GYAN VIGYAN SARITA:शिक्षा

A non-organizational, non-remunerative, non-commercial and non-political initiative to Democratize Education as a Personal Social Responsibility (PSR)

7th Monthly e-Bulletin dt 1st May'19, Fourth Year of the Publication

DIVERSITY COEXISTS

BEAUTY OF NATURE

CONTENTS: (Against Each Content Page Number is Indicated for Convenience)

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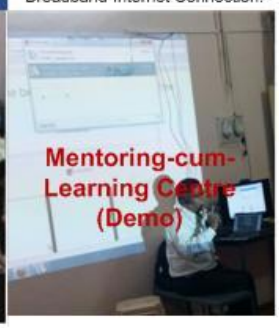
Aim at the Best, but...

Conceptual Representation
of
Online Mentoring
An Initiative To Bridge Gap between
Passionate Teachers
and
Desperate Students
A Selfless Endeavour
to
Democratize Education
with a sense of
Personal Social Responsibility (PSR)

Equipments at Mentoring Center
1.Desk-/Lap-top
2. WebCam
3. Headset with Microphone
4. Digital Pen
AND
Broadband-Internet Connection

Cloud Internet
(Linking platform : cloud based with as low bandwidth as possible for seamless connectivity of audio-video-whiteboard across nodes where internt connectivity is poor- Presently A-VIEW is in use)

Equipments at Learning Center
1.Desk-/Lap-top
2. WebCam
3. A Mixer-cum-amplifier with Speakers
and Wireless Microphone
5. Overhead Projector.
6. UPS (For Continuous Power Supply to computer, internet modem and L&F)
AND
Broadband-Internet Connection:



Important Links
1. Good Internet Connectivity (Wired Broadband Connection)
2. Subject-wise Coordinator for Each Session to Bridge Learning Gaps between Mentor & Students

Special Features
1. Free and Open to all to adopt. Modify, change, correct
2. Welcomes participation, promotion and facilitation on Zero-Fund-Zero-Asset (ZFZA) basis
3. More details on Technological and Operational – please write on http://www.gyanvigyansarita.in/contact/

... start, without loosing time, with whatever is available.

Infrastructural requirement for Centers in Interactive Online Mentoring Sessions (IOMS)

Learning Center (if asked for by Mentor)		Mentoring Center (if asked for by Mentor)	
Estimated Capital Cost (One Time)			
Particulars	**Cost (in Rs)**	**Particulars**	**Cost (in Rs)**
Desktop (without monitor)	20,000	Laptop	25,000
Projector	15,000	Projector	-
Web camera	10,000	Web camera	-
Mixer cum amplifier with Speaker and Wireless microphones	15,000	Headset with Microphone	3,000
Wireless Surface Writing device	15,000	Wireless Surface Writing device	15,000
Total	75,000		43,000
Estimated Recurring Cost			
Internet charges, based on estimated monthly data transfer which depends upon choice of cloud platform, and tariffs of ISP		Internet charges, based on estimated monthly data transfer which depends upon choice of cloud platform, and tariffs of ISP	
Cloud platform : a. A-VIEW indegeneously developed by Amrita University. It is found to be best among available options for use in IOMS. It has been developed for use in imparting Interactive Online Education, with bilateral audio-visual access, in an interactive manner. Cloud platform. b. The IOMS envisages session upto Five Learning Centers. Charges for the platform whenever payable may be shared across in mutual agreement between Learning Centers. c. Benefit of sharing of charges of cloud platform can be optimized with offset of schedule among multiple sessions of IOMS, to the extent Mentor can deliver.		IOMS is since an initiative driven with Personal Social Responsibility (PSR) operating n Zero-Fund-&-Zero-Asset (ZFZA) basis, the Cloud Platform has to provided by Learning Centers for deriving benefit of IOMS. Gyan Vigyan Sarita will be pleased to connect Learning Centers for collectively complementing the cost of Cloud Platform, whenever payable, for arriving at a mutual agreement for cost sharing. So also IT Infrastructure with the Mentors has been in use and is working. But, at any stage if upgradation becomes essential, support of learning centers, beneficiaries of the initiative, is gratefully welcomed on ZFZA basis. Operating cost of Mentor, if required, shall be supported by Learning Centers	

Specification: These are based on ground level operating experience and need of optimizing the cost on the initiative. This is essential to utilize financial resources, considered scarce, for benefitting more number of students at more number of centers and mentoring centers.

These specifications have been updated based on experience of operation of IOMS with available options. Whiteborad application in the tried out cloud platforms are a bit inadequate in terms of writing lucidity. This deficiency is being managed with Microsoft OneNote application. Suggestions for a proper Whiteboard application as a shared space are welcomed; it will be extremely helpful in exploiting Interactive feature of IOMS with a wireless surface-writing device at each learning center.

Web Camera: Logitech HD 1080p, with a tripod or wall mounting

Projector: Portronics LED Projector Beam 100", 100 Lumen, 130" Screen size, 800x480px resolution

Mixer-cum-Amplifier: Ahuja Make PA Mixer Amplifier Model DPA-370, 30 W Max/37W Max, with Two Cordless Mikes and Speakers. This device offers echoless input/output communication with base computer and Mikes and Speakers in the Class.

Cloud Platform: A-VIEW (Amrita Virtual E-Learning World) developed by Amrita University in association with IIT Bombay, an MHRD, GOI sponsored project.. Problems with Whiteboard functionality of A-VIEW are being circumvented with OneNote app of MS Office for IOMS. This has many features of minimizing bandwidth requirements.

Surface Writing Device: HUION make Model WH1409, or Wacom Intuos with wireless device makes it suitable for communication with base computer in class like environment.

UPS: An additional accessory, for uninterrupted continuity of session, based on power availability to be decided by Learning Center, **not included in above cost estimates.**

Furniture and Lighting: At Learning Center, as deemed fit by local administration of Learning Center, **not included in above cost estimates.**

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संपादकीय

लोकसभा चुनाव: समस्याओं का जनक या हल तलाशने की कोशिश

भारत विश्व का सबसे बड़ा लोकतांत्रिक देश है। इसका संविधान विश्व का सबसे बड़ा लिखित संविधान है। भारतीय संविधान '**हम**' शब्द से शुरू होता है। '**हम**' शब्द हर प्रकार के भेदभाव से रहित है। यह शब्द धर्म, जाति, रंग, भाषा, समुदाय, लिंग, आयु का भेद नहीं करता है। जिस प्रकार यह शब्द किसी तरह का भेदभाव नहीं करता है, ठीक उसी प्रकार भारतीय संविधान भी हर एक नागरिक को एक ही रूप में यानि मनुष्य रूप में देखता है।

भारत में सामान्य तौर पर हर पांच वर्ष में एकबार लोकसभा के लिये चुनाव होते हैं। इस चुनाव में हर भारतीय जिसकी आयु 18 वर्ष से कम नहीं होती है और जो भारतीय निर्वाचन आयोग से पंजीकृत मतदाता होता है, उसे लोकसभा के प्रत्याशी को मत देने का अधिकार रहता है। हर उस भारतीय को जिसकी उम्र 25 वर्ष से कम नहीं है, लोकसभा का चुनाव लड़ने का अधिकार प्राप्त है। चुनाव से नयी सरकार चुनने का अधिकार जनता के हाथों में है।

