficient Liaison Officer (LO) or Guides for each country (students and leaders)

• equality of all the delegations is recognized.

• the preparation of at least six spare MCQ problems and one spare theoretical problem. These spare problems will be presented to the IB if any of the originally presented test problems are rejected by two thirds of the IB present. The rejected problem(s) cannot be reconsidered.

• problems are translated by each country for their own students.

• no contacts between leaders/observers/visitors and their team members at the beginning of, during and after problems discussion until the students have finished the test for the discussed problems.

• no advantage is given to the national delegation of the host country.

• the health and safety of the delegations is provided for.

• laboratories, examination halls, materials and other requirements necessary for the carrying out of the IJSO in accordance with the rules are provided.

• a cultural and social programme is in place.

• contact its embassies/trade office abroad and help the participating countries to get their visas.

• freedom for all EC members and observers to access all examination sites.

• time tables for the on going IJSO must be made very clear (location/site, time, etc). Any changes on the schedule must be discussed with EC members.

• all problem discussions, IB Meetings, EC meetings, moderation and other meetings regarding the IJSO must take place at a suitable

location.
• all communication facilities such as internet in the Leader's hotel must be kept normal (ON) for the duration of the IJSO event.
• the website of the IJSO must be kept up-to-date following the arrival of delegations until the departure dates so that the outside world will immediately know what is going on.

§ 6.2 (Duties of the following Host Countries)

The next Host Country must provide a formal invitation to all participating countries. The formal invitation must be addressed by the chairman of the Organising Committee or from the Government Official of the next hosting country. It may bring observers to watch the on going IJSO.
Must invite the EC Members of IJSO to observe the preparation of OC at least 6 months before the date of the IJSO event. All costs for inviting the EC members must be borne by the OC of the next host country.
The subsequent hosting country must send a preliminary invitation to all participating countries and may make any other presentations, etc, to all of the participating countries.

FINANCIAL MATTERS

§ 7 (Financial Matters)
The financial management of the IJSO is as follows:
The host country covers all costs from the arrival at the location of the IJSO until departure of the delegations. This includes the costs of
• board and lodging of the delegations
• excursions
• medals, awards, certificates, other prizes, etc
The Country Coordinators of the participating countries must ensure that the government/sponsor covers the cost for the delegation of
• return travel to the location of the competition
• health & travel insurance for the period of the competition.
• the participation fees for each delegation is US$ 1.000.00 and will be reviewed yearly.

Twenty-five (25%) of the participation fee should be returned to the Treasurer of IJSO within six months for operational costs of IJSO Organisation (§ 4.1). The Financial status of IJSO will be reported by the Treasurer in a written text every year at the International Board Meeting and is subject to be audited by the Internal IJSO's Auditors.
All cost incurred for creating problems (theory and experiment) for the IJSO event is the responsibility of the host country.

THE COMPETITION

§ 8 (Schedule)

The competition is divided into three tasks, prepared by the SC and conducted over three days with an interval of at least one day between each task. The time allotted to each task should normally be three to four hours. The OC decides the sequence of the competition days.

§ 8.1 (Problems)

The problems consist of three tests.
Test One and Two are individual competitions. However Test Three is a team competition, where one team consists of three students of each delegation (each country may have two teams for task three).
Test One is a multi-choice-questionnaire (MCQ). The number of questions should be 30 (thirty). Questions for Test One should include Physics (10 problems), Biology (10 Problems) and Chemistry (10 problems). Each question shall have four possible answers with only one is correct.
Test Two is a theoretical test. The number of tests should be 2 (two) or 3 (three). Test Two should be more complex involving a combination of Physics, Chemistry and Biology.
Test Three is a experimental task. The number of tasks should not

exceed 2 (two). Questions for Test Three should be the combination of Physics, Chemistry and Biology and should be in equal proportion.

The problems must

• be related to the syllabus of IJSO, and cover all content of the syllabus as much as possible.

• be reviewed by the IJSO Scientific Experts (not the local SC, but an ad-hoc Scientific Committee formed by the EC) prior to the problem discussion.

• be created innovatively and the answers must be language independent.

§ 8.2 (Problem Discussion)

The problem discussion

• can only be attended by leaders, EC members, observers and appointed OC members.

• must be lead by a member of the Scientific Committee (SC) of the host country

• should provide a presentation of the problems by the SC to be discussed by all leaders.

• may be mediated by the president if there is a dispute among the leaders

• can reject problems which are determined by a 75% majority vote of the Country Coordinators (CC). One country has one vote only.

• The rejected problem/s must not be reconsidered to be one of the problem/s.

§ 8.3 (Problem Translations)

The Team Leaders must not give any clues, changes, simplifications or modifications for the problems that have been approved by the IB members when the problems are translated to their own languages (translation means to change the sentences/words to one language according to the related Dictionary).

Any country that violates this condition, will be disqualified from the event, and must return home immediately without receiving any expenses related to their participation budget, from the host country or by IJSO. The official English version will be provided to each student on request.

§ 8.4 (Marking)

The marking of the Tests are conducted by the Scientific Committee and may be revised following discussions with the Team Leaders during moderation (§ 8.5).

The maximum points allocated to the tasks are:

• Test One: 30 points

• Test Two: 30 points

• Test Three: 40 points

Test One and Test Two are marked individually. In Test One the correct answer will be marked 1 (one), the wrong answer will get penalty 0.25 (zero point twenty five), and zero marks for not answering. Each member of the team for Test Three will be awarded the same points.

For correct marking the team leader/s is/are obliged to state clearly the names of his/her students as Team A or Team B. However, the names on each team may be changed (reshuffled) only on the arrival date. No more changes can be made afterwards.

§ 8.5 (Moderation)

Moderation is the discussion of the students' marks between Team Leaders and SC members (§ 8.4).

On the night prior to moderation the SC must provide to the team leader the marks for each students including the marking scheme.

Each country will be called according to their schedules, and will only be present for discussion for the allocated time determined by SC (all countries will get the same time allocation).

At the end of the moderation, the head of the team leaders of each country must sign the final agreed mark for their students.

No more changes can be made for the students' marks after modera-

tion, unless there is a proven mistake by the SC on their final marks. Furthermore, the moderation

• can be lead by the chairman of SC members.

• can only be attended by leaders, EC members (if necessary), and appointed OC members.

§ 8.6 (Calculating the Awards)

Medals are allocated on the basis of individual total points.The points allocated to the individual test one and two are added to the points allocated to team test three.

In deciding on the Best Theoretical Winner, only results of the Test One and Test Two are added.

In deciding the Best Team only the results of test three are considered.

In deciding the Country Winner all six individual scores are added. It there is a tie, Gold medals are allocated three points, silver two and bronze one. If there is still a tie, only gold and silver are considered and finally only gold. The following examples may explain the decision procedure in the case of a tie (grey = Country Winner):

Case 1: 3 delegations with 6 students each with a total of 600 P. (tie)

Country	Medals	Total Value	G/S-Value	Gold-Value
Delegation A	3G,3B	12	9 no matter	9 no matter
Delegation B	2G,3S,1B	13	12 no matter	4 no matter
Delegation C	6S	12	12 no matter	0 no matter

Case 2: 3 delegations with 6 students each with a total of 600 P. (tie)

Country	Medals	Total Value	G/S-Value	Gold-Value
Delegation A	1G,4S,1B	12 (tie)	11	1 no matter
Delegation B	3G,3B	12 (tie)	9	9 no matter
Delegation C	6S	12 (tie)	12	0 no matter

Case 3: 3 delegations with **5 or** 6 students each with a total of 600 P. (tie)

Country	Medals	Total Value	G/S-Value	Gold-Value
Delegation A	4G,xx,1B	13 (tie)	12 (tie)	12
Delegation B	2G,3S,1B	13 (tie)	12 (tie)	6
Delegation C	6S	12 no matter	12 no matter	0 no matter

The Overall Winner is the student who has the highest total points (the total of Test One, Two and Three).

The President and the Chairman of the Scientific Committee will ensure that each student has been allocated the correct marks and therefore the correct medal. During the discussion of medal allocations real results should not be shown.

Students results will be released only at the closing ceremony of IJSO.

§ 8.7(Awards)

Certificates

All students who do not obtain a medals will receive a certificate of participation. The student who obtains a medal will receive a certificate that clearly mentions the medal received.

Medals

Medals will be awarded as follows:

For individual competition:

Gold medals : top 10% (approx.) of all students
Silver medals : next 20% (approx.) of all students
Bronze medals : next 30% (approx.) of all students

(must not exceed 60 %)

For team (experimental) competition (1 medal to each team member):

Gold medals : 1st Highest point of the team
Silver medals : 2nd Highest point of the team
Bronze medals : 3rd Highest point of the team

Special prizes and certificates will be awarded to

• the student who obtains the highest overall score (total points obtained from all Tests) is called as ”the over all winner”.

• the student who obtains the highest score for theoretical test (total points of Test One and Two) is called “the best theory winner”.

A perpetual challenge trophy and flag will be awarded by the President of IJSO to the country who achieved the highest accumulated score of all six students and is called “the country winner”. The IJSO flag will not be permanently belong to the winner, however to be returned to the President of IJSO at the opening ceremony of the next IJSO and will be awarded to the next country winner. Additional Special prizes can be awarded at the discretion of the host country.

§ 9 (Honorary Members)

The IB may award a person the title «Honorary Member of the International Junior Science Olympiad» for special service to the IJSO. They may be invited to the IJSO. The payment of all expenses of the honorary member is at the discretion of the host country. The Past Presidents of IJSO are automatically honorary members of IJSO.

§ 10 (Finally)

The original of these Statutes is written in English.

These statutes are immediately effective after they are ratified at the 6th IJSO International Board Meeting in Baku/Azerbaijan on December, 8th, 2009. Therefore, the previous IJSO Statutes are no longer valid.

Changes to the Statutes can only be made at an IB meeting, chaired by the President and called specifically for that purpose. IB members must receive the proposed changes in paper or digital form at least one month before the meeting.

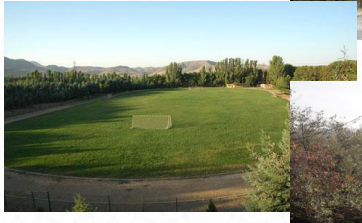
Shahid Abbaspour University

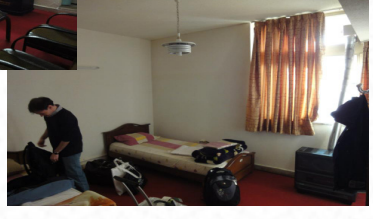
Dr. Ali Akbar Afzalian

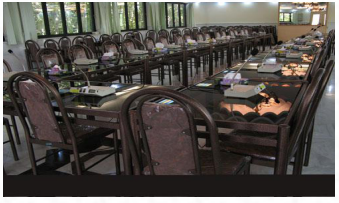
Shahid Abbaspour University Founded in 1970 and is well known for its electrical power, water and energy industry oriented courses and research with about 2200 students.

Shahid Abbaspour University Guest House
IJSO 2012 Accommodation

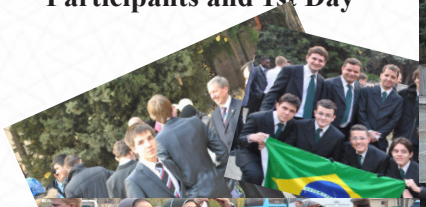







Participants and 1st Day




Opening Cermony



CROATIA
HONG KONG
INDONESIA
NIGERIA
KUWAIT
RUSSIA
MOLDOVA

IJSO 2012 Results

Bronze Medal Winners

Country	Name
AFGHANISTAN	Firoz Sayed Firoz Sayed
AZERBAIJAN	NIZAMI HASHIMLI
I. R. Iran	Rana Alam daran
Indonesia	Dennis Deviandoni
AZERBAIJAN	CAVID AHMADOV
Brazil	Gabriel Queiroz Moura
Hungary	Luca Szabo
Cambodia	KIM SOR HONG
Croatia	Domagoj Bradac
Cyprus	GEORGIOS HADJIVASSILIOU
Lithuania	Dovydas Drakšas
Estonia	Eva-Maria Tõnson
Slovakia	Juraj Jonak
Indonesia	Steven Sebastian
Estonia	Oliver Kahre
Hong Kong	Sik Chi Jonathan LEUNG
Serbia	Nikola Milenic
Hungary	Daniel Takacs
Hungary	Hanga Reka Horvath
Brazil	Matheus Evangelista de Souza
I. R. Iran	Ahmadreza sazegarnezhad
Moldova	Vladlena Hornet
Myanmar	PYAE HEIN HTET
Estonia	Elo Maria Pauman
Indonesia	Timothy Antoni
AZERBAIJAN	IZZAT MAMMEDOV
Estonia	Oliver Nisumaa
Ireland	Joshua Mathew Gorman-Climax
Kazakhstan	Zhanar Tanirbergenova
Kuwait	Maryam nawaf abdi Alsulaili
Lithuania	Marius Kluonis
Serbia	Nikola Spasic
Moldova	Alexandru Cotos
Myanmar	IMRAN ESACK DAWOODJEE
Indonesia	Viriyadhika Putra
Nederland	Michael Daas
Nigeria	Anthony Ikechukwu Okonkwo
Estonia	Oskar Voldemar Lahesoo
Serbia	Nikola Samardzic
I. R. Iran	Keyvan Jahanfar
Kazakhstan	Alexandr Khudyakov
Serbia	Miloje Djukanovic
Slovakia	Monika Hruska
I. R. Iran	amir Reza Moradi Pour
Slovakia	Natalia Ruzickova
South Africa	Yaseen Sayed Ismail
Sri Lanka	USHANI MADUSHIKA PITADENIYA
Thailand	CHITIPAT PHETMUNEE
Zimbabwe	Federico Bescotti
AZERBAIJAN	ELMAR MAMMADLI
I. R. Iran	Mohsen Ghalambor Dezfouli
Serbia	Stanislav Todorovic
Nederland	Kimberley van Adrichem