अमेरिकी विचारक हैरी एमर्शन फास्डिक के अनुसार लोकतंत्र इस धारणा पर आधारित है कि साधारण लोगों में असाधारण संभावनायें होती हैं। लोकतांत्रिक समाज में जनता शांतिपूर्वक तरीके से सरकार को मतदान के माध्यम से बदलती है परन्तु लोकतंत्र की एक कमी है कि जैसी जनता होती है, वैसी ही वह अपना शासक चुनती है।

भारत में चुनाव आजादी के बाद वर्ष 1951-52 से शुरू हुये। समय के साथ साथ इन चुनावों पर खर्च बढ़ता गया है। चुनाव में भाग लेने वाले प्रत्याशियों का आचरण और उनका दायित्व भी बदलता गया है। अपने राजनीतिक विरोधियों को हराने के लिये पहले की अपेक्षा आजकल जिस भाषा, तथ्य अथवा तरीके का उपयोग किया जा रहा है, वह देशहित में कम और समस्याओं को ज्यादा पैदा कर रहा है। राजनीतिक दल इतने अवास्तविक सपने जनता को चुनाव के पहले दिखा देते हैं जिनका पूरा होना संभव नहीं होता है। जनता उसी लालसा में पड़ी रहती है और दिखाए सपने पूरे न होने की दशा में वह सरकार से नाखुश होने लगती है।

आज समस्या यह पैदा हो रही है कि इन चुनावों से सरकारें तो बन जाती हैं पर उन सरकारों के सामने वे नयी चुनौतियां पैदा हो जाती हैं जो वास्तव में होती ही नहीं हैं। फिर सरकार जनता के लिये काम कम करने लगती है और अपना अस्तित्व बचाने के लिये काम ज्यादा करने लगती है।

चुनाव में बाहुबल, धनबल, अशिष्ट भाषा, झूठे तथ्य, और देशहित की अनदेखी सामान्य बात हो गयी है। अपनी राजनीतिक विजय के लिये समाज को धर्म, जाति, संप्रदाय में निर्लज्जता से बांटने की कोशिश करना सामान्य बात हो गयी है। सबसे दुःखद पहलू इन चुनावों का यह है कि एक साथ रहने वाला समाज, चुनाव आते आते विभिन्न गुटों में बंट जाता है और आपसी भाई चारा खो देता है। वैचारिक विरोध लड़ाई झगड़े में बदल जाते हैं। सरकार बाद में बनती है और आपस में लड़ाई पहले हो जाती है।

अपनी जीत के लिये कोई राजनीतिक दल मुसलमानों को एकजुट होने के लिये कहता है। कोई राजनीतिक दल हिंदुओं को एकजुट होने के लिये कहता है। कोई दल एक जाति विशेष के लोगों को अपने विरोधी को वोट न देने के लिये समझाता है। कुछ राजनीतिक दल केवल अपने परिवार के लोगों को ही टिकट देकर अपना आधिपत्य बढ़ाते हैं। कुछ प्रत्याशी एक ही जगह से बार बार चुनाव लड़कर उस क्षेत्र के क्षत्रप बन जाते हैं।

जनता चुनावों के समय और चुनावों के बाद अपना उत्तरदायित्व भूल जाती है। वह समझ बैठती है कि उसके समस्याओं को सुलझाने का काम उसके चुने प्रतिनिधियों का है, उसका स्वयं का नहीं है; देश की सुरक्षा का काम देश की सीमा पर डटे वीर जवानों का है, उसका नहीं है; उसके विकास की चिंता दूसरों को करनी है, उसे नहीं; सफाई की जिम्मेदारी सरकार की है, उसकी नहीं; उसके स्वास्थ्य के रक्षा की जिम्मेदारी सरकारी अस्पताल की है, उसकी खुद की नहीं।

गैर ज़िम्मेदार होती जनता यह सोचती है कि गाड़ी लापरवाही से चलाने के लिये मना करना अथवा लालबत्ती पर रोकने या उसे टोकने की जिम्मेदारी पुलिस वाले की है, खुद उसकी नहीं है; मोटर बाईक चलाते समय हेल्मेट लगाना, कार चलाते हुये सीट बेल्ट बांधने के लिये बताना सिपाही का काम है, खुद उसका नहीं; नौकरी देना सरकार का काम है, खुद के व्यवसाय के बारे में कुछ सोचना और करना उसकी जिम्मेदारी नहीं है; मुफ्त का कर्ज सरकार से पाना उसका अधिकार है, मेहनत करना उसकी जिम्मेदारी नहीं है।

आपसी झगड़ा हम खुद करें और पुलिस और प्रशासन से आशा करें कि वे आकर हमारे बीच में सुलह करायेंगे क्योंकि शांति व्यवस्था की जिम्मेदारी तो पुलिस और प्रशासन की है।

हमें समस्यायें कम पैदा करनी चाहिये ताकि हमारी सहायता में खड़ी सरकार और उसके लोग अन्य विकास के कामों में अपनी ऊर्जा लगा सकें।

सत्रहवीं लोकसभा का चुनाव 11 अप्रैल से शुरू होकर 19 मई तक चलेगा। सात चरणों में मतदान का काम होगा। मतगणना 23 मई को होगी और उसी दिन शाम तक नयी सरकार की रूपरेखा दीखेगी। कुल 543 सीटों पर चुनाव हो रहे हैं। शेष दो सीटों के लिये भारत के राष्ट्रपति दो एंग्लोइंडियन को नामिनेट करते हैं। इन दो को मिलाकर कुल संख्या 545 हो जाती है।

2019 के चुनाव में सभी बूथों पर इलेक्टानिक वोटिंग मशीन का प्रयोग हो रहा है जिसमें वीवीपैट यानि वेरिफाइड पेपर आडिट ट्रेल लगी हुयी है । यह मशीन वोट डालते समय वोट डालने वाले को दिखा देती है कि उसका वोट उसके प्रत्याशी को ही गया है। इस वर्ष करीब 90 करोड़ मतदाता देश में हैं। इसमें से 18 से 19 वर्ष की आयु में करीब डेढ़ करोड़ मतदाता हैं। पुरूष मतदाता करीब 47 करोड़ और महिला मतदाता करीब 43 करोड़ हैं। कुल 50 से अधिक राजनीतिक दल लड़ाई में हैं।

भारत का निर्वाचन आयोग एक स्वायत्त संवैधानिक संस्था है जो इस चुनाव को करा रहा है। चुनाव प्रक्रिया बहुत जटिल है और इसकी व्यवस्थायें भी सरल नहीं हैं। सबसे बड़ी व्यवस्था चुनाव आयोग को यह करनी होती है कि अपने प्रति लोगों की निष्ठा को भी बरकरार रखना

होता है, और साथ ही साथ चुनाव लड़ रहे लोगों के विवकेशून्य होने पर उन पर लगाम भी लगाना होता है।