Indonesia	Roihan Mohamad Iqbal
Indonesia	Tohari Catur Pamungkas
Turkmenistan	Merdan Jepbarov

Bronze Medal Winners

Country	Name
India	Charles Rajan
Nederland	Jeroen Winkel
Hong Kong	Sui Chun Sampson Kwan
Romania	DIANA ANDREEA CATANA
Brazil	Matheus Henrique Camacho
Cambodia	VEASNA VON
Cambodia	KINAL KIM
Hong Kong	Suet Ying Florence Tsang
Cambodia	KEANG YIN CHAO
Brazil	Pedro Jorge Luz Alves Cronemberger
Romania	TIBERIU ALEXANDRU PANA
India	Kushal S Babel
Thailand	SIRACHAT CHAROENKASEMWIT
Hong Kong	See Ip YU
India	Nikhil Kumar Lakumarapu
Cambodia	SIVHUO PRAK
India	Pratyush Sushil Kumar Rajput
Hungary	Peter Mihalicz
Moldova	Gleb Vizitiv
Romania	ANDREI ILIESCU
India	Bhavya Raj Kumar Choudhary
Kazakhstan	Daulet Kurmantayev
Romania	ADRIAN MIHAI RADU
Romania	DAN MIRCEA MIREA
Romania	RUXANDRA TESLOIANU
Thailand	CHONLANAT PUETPAIBOON
Hong Kong	Ching Lok CHONG
Hong Kong	Chun Ting LAU
Thailand	SIRADANAI RIMSAKORN
Brazil	Rubens Martins Bezerra Farias
India	Swati Sanjay Gupta
Russia	Mikhail Beliakov
Cambodia	SOVIRO HENG
Hungary	Botond Zsolt Oreg

Gold Medal Winners

Country	Name
Russia	Daniil Rabinovich
Thailand	Veerapatr Yotamornsunthorn
Hungary	Aron Ricardo Perez-Lopez
Indonesia	Kevin Limanta
Chinese Taipei	NAI-WEI HSU
Chinese Taipei	KUN-WEI LAI
Chinese Taipei	KUN-LIN TSAI
Russia	Pavel Semenenko
Russia	Arsenii Sorokin
Russia	Anton Maksimov
Indonesia	Rahmat Waluyo
Chinese Taipei	CHE-NING YANG
Brazil	Felipe Brandao Forte
Thailand	ABHIJATMEDHI CHOTRATTANAPITUK
Chinese Taipei	CHIHHSIANG YANG

Russia	Maxim Didin
Chinese Taipei	LAI-HO CHANG

Experimental winners

Team	Country	Name	score	Medal
A	Brazil	Felipe Brandao Forte	40	Gold
A	Brazil	Rubens Martins Bezerra Farias	40	Gold
A	Brazil	Matheus Henrique Camacho	40	Gold
B	Indonesia	Rahmat Waluyo	39	Silver
B	Indonesia	Timothy Antoni	39	Silver
B	Indonesia	Dennis Deviandoni	39	Silver
B	I. R. Iran	Ran›a Alam daran	39	Silver
B	I. R. Iran	Ahmadreza sazegarnezhad	39	Silver
B	I. R. Iran	Alireza Darzi Ramandi	39	Silver
A	**Chinese Taipei**	LAI-HO CHANG	38	Bronze
A	**Chinese Taipei**	CHIHHSIANG YANG	38	Bronze
A	**Chinese Taipei**	CHE-NING YANG	38	Bronze
B	Russia	Anton Maksimov	38	Bronze
B	Russia	Pavel Semenenko	38	Bronze
B	Russia	Arsenii Sorokin	38	Bronze

Theory winners

Country	Name	Medal
Russia	Maxim Didin	Gold
Indonesia	Kevin Limanta	Silver
Thailand	Abhijatmedhi Chottanapituk	Bronze

Overall Winners

Country	Name	Medal
Chinese Taipei	LAI-HO CHANG	Gold
Russia	Maxim Didin	Silver
Chinese Taipei	CHIHHSIANG YANG	Bronze

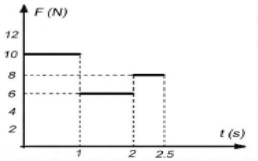
International Junior Science Olympiad 9th 2012 Iran

Multiple Choice Competition, 9th IJSO, Tehran, I.R.of Iran, December 3rd , 2012

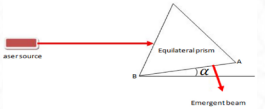
1. A block of 0oC ice with the mass of 50 kg slides on a horizontal surface. The initial velocity of ice is 6.0 m/s and it stops after a distance of 28.3 m. How much ice melts due to the friction? (specific latent heat of fusion of ice, L_f = 80 cal/g and 1 cal = 4.18 J and neglect the heat transfers to the environment)
(a) 47 g (b) 2.7 g (c) 4.7 g (d) 11.2 g

2. Why does the Moon always show its same face to Earth? Because:
(a) it rotates about its axis almost once per day
(b) it rotates about its axis almost once per month
(c) it rotates about its axis almost once per year
(d) it does not rotate about its axis

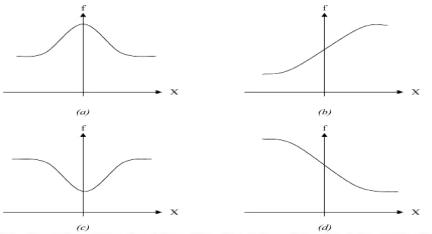
3. The following diagram shows changing force which is applied to a body with a mass of 5 kg in the same direction. The body is initially at rest. What is the final speed in m/s after 2.5 s?
(a) 4 (b) 6 (c) 8 (d) 10



4. A light beam from a laser source which is parallel to the horizontal surface, hits an equilateral prism as shown in the figure below. What is the angle α (between AB and the horizontal surface) if the emergent beam is perpendicular to the face AB? (Refractive index of the prism is 2)
(a) 24.5° (b) 42.5° (c) 15° (d) 30°

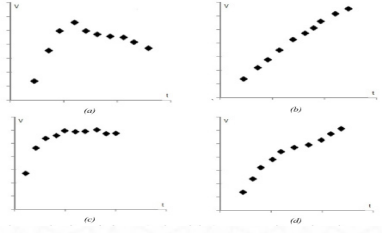


5. An ambulance moves through a street along the positive X direction and a person who stands beside the street hears the sound of the ambulance siren. Which option represents the frequency(f) received by the person? X is the position of the ambulance; the person stands at the origin.