देश में कुछ भी बोलने की आज़ादी के कारण कुछ प्रत्याशी और उनके समर्थक चुनाव आयोग को ही दोष देने में नहीं चूकते हैं। कोई कहता है कि वे मुसलमान हैं इसलिये उन पर कार्यवाही होती है, तो कोई कहता है कि वह दलित है इसलिये उस पर कार्यवाही होती है। कोई अपने कार्यो पर कभी खेद नहीं व्यक्त करता है, पछतावा नहीं करता है।

हाय रे, पढ़े लिखे लोगों की सोच! ये लोग शासक बनकर दूसरों को तो सुधारने का दमखम रखते हैं परंतु खुद अपना अनियंत्रित आचरण नहीं सुधारते हैं। एक और विडंबना समाज की यह है कि अपने भावी शासक का चयन करते समय वे उन अधिकांश लोगों में से अपना शासक चुन रहे होते हैं जिन पर पहले से ही आपराधिक मुक़दमे चल रहे होते हैं।

देश के समक्ष आज सबसे बड़ी समस्या यह है कि इतना बड़ा देश होने के बाद भी साफ सुथरे लोगों की संख्या लगभग शून्य हो रही है। जिधर देखो, झकाझक सफेद कपड़ों में राजनेता तो हैं परंतु उनके अंदर साफ सुथरापन नहीं है। हम अपने नेताओं को साफ सुथरा कपड़ा तो पहना देते हैं, उनको सुरक्षा दे देते हैं पर उनको सही आचरण नहीं सिखा पाते, देश और जनता के लिये काम करने का ईमानदारी पूर्ण तरीका नहीं समझा पाते और देश को सबसे ऊपर समझने का भाव नहीं दे पाते हैं।

चुनाव एक व्यवसाय बन गया है। यह जीतने वाले के लिये पूर्णकालिक और अन्य सबके लिये अल्पकालिक व्यवसाय हो गया है। आजकल राजनीति में लोग इसलिये आते हैं कि अथाह पैसे कमाये जायें, अकूत संपदा हासिल की जाये और पीढ़ी दर पीढ़ी की व्यवस्था की जाये।

हमें नेताओं के भाषणों के चक्कर में पड़कर अपने आपसी संबंध खराब नहीं करने चाहिये। वोट हम चाहें किसी को दें, दलों की विचारधारा को हमें आपसी बातचीत का विषय नहीं बनाना चाहिये क्योंकि देश का विकास किसी एक दल, अथवा एक नेता का काम नहीं होता है। देश वही आगे बढ़ता है जो सबको साथ लेकर चलता है और सबका विकास करता है।

सुप्रसिद्ध समाजशास्त्री एमएन श्रीनिवास ने अपनी पुस्तक 'दि सोशल सिस्टम आफ मैसूर विलेज' में पहली बार वोटबैंक शब्द का प्रयोग किया था। उनके अनुसार वोटबैंक प्रतिनिधि लोकतंत्र के लिये नुकसानदेह है क्योंकि यह समाज को धर्म-जाति आदि समुदायों में बांट कर चुना जाता है।

आज की आवश्यकता है कि हम भारत के सभी नागरिकों को सुशिक्षित करें और उनके अधिकार और कर्तव्यों से उनको अवगत करायें। जनता द्वारा चुनी गयी सरकार सबसे अच्छी सरकार मानी जाती है क्योंकि जनता इसमें सीधी भागीदार होती है। जनता की सरकार का मतलब ही है कि जनप्रतिनिधि जनता के मध्य से आयेगा तो उसे जनता की तकलीफें पता होंगी और उसके निदान का तरीका भी वह अच्छी तरह से समझा पायेगा।

ज्ञानविज्ञानसरिता परिवार की अपेक्षा है कि जनता द्वारा चुनी गयी सरकार, जनता के लिये काम करेगी, अच्छा काम करेगी और लोकतंत्र की मूल भावना के अनुसार काम करेगी जिसमें सबका विकास होगा और सब हंसी खुशी साथ-साथ रहेंगे। जय भारत!

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INVITATION FOR CONTRIBUTION OF ARTICLES

Your contribution in the form of an article, story poem or a narration of real life experience is of immense value to our students, the target audience, and elite readers of this Quarterly monthly e-Bulletin ***Gyan-Vigyan Sarita: शिक्षा,*** *and thus create a visibility of the concerns of this initiative. It gives target students a feel that you care for them, and they are anxiously awaiting to get benefitted by your contributions. We request you to please feel free to send your creation, by* ***20th of each month*** *to enable us to incorporate your contribution in next bulletin, subhashjoshi2107@gmail.com.*

We will be pleased have your association in taking forward path our plans as under-

- ***With the the release of 1st Monthly e-Bulletin in its consecutive Fourth Year, we are gearing up for next Monthly e-Bulletin Gyan-Vigyan Sarita: शिक्षा due on 1st of ensuing month.***
- ***This cycle of monthly supplement e-Bulletin Gyan-Vigyan Sarita: शिक्षा is aimed to continue endlessly, till we get your तन and मन support in this sefless educational initiatice to groom competence to compete among deprived children.***

Formatting Guidelines: (a) Paper Size A4, (b) Fonts: Times Roman (English), Nirmala UI (Hindi), (c) Font Size Title/Author Name/Text: 14pt/12pt/10 pt (d) Margins: top/bottom/left/right – 1"/1"/0.4"/0.4", (e) Photoprofile of author – In 4-5 lines with mail ID and Photo. We will be pleased to provide softcopy of template of an article, in MS Word, would be provided.

We believe that this e-Bulletins shall make it possible for our esteemed contributors to make its contents rich in value, diversity and based on their ground level work and/or experiences.

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Coordinator's View

Social Policing

Arrogance of some qualified and responsible persons in justifying their breach of social needs to suit their convenience has been bothering me for quite some time. Suddenly seeing Chowkidar word that has shot up into prominence while our country is reeling through fever of general elections, it has triggered a thought provocation on meaning and expectations of twin words Social Policing. This article is manifestation of discomfort undergone during introspection of my role in prevalent social behavio. Elections do happen periodically, but need of social policing has remained, remains and shall remain forever. It is the need of a stable and growing democracy. In view of this, this dissemination is with a hope that it will give rise to collectively complementing of efforts, among elites, for a better understanding and implementation of the essence the title of this article.

Society and Police are two notions which have different meaning to different people. Many look upon society to be a matter of everybody's concern and least of individual. It is characterized by general notion that '*persons like Bhagat Singh, Tilak, Gandhi, Bose and many more are born in every other house except mine'*. So also the word police, in general, create an impression of a constable in uniform, carrying a batten in his right hand and blowing whistle held in left hand to disperse crowd. His efforts go unnoticed. Everyone in the crowd remains busy to find a way out without caring for inconvenience of the others. After coming out they brilliantly blame the policeman for the chaos.

Policing is about maintaining not only maintenance of law-&-order, it also comes into action in case of social upheavals. Common argument among elite section of society is that by contributing their dues through taxes their job is done. They put onus of surveillance and law-&-order on the administrative setup, including police. The next escape, taken by the elites, from their responsibility of social order is that they are too occupied with their duties and responsibilities. On the other hand persons below these elites, in the hierarchy, draw their role from conduct of their superiors. When it comes to downtrodden people, they are driven by their compulsions of survival and take a route which can at best fulfill their needs. These people are soft target of activists. Their vulnerability is exploited by activists to plough with slightest provocation as discussed in article Activism vs Reformism.

In a country of our population, spread and diversity the quantum of efforts, resources, time frame and mechanism of transforming social disorder into a proper order is unimaginable. It, therefore, demands from every citizen, specially educated ones, to look beyond and help to ensure a social order which gives everyone a deserving place. These educated persons are best to play this role by virtue of their wisdom, position and social respect that they command. In this connection a few examples are maintenance of use of polythene, social hygiene, social discipline and many more. It is seen that people respond to these issues according to their work ethics. In this connection an article Honesty Breakdown would be found to be providing appropriate context. Honesty is a multidimensional trait. Financial dishonesty which is most talked about is just a tip of the iceberg. Most of the dishonesty is invisible and finds place in every act be it professional, moral, intellectual or social. Unless honesty finds its deserving place, any society cannot grow in a stable manner, irrespective of its cultural heritage and natural resources. It is very relevant to our country

It reminds a story of Everybody, Somebody, Anybody and Nobody which leads to a situation that a work which could be done by everybody, yet nobody addresses it. These elite people get opportunity to travel abroad for professional and personal growth and dovetail themselves adroitly in culture prevalent in foreign land. They rather take pride in doing there any small thing and self-help. This adaptability is either in wait for better opportunities or out of fear of severe punishment on infringement. Those countries have successfully evolved a wood work culture perhaps due to small size and population. Attributing their culture to their affluence might be incorrect. It is the culture which promotes economic growth and vice-versa. These two grow out spirally as discussed in Economics of Education. It is astonishing to observe that the same set of elite persons when back home become highly demanding and critical of systems in home land without doing a bit to correct it.

There is another story of a White Elephant, rare species. In a kingdom it was spotted and king ordered special care of the elephant so much so that the elephant be fed only milk. It was reported to the king that the elephant was growing weak. Immediately the king appointed a supervisor to ensure quality of milk being fed. The trail continued and finally out of sheer disappointment the king ordered his most trusted lieutenant to look after the elephant. The king to his astonishment was reported by the lieutenant that a fish had blocked wind-pipe of the elephant. This is what happens when responsibility is delegated to people irresponsible about work ethics.

There is another story of Swami Ramkrishna Paramhans of treating a boy eating too much of sweets. Swami ji could pacify the worried mother of the boy not by any

miracle but by first exercising self-discipline and then counseled the boy.

These three stories are contextual to appreciate that correcting social, policy and political order is not job of only people in administration or in government. People occupying these positions are no alien; they also come from the society in place. Therefore, it would be incorrect either to ignore or to remain complacent about any ill-doing. It demands from every educated and responsible person to act appropriately for correction. *This authority of command comes only from self-discipline which descends from top to bottom. It is irresponsible to expect ascend of discipline and responsibility from bottom to top. This is what makes elites more vulnerable.*

Emphasizing role of elites in social discipline drives me to compare educated and literate persons. A system which drives education to accomplish marks, rank, selection, position, power etc.. It leads to literacy and is discussed in an article A Systemic Tragedy- Education. It is seen that literate persons are quite smart in using jargons, principles, formulae, laws and quotations of learned and accomplished persons. Where as *education in essence is reform of thought process and perspective*. It entails ability to reason every happening around, analyze its effects, and choose a course which optimizes gains leading to sustainable coexistence among people, and with the nature. Such an education breeds wisdom. A literate person making citations to justify any ill-doing or escaping from responsibility of action is certainly intelligent. But, such citations that lack remedial appeal and action need introspection on the plain of honesty. Choosing a right path is a tough job, yet it is the duty and responsibility of every educated person who is essentially wise. As regards easy path, it is chosen by most, it is circumstantially tolerable from deprived ones, the common men. By default elites are expected to complement efforts of uplifting deprived one. Such contributions individually might be minuscule, but collectively they build a synergy that is comparable to efforts of omniscient, omnipotent and omnipresent person or institution. Moreover, such engagement of elites would set in a cultural reform most needed for growth of a society or a nation. Such collective efforts of reform are bound to experience more acceptance and less resistance. It is observed that most of the elite tend to agree to this contention, but their inhibition is – *should I would take the first step?* This is where wisdom propels one to take up the reins of reforms with a sense of Personal Social Responsibility (PSR).

At the core of the subject matter lies sense of rights and responsibility. One gains sense of right through education which is like sunlight showered equally on all. While, sense of responsibility is driven by the wisdom, acquired by a person, during pursuit of education and thereafter. Rather, it is the nature of the wisdom that it triggers a desire in a person to volunteer and work restlessly assuming responsibility for the larger good. Thus education and wisdom vis-à-vis rights and responsibility leads to a classification having an extension beyond binary 2×2 matrix of possibilities. The binary classification is: **(a)** A person who knows his rights and responds to his responsibility. In true sense he is an educated person. There could be difference in degree of wisdom depending upon competence acquired by individuals in the process of education or to the extent of information available. **(b)** A person who claims rights without responding to responsibility is at best a literate person. It leads to further classification based on behavioral uncertainties, discussed in next para. **(c)** A person who does not claim rights but discharges his responsibility is a wise person. Such a person may or may not be educated, but the sense of his responsibility acquired by such persons had its offing during informal education had by them while living in the school of life. Such persons develop sensible sensitivity for suffering of others. They tend reach out to persons in trouble ignoring their own discomfort. **(d)** Persons who neither knows his rights nor responsibility is really a down trodden person, and they remain out of main stream. Such persons deserve care and concern for their upliftment. It goes without saying that a wise person whenever encounters such downtrodden person(s) would tend to do whatever is possible within his capacity.

Three more possibilities, based on behavioral pattern, as indicated at (b) above, have been drawn out and are- **(e)** An educated person who is aware of rights and responsibilities, but is under compulsion of circumstances where he is neither able to exercise his rights nor able to discharge responsibilities with full honesty. Such persons need consideration and necessary help to rescue them from trap of their circumstances. **(f)** It pertains to persons who use their knowledge and intelligence to vindicate their actions or omissions committed unknowingly. Such persons need proper counseling and rehabilitation at a level of wisdom that they deserve. **(g)** An educated person who deliberately violates responsibility to meet his vested interest and then uses his intelligence to justify wrong-doing. Such situations raise multiple questions - Is this pattern of behavior characteristic to such a person? Are arguments of such a person tenable? Does such a person deserve any consideration, counseling or mercy? Is such a person respecting freedom of others? These questions are open to all elites for brain storming and decide upon place of an educated defaulter in society.