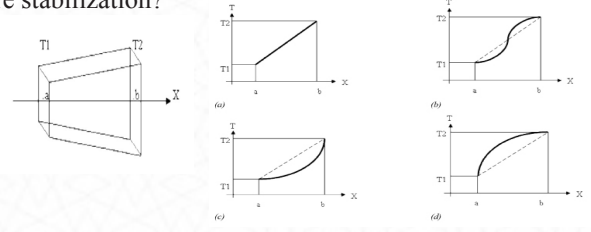


6. In the Track and Field World Championships, the world record in the 100-m dash was as shown in the table. Which of the following graphs best represents the time variation of velocity?

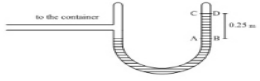
t (s)	1.88	2.96	3.88	4.77	5.61	6.46	7.30	8.13	9.0	9.87
x (m)	10	20	30	40	50	60	70	80	90	100



7. The vertical surfaces of a frustum (as shown below) are connected to two thermal reservoirs at different temperatures. The material is solid and uniform. Which diagram shows the temperature variation along the frustum axis after temperature stabilization?



8. The following figure shows a barometer, the cross section area of each pipe is 1.8 cm^2. The barometer contains the fluid with density of 8 g/cm^3.
The barometer is connected to a gas tank. The right pipe is closed and above the fluid is vacuum.The height difference between the liquid levels in the two pipes equals to 0.25 m.
What is the weight of liquid (between the two AB & CD levels)? What is the ratio of the gas pressure to the atmosphere pressure? g= 10 m/s^2

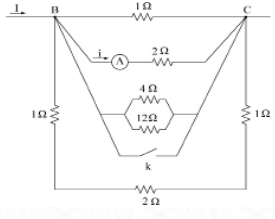


(a) 3.6N, 2 (b) 3.6N, 0.2 (c) 36N, 2 (d) 36N, 0.2

9. A word is written in blue ink on a white sheet paper. A red light illuminates this paper and
(A) The word is seen red
(B) The word is not seen
(C) The word is seen black
(D) The word is seen blue

10) In the following circuit, what is the ratio of equivalent resistance when the switch (k) is closed to switch (k) is open? If the total current through the circuit is" I", when the switch is opened, what fraction of "I" is shown by the Ammeter (A)?

(A) $0, \frac{12}{50}I$ (B) $0, \frac{2}{19}I$ (C) $\frac{12}{50}, \frac{12}{25}I$ (D) $0, \frac{12}{25}I$



11. The density of hot and cold water are different mainly because:
(a) The molecules in hot water are slightly larger than in cold water.
(b) The bond between hydrogen and oxygen atoms in a single water molecule is stronger in cold water.
(c) The molecules in hot water move faster and are slightly further apart.
(d) Intermolecular forces in cold water are weaker.

12. When certain substances dissolve, the solution gets colder. This type of dissolving process is endothermic. In endothermic dissolving:
(a) More energy is released when solvent molecules bond to the solute than is used to pull the solute particles apart.
(b) More energy is used to pull the solute particles apart than is released when solvent molecules bond to the solute.
(c) More energy is used when the solute molecules get apart than to pull the solvent molecules apart.
(d) The energy released when solvent molecules get apart is more than the energy released when solute molecules bond to solvent.

13. Consider the following aqueous equilibrium;

$$HF_{(aq)} \rightleftharpoons H^{+}_{(aq)} + F^{-}_{(aq)}$$

In which of the following answers would both of the compounds decrease the amount of HF in equilibrium, when added to the solution ?
(a) NaCl , CaCl2
(b) NaF, NaOH
(c) H2O, NH¬3
(d) CaF2 , H2SO4

14. In four containers with equal volume and temperature, equal masses of the gas mixtures below is confined. Which container would have the highest pressure? The compositions are given in mole percent.
(a) 50% He, 50% Ne
(b) 50% He, 50% Ar
(c) 70% Xe, 30% Ne
(d) 90% Xe, 10% Kr

15. 50 ml of 0.1 M Ammonia solution is being titrated with a standard 0.1 M HCl solution. Which of the following acid-base indicators is the most accurate to reveal the equivalent point (pKa of NH_4^+ ion is 9.2)?
(a)Phenolphthalein which changes color between pH=8.2 to 10.0
(b)Methyl Red which changes color between pH=4.8 to 6.0
(c)Bromothymol Blue which changes color between pH=6.0 to 7.6
(d)Methyl Orange which changes color between pH=3.2 to 4.4

16. Carbon monoxide and chlorine react to form Phosgene, $COCl_2$. A mixture was prepared containing 0.20 mole of CO and 0.10 mole of Cl_2 in a 3.0 dm^3 vessel at 400K. The equilibrium constant for the reaction in these conditions, K_c=0.41. What would be the number of moles of $COCl_2$at equilibrium ?
(a) 8.75×10^{-4} mol
(b) 2.92×10^{-4} mol
(c) 2.63×10^{-4} mol
(d) 2.63×10^{-3} mol

17. What is the correct order for the bond energy in the following molecules ?
(a) $CO_2 > CCl_4 > N_2 > CH_4$
(c) $CO_2 > N_2 > CCl_4 > CH_4$
(b) $N_2 > CO_2 > CCl_4 > CH_4$
(d) $N_2 > CO_2 > CH_4 > CCl_4$

18. Assuming that all reactions go to completion, which of the compounds below would release more CO_2 molecules if we heat the amount indicated in parentheses ?
(a) $BaCO_3$ (1.0 g)
(b) Li_2CO_3 (2.0 g)
(c) $Ce(CO_3)_2$ (3.0 g)
(d) $Fe_2(CO_3)_3$ (2.0 g)

19. Which of the following statements about a sample of N_2 at room temperature and 1 atm pressure, is wrong?
(a) All of the N_2 molecules do not have the same kinetic energy.
(b) The molecules collide elastically with the container's walls.
(c) The mean potential energy of the molecules does not change over time.
(d) If we double the absolute temperature, the mean speed of molecules doubles.

20. The rate of which of the elementary reactions below, would increase more if the pressure rises by reducing the volume of the container? All reactions take place in the gas phase.

(a) $H + Cl_2 \longrightarrow HCl + Cl$

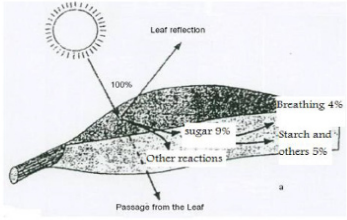
(b) $Br_2 \longrightarrow 2Br$

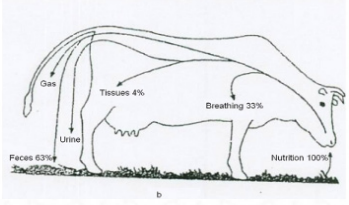
(c) $2H + H^+ \longrightarrow H_3^+$

(d) $Br + H_2 \longrightarrow HBr + H$

21. According to the following figures, a cow uses plant leaves as a nutrition source. As we know, the energy of sunlight is absorbed by plant leaves (Photosynthesis process). So, calculate the percentage of the sun›s light energy assimilated by a cow.