Case Study: *It has been framed out of a reasoning -Is it necessary that for court to decide treatment to educated*

defaulters? This question assumes importance in wake of courts already busy in clearing a big pile of pending cases. This is where role of social policing comes into play, whereby issues can be settled out of court. It derives inspiration from sensitivity every individual to his social credibility. This credibility is a clue to handle the issues of social importance. It requires elites, who practice self restraint in respect of issues of social concern, to take initiative. Such persons need to come out of complacence. They have to observe conduct of others who violates social norms, to the extent possible. In the beginning request should be made to defaulters. This request should be made indiscriminately but politely. It is seen that generally people are reasonably responsive to a cause pursued selflessly. Such request with same sense of urgency, necessity and conviction should be repeated. Repetition of such a request is essential since consequence of such a violation does not directly affect the defaulter. This requires a little extra effort on the part of defaulter to change his practice and overcome natural resistance to change. There are some defaulters who are arrogant and hard to change. Such persons require next level of effort; one of them is their social boycott with a prior notice. If this also is ineffective implement social boycott, without talking law in hand. It is a job of patience and self discipline in a flawless manner. This is what called social policing. Any error or breach in social norm by the person exercising social police would create a severe backlash by persons subjected to social boycott. This method has been evolved through a small initiative to restrain use of polythene bags in a residential complex which is considered to be one of the most sophisticated societies in NOIDA. Here residents are highly qualified. In such a society number of persons currently using polythene bags is estimated to be more than 99 percent. This large number of defaulters is seen as a matter of credibility crisis.

Anti-polythene request in last six months has seen marginal reduction in number of polythene users, but the process has set in. Some have started reusing polythene in store, while others have started using reusable cotton/jute bags. The latter practice is more environment-friendly and helps to canvass in favour of the reusable bag.

Seeing slow rate of persons turning polythene bag into users of reusable bags, a new dimension has been added. Persons carrying reusable bags are complemented for volunteering as Ambassador of Mother Nature and making their children responsible citizens of tomorrow.

The slow rate of transformation is attributed to the fact that such ambassadors are generally happy with their own reform. However, they consider it to be unwarranted to transform others through social policing. If each of such persons adapt to social policing, the transformation of polythene users into Ambassadors of the Mother Nature would grow like chain reaction.

This case study was taken up based on urgency of mitigating threat caused by non-biodegradable dump-hills, toxic air caused by burning of polythene and many other irreparable damages. It is not a prescription but just experience dissemination. Every elite person may choose area of concern for social policing based on appeal of his wisdom, extent of patience, self-conviction, selfless commitment and passion. There are innumerable areas open to social policing and to cite a few - abuse of natural resources, abuse of public/common property, misbehavior with women, children and old men, torture of animals, preserving biodiversity, public hygiene, insane driving, destruction of green cover.

Initially people enjoying social recognition felt offended to the extent that they ridiculed the requester by calling झोले वाले भैया and inspecting contents of the shoulder bag. As a senior citizen engaged in mentoring unprivileged children in a selfless manner, there is nothing to gain or lose in making anti-polythene appeal. Such an endeavour may be called Environment Friendly Drive or सत्याग्रह. Name to the endeavour is not important. The matter of primary importance in social policing is the intent, self-conviction, self-discipline and urge to reform for a better tomorrow. This is considered to be a humble self-step, without waiting for others, towards a progressively stable democracy where each person regards his nation with spirit of patriotism and nationalism.

Summary: *Mark Nichol has stated that Police, Policy, and Politics are similar notions and related to efforts for welfare of the people leading to a sustainable growth with socio-economic stability. This does not happen automatically; shear pessimistic criticism of the prevalent system and blaming the history is of no avail. It requires every individual to collectively complement for the cause to the extent possible with full sincerity, commitment, passion* ***without violation of law-&-order****. It would surely create a future where our descendents to feel proud of the legacy of peaceful coexistence left behind by their predecessors. This endeavour of social policing is a proactive option to support the people responsible for a welfare state; it will help them to undertake higher priorities more effectively for our collective benefits. In this pursuit grooming wisdom through proper education is a must.*

You start dying slowly...
Martha Medeiros (Brazil)

जीवन का रह जाता कोई अर्थ नहीं...
मार्था मेडेरिओस (ब्राज़ील)

You start dying slowly
if you do not travel,
if you do not read,
If you do not listen to the sounds of life,
If you do not appreciate yourself.

You start dying slowly
When you kill your self-esteem;
When you do not let others help you.

You start dying slowly
If you become a slave of your habits,
Walking everyday on the same paths...
If you do not change your routine,
If you do not wear different colours
Or you do not speak to those you don't know.

You start dying slowly
If you avoid to feel passion
And their turbulent emotions;
Those which make your eyes glisten
And your heart beat fast.

You start dying slowly
If you do not change your life when you are not satisfied with your job, or with your love,
If you do not risk what is safe for the uncertain,
If you do not go after a dream,
If you do not allow yourself,
At least once in your lifetime,
To run away from sensible advice.

Source:
https://www.goodreads.com/quotes/7399581-you-start-dying-slowly-if-you-do-not-travel-if

नित जीवन के संघर्षों से
जब टूट चुका हो अन्तर्मन,

तब सुख के मिले समन्दर का
रह जाता कोई अर्थ नहीं ।।

जब फसल सूख कर जल के बिन
तिनका -तिनका बन गिर जाये,

फिर होने वाली वर्षा का
रह जाता कोई अर्थ नहीं ।।

सम्बन्ध कोई भी हों लेकिन
यदि दुःख में साथ न दें अपना,

फिर सुख में उन सम्बन्धों का
रह जाता कोई अर्थ नहीं ।।

छोटी-छोटी खुशियों के क्षण
निकले जाते हैं रोज़ जहां,

फिर सुख की नित्य प्रतीक्षा का
रह जाता कोई अर्थ नहीं ।।

मन कटुवाणी से आहत हो
भीतर तक छलनी हो जाये,

फिर बाद कहे प्रिय वचनों का
रह जाता कोई अर्थ नहीं।।

सुख-साधन चाहे जितने हों
पर काया रोगों का घर हो,

फिर उन अगनित सुविधाओं का
रह जाता कोई अर्थ नहीं।। ...!!

Source:
https://nitindudhrejiya04.wordpress.com/2018/09/23/nobel-prize/

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An Appeal: for Interactive Online Mentoring Session (IOMS) at your establishment
By Gyan Vigyan Sarita – A non-organizational educational initiative

Philosophy: Socio-economic reform through education with **Personal Social Responsibility** (PSR) in a non-organizational, non-remunerative, non-commercial and non-political manner.

Objective: Groom competence to Compete among un-/under-privileged children from 9th-12th in Maths, Physics and Chemistry, leading to IIT-JEE.