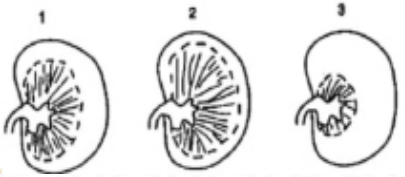
a) 2%
b) 0.2%
c) 4%
d) 5%





22. The Karyotype shown below belongs to a …….
a) normal woman
b) normal man
c) woman with Trisomy 18
d) man with Trisomy 18

23. The diagrams show vertical sections of kidneys of a freshwater seal, Northern Three-toed Jerboa (a species of rodent living in arid deserts of Northeastern Iran) and Persian fallow deer (a rare ruminant mammal inhabiting in Khuzestan, Southern Iran, and in Mazandaran, Northern Iran, and in an island in Lake Urmia in Northwestern Iran), showing the relative size of cortex and medulla..



a) 1:Persian fallow deer 2: Seal 3: Jerboa
b) 1: Jerboa 2: Persian fallow deer 3: Seal
c) 1: Jerboa 2: Seal 3: Persian fallow Deer
d) 1: Persian fallow deer 2: Jerboa 3: Seal

24. A musician suffering a stroke has lost his coordination and accuracy in playing piano. Which part of his brain may be damaged?

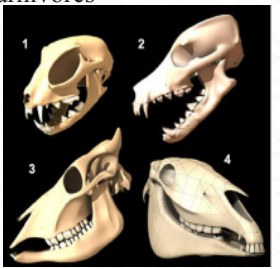
a- Cerebellum
b- Medulla oblongata
c- Hypothalamus
d- Limbic system

25. There is a receptor on the antennae of the male silkworm moth that plays a role in the recognition of a female silkworm moth at a distance. What type of the following receptor is it?

a) Photoreceptor
b) Thermoreceptor
c) Chemoreceptor
d) Mechanoreceptor

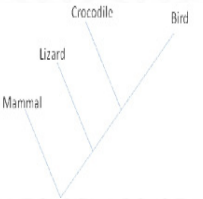
26. Which teeth patterns belong to carnivores and which ones to herbivores?

a)1 and 2: carnivores 3 and 4: herbivores
b)1 and 3: carnivores 2 and 4: herbivores
c)1 and 2: herbivores 3 and 4: carnivores
d)1 and 3: herbivores and 4: carnivores



27. According to the figure below, which pair is closer evolutionarily to each other?

a)Crocodile-bird
b)Crocodile-lizard
c)Mammal-bird
d)Lizard-bird



28. Which one shows the ascending order in the relative lengths of the caecum to the whole alimentary canal of the following animals?

a)Rabbits ◯ dogs ◯ humans
b)Rabbits ◯ humans ◯ dogs
c)Dogs ◯ humans ◯ rabbits
d)Humans ◯ rabbits ◯ dogs

29. There are many migrating birds which go across the Iranian Plateau during the migration season. Which of the following factors is the most effective in triggering their migration?

a)Change in temperature
b)Change in food available
c)Change in behavior of predators
d)Change in daylight time

30. A precipitation resulted from blood sample and antibody A. Which one of the following choices is definitely incorrect?

a)Only gives blood to anybody with blood group B.
b)Cannot take blood from anybody with blood group AB.
c)Can give blood to anybody with blood group A.
d)Can take blood from anybody with blood group O.

International Junior Science Olympiad 9th 2012 Iran

Theoretical Competition, 9th IJSOTehran, I.R.of Iran, December 5th , 2012

Physics

Iran is connected to the free waters by the Persian Gulf. This Gulf is located in Western Asia between Iran and the Arabian Peninsula. Its area and the average depth are 240,000 km2 and 50 m respectively. It is the largest Gulf after the Gulf of Mexico, and Hudson Bay , rich in oil and gas resources. Sailing in this region has a long history,and the first conclusive evidence can be traced to the fourth century BCE. In this problem take g=10 m/s^2.

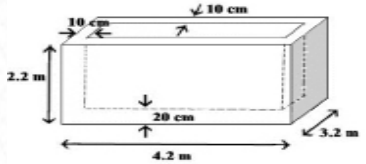
Part A)

How much energy is required to raise the temperature of water by 1°C. Consider the Gulf in the form of a box. The specific heat capacity of water is $C_{water} = 4200 \frac{J}{kg.K}$ and the density of this is $\rho_{water} = 1000 \frac{kg}{m^3}$

Part B)

Fishing and pearling is one of the main sources of income for the people of this region. Local people build small wooden boats. The small boat is built entirely from a kind of local wood. What is the density of the wood if about 0.186 m of the boat's height goes below the water surface? For simplicity consider the boat like a cuboid as in the figure below. The

thickness is 10cm and 20cm at the walls and the bottom respectively.



Part C)

I- Part B was theoretical , when people use this boat it needs interiors, equipment , material and so on. The additional mass inside the boat is $1.99*10^4$ kg .

What is the maximum number of divers that can be loaded in the boat, if we want not more than 80% of the height of the boat to be below the water surface? Consider the mass of each diver to be 80 kg.

II- In hot summer days the temperature goes up to 50^0 C and the salty water evaporates intensively. Which statement is true assuming that not more than 80% of the height of the boat to be below

the water surface? Neglect thermal expansion. The maximum number of divers who can be loaded in the boat

1) increases

2) decreases

3)remains the same

Part D)

The divers realize that water has entered inboard due to a leak and has covered the bottom of the boat in a thin layer. A suction pump is used to eject this water. It has a uniform plastic pipe with the inner radius of 1cm leading the water out of the edge of boat with the velocity of 3 m/s. What is the output power of this pump?

Part E)

Centuries before the discovery of oil, pearling and its trading, had been the most important economic activity in the Persian Gulf as a source of wealth for the south shore dwellers. In addition to white pearls , pink, yellow, green, blue, brown and black ones are found in this Gulf.

One of the divers has gone down to a depth of 15 m for pearling. What is the pressure on the diver at that depth (in Pascal)?

PartF)

A 2.0 kW pump is powered by a solar panel. Given efficiency of conversion of light energy into electrical is 12 %. Find the minimum area of the solar panels required if the intensity of solar radiation received by the solar panels is 1100 W/m^2.

Part G)

Given that the speeds of sound (ultrasonic waves) in air and in water are 340 m/s and 1440 m/s respectively.

I- Calculate the refractive index for sound waves in water with respect to that in air.

II- An aircraft at a height of 1 km from the ocean surface, directs a beam of ultrasonic waves to the bottom of the ocean and receives an echo from the bottom of the ocean in 7 s. Estimate the depth of the ocean.

Chemistry

Chemical Analysis of a sample of Persian Gulf Water

Chemical analysis has many applications in different industries. It also plays an important role in other sciences than chemistry. For example, chemical analysis may help biologists to characterize and maintain the properties of water that certain plants grow in.

A biology team working on Mangrove forests near Persian Gulf, was concerned about the composition of chemicals in water. A sample of the water was given to an analysis laboratory to determine the chemical species present in the water and their concentrations. Certain qualitative tests were applied to reveal that the species present in the sample are :

Cl^- , I^-, HCO_3^- , HSO_3^- , Fe_2^+

To determine the concentrations of chloride and iodide ions, 20.0 mL of the sample solution was treated with an excess of $AgNO_3$ solution and 2.93 g of precipitate was obtained. In another experiment, an excess of $Pb(NO_3)_2$ solution was added to 30.0 mL of the sample solution and resulted 4.30 g of precipitate. Assume that both ions precipitated completely in each case,

Note : Use precise atomic masses from the given periodic table in all your calculations.

1) Write down the balanced chemical equations for all the reactions involved. (2 marks)

2) Calculate the concentrations of Cl^- and I- in the sample. (3 marks)

After that, the concentrations of HCO_3^- and HSO_3^- were to be measured. For this purpose an excess of a 5.0 M sulfuric acid was added to 100 mL of the sample and the gas evolved was collected and its volume was measured.

3) What volume, in millilitres, of concentrated H_2SO_4 (98% by mass, density=1.83 g/mL) is needed to make 1000 mL of 5.0 M H_2SO_4? (1 mark)

4) Which gases are evolved during the reaction? Write down the balanced chemical equations. (1.5 marks)

The volume of the gas obtained was 2.5 mL at 298K and 1.0 atm [101325 Pa]. The gas mixture was passed through an acidic bromine solution. Only one of the gases dissolved.

5) Draw the Lewis structure of both gas molecules. Show the oxidation state of the central atom. Indicate which of the two gases can be oxidized further by circling it. (2 marks)

The volume of the gas collected after passing through the acidic bromine solution was 2.0 mL at 298K and 1.0 atm [101325 Pa]. The value of the gas constant, R, is 0.0821 atm.L/(mol.K) [8.314 J/(mol.K)]. Ignore any water vapour that may be present. Assume that the gases behave ideally.

6) Calculate the concentrations of HCO_3^- and HSO_3^- in the sample. (2 marks)

To find the concentration of Fe2+, 100 mL of sample was first treated with suitable reagents to remove other ions present in the solution and then was titrated with Permanganate ion and required 9.3 mL of 1.0×10^{-3} M KMnO4 solution to reach the equivalent point. The reaction of titration is :

$MnO_4^- + Fe^{2+} + H^+ \rightarrow Mn^{2+} + Fe^{3+} + H_2O$

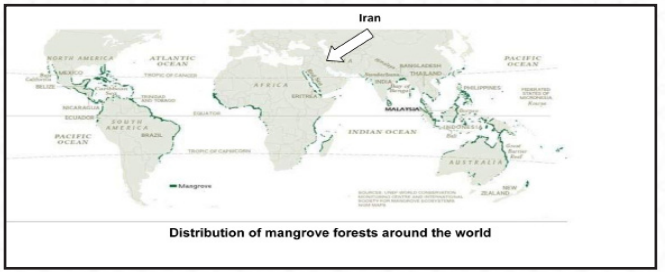
7) Balance the chemical equation of titration. (1 mark)

8) Calculate the concentration of Fe^{2+} ions in the sample. (1.5 marks)

Bilogy

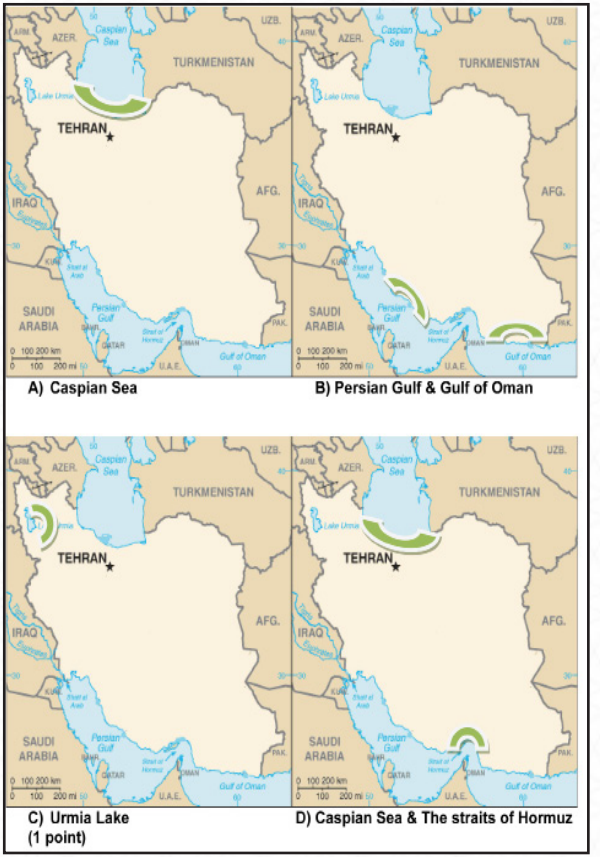
Mangrove forest or mangals include trees and shrubs that grow in tropical and subtropical latitudes (coastal and intertidal zones) adjacent to the equator. Mangrove plants need a number of morphological and physiological adaptations to overcome unfavorable conditions such as anoxia (lack of oxygen), high level salinity and frequent tidal inundation.
Avicennia marina is the famous mangal plant in Iran which is viviparous (seeds germinate while still attached to the parent tree).

Mangrove tree



Distribution of mangrove forests around the world

1.According to the text and the map above, determine the distribution of mangrove forest in Iran (shown by a thick curve).



A) Caspian Sea

B) Persian Gulf & Gulf of Oman

C) Urmia Lake
(1 point)

D) Caspian Sea & The straits of Hormuz

2.Match the problem encountered and corresponding adaptation(s) for the mangrove plants to cope with (one or more answers may apply).

	Problem encountered		Adaptations
A	Intertidal currents	i	Viviparity
B	Anoxia	ii	Reduced surface area of leaves
C	High concentration of Salt	iii	Leaves with glands that excrete salt
D	Reproduction in unsuitable condition	iv	Larger extension of root in seabed
E	High temperature and evaporation	v	Breathing roots
		vi	Reduced opening of the stomata

(0.5 X 6 = 3 points)

3.Benthic invertebrates that live in a mangrove habitat are exposed to air during low tide. During that period, the concentration of lactic acid in the body of benthic invertebrates will increase. State whether the following statements are true or false by ticking the appropriate box in the answer sheet.

Statement	True	False
These invertebrates will change their respiration mode from aerobic to anaerobic pathway during the low tide.		
These invertebrates will slow down their metabolism during the low tide.		