Financial Model: ***Zero-&-Fund-Zero-Asset (ZFZA).*** It calls for promoters and facilitators to provide infrastructure for use to the extent they feel it is neither abused nor there is a breach of trust. And, reimbursement of operational expenses, as and when they arise, to the initiative

Operation:

a. **Mode:** Interactive Online Mentoring Sessions (IOMS) since July'16, which has been recently switched over to A-VIEW, web-conferencing S/w, with connectivity upto 5 Learning Centers, with One Mentoring Center.
b. **Participation:** Voluntary and Non-remunerative, Non-Commercial and Non-Political

Involvement:

a. **Promoter** –
   i. Initiate a Learning Center,
   ii. Sponsor a Mentor who is willing to join on certain terms,
   iii. Sponsor cost of operation and up-gradation of infrastructure to voluntary mentors,
b. **Facilitator** –
   i. Provide space and infrastructure for **Interactive Online Mentoring Sessions (IOMS).** Most of it is generally available, and may need marginal add-on,
   ii. Garner support of elite persons to act as coordinators at the Learning Centre.
c. **Participator** –
   i. As a Mentor,
   ii. As a Coordinator,
   iii. Operational support
   iv. E-Bulletin and Website promotion for increasing its depth and width across target students

Background: *The initiative had its offing in May'12, when its coordinator, a non-teacher by profession, soon after submission of Ph.D. Thesis in 2012, at one of the IITs, under taken after retirement got inspired to mentor unprivileged students.*

The endeavour started with Chalk-N-Talk mode of mentoring unprivileged students starting from class 9th upto 12th. Since then it has gone through many ground level experiences and in July'16 it was upgraded to IOMS, philosophy in action to forward to reachout to more number of deprived students. Currently regular sessions of IOMS are held regularly for students of class 9th and above at few Learning Centeres. Efforts are being made to integerate more learning centers and mentos to diversify its scope.

It is a small group of Four persons including ***Prof. SB Dhar****, Alumnus-IIT Kanpur,* ***Shri Shailendra Parolkar****, Alumnus-IIT Kharagpur, settled at Texas, US and* ***Smt. Kumud Bala****, Retd. Principal, Govt. School Haryana. More details of the initiative are available on our website and operational aspects of can be online accessed at IOMS .*

Actions Requested: *May please like to ponder upon this initiative.* ***Queries*** *,if any, are heartily welcome. We would welcome your collective complementing in any of the areas listed above at* ***Involvement****, to make the mission more purposeful and reachable to target children.*

Contact: Dr. Subhash Kumar Joshi, **Coordinator** –Gyan Vigyan Sarita.
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e-Mail ID: subhashjoshi2107@gmail.com, **Website: http://www.gyanvigyansarita.in**

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अंदाज ए बयां

दाल, भात और भटे-पालक की भाजी !!!

समीर लाल 'समीर'

"अम्मा, खाना लगा दे"

"क्या हुआ, आज जल्दी जायेगा क्या स्कूल?"

"हाँ अम्मा, वो क्लास के पहले सुदेश की गणित किताब से कुछ प्रश्न उतारने है. उसके पास अंग्रेजी स्कूल की किताब भी है न."

अम्मा जल्दी जल्दी भाप छोड़ते भात , अधपकी छितरी राहर की दाल और लगभग पक गई भाटे पालक की भाजी थाली में डाल कर दे देती है और उस पर से आधा चम्मच देशी घी. स्कूल जायेगा , दिन भर पढेगा तो घी से ताकत बनी रहेगी. अम्मा घर पर मलाई से बनाती है अनिल के लिए देशी घी.

अनिल जल्दी अल्दी फूँक फूँक कर खाने लगता है. पूरा खाना बिना खाये ही दीवाल घड़ी पर नजर पड़ती है और वो आधा खाना छोड़ कर भागता है. अम्मा कहती है , अन्न का अपमान नहीं करते बेटा. खाना आराम से खाते हैं वरना अन्नपूर्णा देवी नाराज हो जायेगी. मगर अनिल को तो स्कूल जाने की जल्दी है सो भागता है.

बरामदे से साईकिल निकाल कर , जब तक अम्मा बाहर आये, अनिल आवाज लगा कर 'जा रहा हूँ अम्मा!!' निकल जाता है. गली से सड़क पर आकर कोने में ही शर्मा जी की कोठी है जिनकी फैक्टरी में अनिल के पिता जी काम करते हैं. शर्मा जी की कोठी के बाहर एक साथ तीन कारें खड़ी होती हैं. एक शर्मा जी की , एक उनकी पत्नी की और एक शुभि की सफेद वाली दो दरवाजे की. शुभि उसी से स्कूल जाती है.

अनिल के सरकारी स्कूल से पिछली सड़क पर शुभि का कान्वेन्ट स्कूल है तीन मंजिला लाल रंग का.

अनिल को जल्दी स्कूल पहुँचना है, वो तेजी से साईकिल के पैडल मारता है. आज जाने क्यूँ एड़ी में दर्द भी है.

अनिल कक्षा में बैठा है. मास्साब भौतिकी के चुम्बकत्व के सिद्धांत वाला अध्याय पढ़ा रहे हैं. विपरीत ध्रुवों के आकर्षण को विस्तार से समझा रहे हैं. अनिल अपनी बैन्च पर बैठा अपने खपड़ैल की छत वाले क्लास रुम की खिड़की से बाहर पीछे के वाले स्कूल की ओर ताक रहा है. ढेरों लड़कियाँ उस स्कूल में पढ़ती है. नीला ट्यूनिक और सफेद कमीज पहने. परियों जैसी लगती हैं सब अनिल को उजली उजली सी. सबके बैठने की अलग अलग कुर्सी. दूर से कुछ साफ तो दिखता नहीं , बस बैठा कल्पना करता रहता कि शुभि ही होगी जो खिड़की से दिखाई दे रही है.

एक बार श र्मा जी के दरबान के लड़के से पूछा था तो उसने बताया था कि शुभि भी उसी कक्षा में है जिसमें अनिल पढ़ता है.

दिन में लंच की छुट्टी में अनिल भी दोस्तों के साथ धूल में सतोलिया खेल रहा है. गेंद पीछे झाड़ियों में जाती है. अनिल दौड़कर गेंद उठाने जाता है. उस स्कूल का बड़ी ऊँची ऊँची जालियों का बाड़ा है. बाड़े के उस पार कुछ लड़कियाँ बेडमिंटन खेल रही हैं. कुछ हरी हरी दूब में गोला बना कर गप्प करती खाना खा रही हैं. अनिल ने झाड़ियों के बीच से छुप कर देखा , उसे शुभि दिखाई पड़ी अपनी सहेलियों के साथ बैठे खाना खाते. शुभि खाने में सैण्डविच खाती है.

अनिल लौटकर आ जाता है. अब उसका खेलनें का मन नहीं है . क्लास रुम में आकर अपना खाने का डिब्बा निकाल लेता है. अम्मा ने चाव से दो रोटी के साथ आम का अचार रखा है. उसे जाने क्यूँ आज खाना खाने का मन नहीं है. डिब्बा बन्द करके बस्ते में रख देता है. उसे प्यास लगी है. पानी की टंकी तक जाता है. पीछे स्कूल पर फिर नजर जाती है. एक लड़की वाटर बोटल से पानी पी रही है. अनिल टंकी से हाथ धो कर लौट आता है.

शाम को साईकिल से घर लौट रहा है. शुभि की कार शर्मा जी के घर के बाहर खड़ी है जबकि उसका स्कूल अनिल के स्कूल के १५ मिनट बाद छूटता है लेकिन वो हमेशा घर पहले पहुँच जाती है चाहे अनिल कितनी भी तेज साईकिल चला कर लौटे.

रात होने लगी है. अम्मा ने आंगन में खटिया लगा दी है. अनिल खटिया पर जाकर लेट जाता है. अम्मा सर पर तेल मल रही है , और वो चाँद को देख रहा है. वही उसका खिलौना है जिससे वो बचपन से खेलता आया है.

अनिल इन्जिनियर बन गया है. बाबू जी तो उसकी इन्जिनियरिंग की पढ़ाई खत्म होते ही चल बसे थे और फिर छः महिने में अम्मा भी. अनिल को एक अच्छा ऑफर मिला और वो अमरीका आकर बस गया है. अब बीबी और दो बच्चों का परिवार है.

दरवाजे पर तीन गाड़ियाँ हैं. एक खुद की कार, एक पत्नी की और एक वैन, जब परिवार के साथ कहीं लम्बा जाना होता है तब के लिए.

ऑफिस जाने को तैयार होता है.

पत्नी ने ब्रेकफास्ट के लिए सेण्डविच लगा दिये हैं और एक सैण्डविच और फ्रूट लंच के लिए पैक कर दिया है. साथ में मिनरल वाटर की ठंडी बोतल. वैसा ही सेण्डविच जो शुभि खाती थी और वो चाहता था कि काश! उसे भी माँ वैसे सेण्डविच पैक करके दे.

आज अनिल को सेण्डविच के बदले वो भाप छोड़ते भात , अधपकी राहर की दाल और लगभग पक गई भाटे पालक की भाजी थोड़ा सा घी डाल कर खाने का मन है.

वो पत्नी से कहता है. पत्नी हँस देती है. "नो भात, नो घी. मोटा होना है क्या?"

कह रही है "जल्दी निकलो और ये सैण्डविच भी साथ लेते जाओ, ड्राईव करते हुए खा लेना वरना ऑफिस को देर हो जायेगी."

फिर छेड़ते हुए हंसती है ' "हर समय बस खाने में ही मन लगा रहता है मोटूराम का!!"

बेटा पूछ रहा है "डैडी ये भाटे पालक क्या होता है?"

आज जाने क्यूँ अम्मा की याद आ रही है उसे. और कान में गुँजती है एक आवाज- , अन्न का अपमान नहीं करते बेटा. खाना आराम से खाते हैं वरना अन्नपूर्णा देवी नाराज हो जायेगी..आज उसे लगा कि सच में अन्पूर्णा देवी नाराज हैं.

उसकी आँखें नम हैं.

लोकप्रिय चिट्ठाकार समीर लाल व्यवसाय से चार्टर्ड एकाउंटैंट हैं। आजकल वे कैनैडा में रहते हैं। उन्होंने कहानी लिखना पाँचवीं कक्षा में ही शुरु कर दिया था। आप कविता, गज़ल, व्यंग्य, कहानी, लघु कथा आदि अनेकों विधाओं में दखल रखते हैं| भारत के अलावा कनाडा और अमेरिका में मंच से कई बार अपनी प्रस्तुति कर चुके हैं। आपका ब्लॉग "उड़नतश्तरी" हिन्दी ब्लॉगजगत में एक लोकप्रिय नाम है।

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Science in general and Physics in particular are not a subject to learn, but an area of observation and exploration by correlation, integration and analysis of repetitive nature, and then conclusion.

It is a real thrill, full of fun.
But, it can't be done in dicrete manner, it has to be done patiently, like climbing stair far a faster and purposeful journey.
This is where role of education come in; it is to streamline the process.

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Nothing is more important in our national life than the welfare of our children.

- Harry S. Truman (33rd President of the US)

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Ayurveda- Health Care

Hyperacidity (Amlapitta)

Dr Sangeeta Pahuja

Hyperacidity is a condition in which the level of acid in the gastric juices is excessive causing discomfort, heart burn, regurgitation of food or sour substance, gaseous distention of abdomen etc.

In Ayurveda Acidity is referred to as Amalpitta

This disorder is caused by imbalance of Pitta Dosha, which is governed by Fire and Water and they govern the digestive fire and enzymes.Therefore people of Pitta constitution tend to suffer from hyperacidity,peptic ulcers and heartburn.

There are two main types of Amalpitta.

a. Urdhwag Amalpitta - characterized by the upward movement of Pitta.
b. Adhog Amalpitta - characterized by the downward movement of Pitta.

Line of treatment: As the disorder is caused by imbalance of Pitta,all measures should be taken to pacify Pitta.
Ayurveda has provided the diet and lifestyle guidance to balance Tridoshas ,by following them,we can overcome the problems.
In addition Ayurvedic Herbs and Panchkarma procedures like Vaman-Emesis,,Virechan- Purgation,,Vasti-medicated Enema are also used according to the requirement of patient's condition.

Favourable Diet: Consume Sweet,Bitter, Pungent (Madhur, tikt, kashay) food items to pacify Pitta. Wheat, old rice, barley, oats, green gram, sugar candy, cucumber. Vegetables like pumpkin, Bitter gourd, bathua, broccli, chaulai, mushroom, ladyfinger, tomato are advised. Fruits like gooseberry, dry grapes, apple, avacado, mango, melon, guava, pineapple, black grapes, pomegranate, figs, lemon juice, amla juice are helpful.

Dairy products like cow ghee and milk are recommended. Beans like black beans, kidney beans, moong beans, Tofu. Seeds like gourd seeds, sunflower seeds are also soothing. Sweets like jaggery, Mapple syrup and spices like cardamom, Dalchini, coriander, sweet fennel, kesar are helpful

Favourable lifestyle: It is recommended to (a) keep yourself hydrate, (b) exercise in moderation, (c) eat after short intervals, (d) consume dinner 2-3hours before going to bed. In addition practice yoga, meditation, pranayam, exercise on regular basis. Yogasan like vajrasana,yog mudra,Shitali pranayam are helpful.

Unfavourable diet and lifestyle: Avoid (a) astringent, Sour and salty(kashay,amla,lavan) food items, (b) oily and spicy food, (c) sun exposure, (d) fried and junk food (e) fasting for long hours, (f) irregular food habits, (g) lying down immediately after having good, (h) smoking, alcohol, tea coffee, (i) stress, fear, anxiety, anger, and (j) skipping meals.

Home Remedies: Some of these are - (**a)** Soak coriander seeds in one glass of water overnight and drink in the morning after sieving, (b) Drink coconut water twice a day (c) Add Amla in your daily diet, (d) Consume buttermilk with lunch, (e)
Consume a small piece of jaggary after each meal, (f) Drink 2tsf Aloevera juice before meals, (g) Drink a glass of milk(boiled and chilled fat free milk) before going to bed, (h) Consume cumin seeds or fennel after Every meal, (i) You can take licorice powder with buttermilk or water to control acidity and (j) Add 2tsf Apple Cider vinegar and1tsf honey in one glass of lukewarm water and drink it half an hour before meal.