(0.5 X 2 = 1 point)

4.Identify which of the cross-sections of leaves shown in figure 1, 2 and 3 belong to:
a.Mesophytic plant (adapted to grow in moderate amount of water)
b.Hydrophytic plant (adapted to grow in water)
c.Xerophytic plant (adapted to grow in dry conditions)

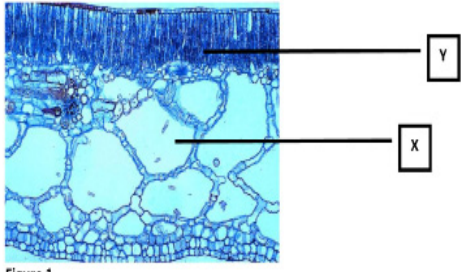


Figure 1

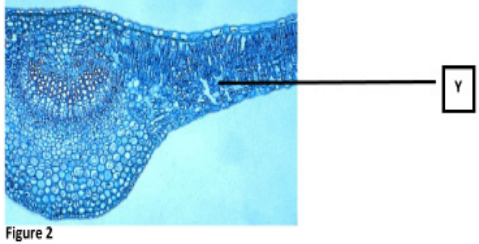


Figure 2

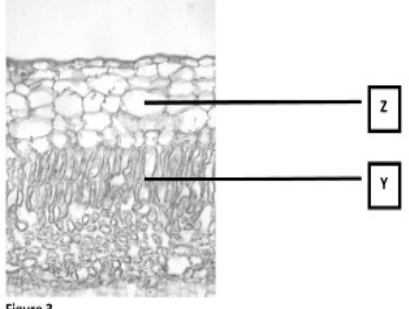


Figure 3

(0.5 X 3 = 1.5 points)

5.Read the following passage and complete the blank spaces with the correct word. Choose the words from the table below and write the corresponding number on the answer sheet

A xerophyte is a plant that has adapted to survive in an environment that lacks sufficient a)…., such as a desert. Xerophytic plants may have adapted shapes and forms or internal functions that reduce their water loss or store water during long periods of dryness. Plants with such morphological adaptations are called xeromorphic. Xerophytic plants have less overall b)… than other plants in order to reduce water loss by c)….. Xerophytes have d)… leaves than other plants. An example of a xerophytes is a e)….

Hydrophytes are plants that have adapted to living in aquatic environments. These plants require special adaptations. The most common adaptation is the possession of f)… storage tissue. The stomata of hydrophytes are located on the g)… surface of the leaves. An example of a hydrophyte is a h)….

Letter in text	Answer	
a.	I	air
	II	salt
	III	water
	IV	light
b.	I	height
	II	mass
	III	volume
	IV	surface area
c.	I	osmosis
	II	evaporation
	III	diffusion
	IV	active transport
d.	I	lighter
	II	larger
	III	darker
	IV	smaller
e.	I	cactus
	II	water lily
	III	rose
f.	I	glycogen
	II	starch
	III	air
g.	I	upper
	II	lower
h.	I	cactus
	II	water lily
	III	rose

(0.25 X 8 = 2 points)

6. Mangroves have xerophytic adaptations.

Which of the following statements are true? Tick the appropriate box on the answer sheet.

Statement	True	False
a. The air roots of mangroves directly absorb air from the atmosphere.		
b. Mangroves store salt in their vacuoles and use osmosis to take up water.		
c. Mangroves use osmosis to excrete salt into the environment.		

(0.5 X 3 = 1.5 points)

Practical Examination

Physics, Chemistry, Biology

The purpose of this experiment is to extract DNA from germinated wheat.

Then to compare the size of DNA fragments with given samples by gel electrophoresis.

DNA extraction from sprouted wheat

Note: More than one of choices may be correct, and you need to mark all corrected answers to get complete scores.

Some part of DNA extraction procedure has been already done by laboratory staff.

DNA can be isolated from a number of plant tissues. The

sprouted wheat is an excellent source of DNA. This part of the procedure has been done for you.
•2 grams of dried powder of sprouted wheat was placed in tube.
•A solution containing buffers, salt and detergents was added to the tissue.
•The tissue was incubated at 60oC for 20 minutes with frequent mixing. Tubes containing the sprouted wheat mixture were transferred to an ice bath for a few minutes to quickly cool it to approximately 25°C. Swirled gently during this period.
•Tubes were placed on the table.
Students should start their experiments from step A.
We have made a solution containing DNA and give 3 mL of it to all groups in a test tube.
A- Tilt your test tube and slowly pour alcohol (Ethanol) into the tube, down the side so that it forms a layer on top of the wheat extract. Pour until you have about the same amount of alcohol in the tube as wheat mixture .
B- During about a 5-minute period, observe any change that may appear. After that, you should be able to answer the questions 1 & 2.
1- What change(s) do you observe after adding alcohol to the DNA solution? (1 Mark)
I. Two separate phases are observed.
II. Appearance of milky white clumps after 5 minutes.
III. DNA clumps are made in the solution but they are invisible.
IV. Appearance of a milky white homogeneous solution.
C- Use a yellow tip or metal loop to draw up the DNA clump.
D- Transfer the collected DNA into «Your Sample» tube containing dye solution.
Step A requires the cold alcohol. The solubilized DNA contacts the alcohol where the two liquid layers meet. The alcohol dehydrates and precipitates the DNA, as DNA is insoluble in the alcohol (especially cold alcohol).
2-What happens during the 5-minute period after adding ethanol to the test tube? 1 mark
I. DNA clumps appear immediately after the addition of ethanol.
II. A very thin string of DNA appears after the addition of ethanol and its amount gradually increases.
III. DNA clumps separate from the lower phase and they float on the upper phase.
IV. DNA clumps sink to the bottom.
What is Electrophoresis?
Electrophoresis is a technique used to separate a mixture of macromolecules such as DNA and RNA fragments or proteins by their physical properties. DNA molecules which are to be analyzed are set upon a viscous medium agarose gel,and are induced to migrate through the gel.
Agarose is a natural polymer made from seaweed and it makes a porous network when it is mixed with water to make the gel. Bromophenol Blue and Xylene Cyanol dyes migrate through agarose gel at roughly the same rate as double-stranded DNA fragments of 500 and 4000 base pairs, respectively.
3-What induces DNA molecules to migrate through the agarose gel? 1 Mark

I. External electric field
II. Gravitational field
III. Electrical force between molecules
IV.Induced magnetic field

4-In the experiment, the main factor slowing down the migration rate of the DNA molecules inside the agarose gel is ... 1 Mark

I. Electric charge of DNA molecule
II. Electric field in the gel
III. Size of the DNA molecule
IV.Thickness of the gel

5- DNA molecule has a …… and migrates to the ……... 1 mark

I. Negative electric charge - anode
II. Positive electric charge - anode
III. Positive electric charge - cathode
IV.Negative electric charge - cathode

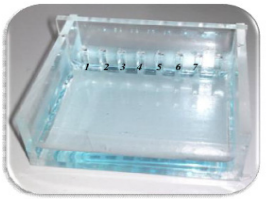
6-Which of the following options complete the phrase below correctly?

The higher the concentration of the agarose in the gel, the ……... of the gel. 1 mark

I. smaller the pores
II. bigger the pores

For each group an agarose gel is provided. Each agarose gel contains 7 wells in which the samples will be loaded. For loading your sample in the wells, take a syringe, join it to the yellow tip and draw the sample. The samples in the yellow tip should be less than half of the length of the tips. Load in the well only one drop of the sample. For loading each well use a new tip. You should be aware not to destroy the well. if you cannot do the procedure, ask the lab assistant for help but you will be penalized 2 marks. The wells should be allocated to the samples as follows:

•1 & 2: your sample, which is marked by a smiley face. Number 1 is for
practice of loading and number 2 is for the actual run.
•3, leave it empty.
•4, sample X1
•5, sample X2
•6, sample X3



DNA Electrophoresis Apparatus

7. Which sample (lane) is identical to «Your Sample»? 3 marks

I. X1
II. X2
III. X3

8. Measure the voltage of the power supply and report it. 1 mark

9. In this part first set up the electrophoresis and add the multimeter for measure the current and then asks for assistant to check the system. 2 marks

10. Measure the current in the circuit and the distance travelled by the molecules in the tank for X1, X2 and X3 samples. Record your data in the table. The voltage of the power supply is assumed to be stable. Measure for 4 samples at the same me. Start at t=0 and measure ll t=40 minutes; use time

intervals of 5 minutes. Sample X2 contains 2 different kinds of molecules called p and q. Molecule p appears as light blue color belt and molecule q appears as dark blue color belt which appear when you run the samples using electrophoresis. 8 marks

11. Calculate the resistance and record in the table. 2 marks

Time in min.	*Current(I) in mA*	*Distance (x) in mm*				*Resistance (R) in Ω*
		X1	*X2*		*X3*	
			p	*q*		
0						
5						
10						
15						
20						
25						
30						
35						
40						

12. Plot a graph of electric current versus the time. 1.5 marks

13. Plot a graph of electrical resistance versus the time. 1.5 marks

14. For X1 and X3 samples, Plot a graph of distance versus the time. Label your graphs by suitable labels. 4 marks

15. Supposing that the electric field within the tank is uniform. Estimate its value. 1 mark

Molecules move with terminal speed in the gel when the imposed force on molecules is equal to friction force inside the gel. Friction force is equal to friction coefficient multiplied terminal speed.

16. Assume the electric charge of each molecule is equal to 1´10-16 C. For X1 and X3 samples, calculate the value of coefficient of gel. 2 mark

17. Mobility by definition is ratio of terminal speed of molecules to imposed electric field. For X1 and X3 samples, Calculate the mobility. 2 marks

18. During the electrophoresis, it is observed that bubbles are continuously evolved from the electrodes. Write down the chemical formula of the gases evolved at,

0.5 mark

Anode:

Cathode:

19. Write down the electrochemical half-reactions which are taking place at

2 marks

Anode:

Cathode:

20. Use suitable arrows (for increase, ¯ for decrease or «for no change) to fill in the blanks :

1.5 marks

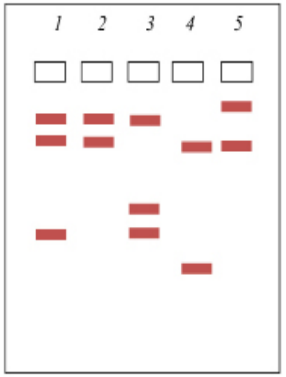
The pH of the solution near anode during the electrophoresis:

The pH of the solution near cathode during the electrophoresis:

The pH of the total solution after the electrophoresis:

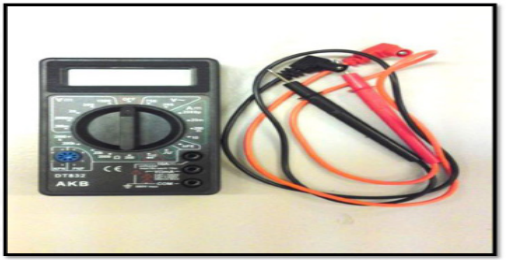
21. Restriction enzymes cut DNA molecules at designated points and so produce DNA fragments. A DNA sample was treated with a restriction enzyme at the points shown by arrows. The DNA fragments were then separated using electrophoresis. Which of the schemes below(1 to 5) is the most probable result if DNA is linear ?

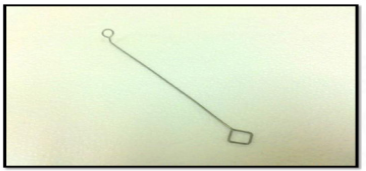
1 mark



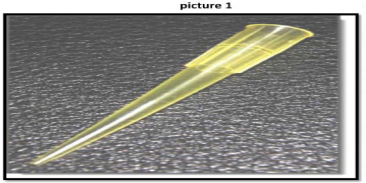
22. If this DNA molecule was circular which pattern would be the correct answer after
complete digestion?
1 mark

picture 5





picture 1



IJSO 2012 Excursion







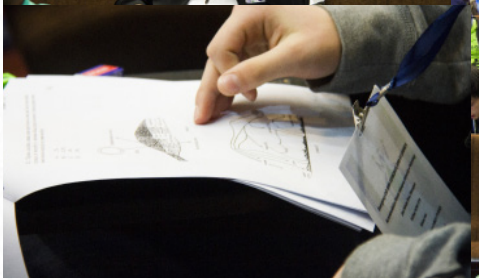









IJSO 2012 Competition



IJSO 2012 discussion & Translation

IJSO 2012 Awarding Ceremony

Honorary Guest- Dr Alli Asghar Yazdani Vice minister of Ministry of Education

Awarding Medals - Manager of TV office of Kuwait in Tehran

Awarding Medals - Dr. Paraic James

Awarding Medals - Michael Cotter

Awarding Medals - Embassador of Romania embassy

Awarding Medals - Embassador of Serbia embassy

Awarding Medals - President of IJSO

Special Thanks To:

Dr. Ahmad Fayaz Bakhsh with his great efforts in IJSO 2012

Assistant Professor, Department of Health Management and Economics, School of Public Health (SPH), Tehran University of Medical Science (TUMS)

Education

1. Ongoing: Teaching and Learning Skills for Medical Education, Distributed Interactive Learning Environment (http://www.dilenvironment.com), A set of Nottingham University based Online Courses, UK
2. 2006: Post-Graduate Fellowship and Certificate in Medical Education, Educational Development Center (EDC), TUMS, Tehran, Iran
3. March 2004: PhD from Department of Health Policy and Management, School of Health and Related Research, University of Sheffield, UK

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Mrs. Maryam Emami Ale Agha
Manager of Imam Ali Complex

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Dr. Abdollah Rashidi Mehrabadi
Shahid Abbaspour University
Faculty of Water & Environmental Engineering

For making well arrangements in Shahid abbaspour university Hostel during IJSO 2012

Education

MSc. Civil Engineering – Environmental University of Tehran
PhD. Environmental Engineering University of Tehran

موسسه اندیشه‌های خلاق جوان آریایی
برگزار می‌کند

IJSO
International Junior Science Olympiad

Abbaspour University of Technology

Payame Noor University,Tehran

National Institute of Genetic Engineering & Biotechnology (NIGEB)

Ariaian Young Innovative Minds Institute
AYIMI