Know Ayurveda, Follow Ayurveda and Stay Healthy.

Author is an Ayurvedic Medical Practitioner. She did B.A.M.S. from M.D. University, Rohtak. She has consultation centres at Delhi and Noida. She is keenly interested in spiritual, women and social developmental activities. Contact No.: 9953967901,

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"Vote-Bank Politics" in Democracy

Prakash Kale

This is the season of election and we are in the middle of Lok Sabha election. The term "vote-bank politics" is being used negatively by all and sundry - they may be politicians, journalists, election analysts and others.

I wish to put other aspect or side of this subject matter.

Let us understand what the politics is, and what is democracy? In its crudest form politics is all about "who gets what". And "democracy" is all about representation (anyone who links it to merit or regret merit not getting its due in democracy, does not understand democracy at all). If we combine who gets what and question of representation, it will be easy to understand "vote bank politics" in positive sense.

Now let us understand what is meaning of "Vote-bank politics"- it denotes political appeals made to voters on the lines of *caste, language, religion, and sect*. Even though, model code of conduct etc. bans this, over the years, this has become a phenomenon and political parties across the spectrum have used it to their advantage to *nurture groups* of dedicated voters who align with their agenda and support them during elections. Further many of political parties have been created or are in existence to cater to a specific caste, language, religion, and sect. Please remember, if a political party makes promises to a single section of society that it is going to fulfill their specific demands, it is within the party's rights to do so.

Also, over the years, a perception has been created among the masses that being called a "vote bank" is an insult to them as citizens. This is again questionable. Being part of a vote bank could make voters more aware of both their individual strength as citizens and collective strength as hailing from a particular strata of society. It doesn't always reduce one's identity, as is often claimed. Rather, it enhances one's bargaining power within the democratic system. It also makes for heterogeneity in popular representation.

But, many scholars point to this as a drawback of vote-bank politics, as it has a tendency to widen identity fault lines. As a result, almost no political party wants to be seen as one that indulges in such politics, but covertly always practicing it right from selection of candidate. This theory or line of thinking suggests that vote-bank politics is low-level politics, which political parties should refrain from.

The larger question, however, is whether in light of definition of politics and democracy, given above, "vote-bank politics" is essential part of democracy and unnecessarily we have painted it bad.

It is considered dangerous because political parties try to woo particular caste groups and communities by making promises that are specific to those groups. It is done selectively and yardstick changes with constituency. Though the "vote banks" in turn see this as an opportunity to get their demands fulfilled, if their choice of party comes to power. Puritan argue that in such a scenario, parties start favoring only certain groups that form the core of their support, thereby hampering overall societal development due to conflicting priorities. But, if every group and community is catered to by some party or the other, is it still a bad phenomenon? India's electoral history has shown that balanced vote-bank politics has provided both stable coalition governments and strong oppositions, where the interests of every section of society are represented. Apparently, it is the pressure of "vote banks" that keeps a check on parties once they are elected to power. And his is essence of democracy.

Conversely, when people have voted overriding caste lines and vote banks in support of a single party, it has resulted in wave elections, such as in 1984 and 2014, which subsequently led to majoritarian tendencies within the government.

How then did the term "vote-bank politics" acquire such a negative ring? Is such politics really synonymous with divisiveness? The answer lies in how one understands the term. If a political party or a politician appeals to one section of society in the name of a caste or religion, it may not necessarily be bad unless the act of appealing to that single section of society extends to positioning that group against others or the rest of society. Further, some caution would be in order, if the demands, and their fulfillment, of a particular section of society could overwhelm or harm the interests of other sections of society in the process of getting their demands fulfilled, creating unrest and violence. It is only when the either one of condition-pitting one community against other gives rise to problems.

Further, those who fear heterogeneity and diversity often make the most strident arguments against the concept, for they know that vote-banks are symbolic of the demands of different sections of society. A culture is being propagated in India that seeks to homogenize voices and reduce diversity, but its proponents should recognize that in a country like India, which is founded as a nation-state on the principle of celebrating diversity, it is but natural for different sections of society to speak in different voices, make different demands and have different opinions that may be mutually opposed.

So, vote-bank politics is not a bad as long as while catering to aspirations of specific group, common objective of coexistence with a sustainable economic growth is achieved. In the event of abuse of vote-bank the idea is highly inflammable. Therefore, when media houses, political parties and politicians cry foul over vote-bank politics, they need to be questioned by citizens who may themselves be part of a vote-bank. The duty of political parties, civil society and media is then to bridge the divergences that arise from this process of conflicting interests of various sections vying for power. Sadly, however, this basic duty is not being fulfilled. A few person/parties want everyone to speak in one voice, even as their actions in the political domain have the effect of pitting one faith against the other, one caste against another, and so on.

To conclude Vote-bank politics in itself is not a bad notion as long as is serves an essential objective of polity and in turn the nation to grow economically, socially and culturally, with coexistence.

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"A hundred times every day I remind myself that my inner and outer life are based on the labors of other men, living and dead, and that I must exert myself in order to give in the same measure as I have received and am still receiving."

Albert Einstein

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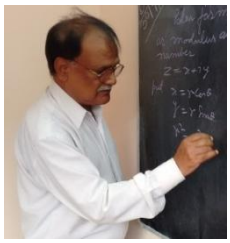
हमारा पंचवर्षीय प्रवास

Start: June-2012



April-2015

June-2016……..

पारम्परिक शैक्षणिक मार्दर्शन से प्रारम्भ कर आज हम तकनीकी-विकास के सहारे मूलभूत प्रासंगिकता को आगे बढ़ने में संलग्न हैं..

यह प्रयास अपने सामाजिक कर्त्तव्य के प्रति सहजविनीत आग्रह है; कृपया इस पर विचार करें.

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Education is not job training;
the function of education is to instill an appreciation
of our place in the flow of time and space,
to expand our intellectual and empathetic understanding
of nature and people.

- Jonathan Lockwood Huie

—00—

"I have been impressed with the urgency of doing.
Knowing is not enough; we must apply.
Being willing is not enough; we must do."
-Leonardo da Vinci

—00—

The moment I have realized God sitting in the temple of every human body, the moment I stand in reverence before every human being and see God in him – that moment I am free from bondage, everything that binds vanishes, and I am free.

- *Swami Vivekananda*

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They are only saints or a prophets who can keep forgiving evils. Anyone who supports and/or camoulfleges inactions or evils of others, on pretext of divinity or any other excuse is an accomplice in the evil. Such persons are against cause of the larger good and are opposed to the passionately committed selfless mission.

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There are two educations.
One should teach us how to make a living,
and the other how to live.

- John Adams

COMMON ADMISSION TEST

Prof. SB Dhar

The Common Admission Test (CAT) is widely considered as one of the most competitive examinations in the world, with a success rate of around one in two hundred. It is a way of entry for admission to the IIMs in India.

There are twenty Indian Institutes of Management (IIMs) in India. These are located at Ahmedabad (estd.1961), Amritsar (estd.2015), Bangalore (estd.1973), Bodh Gaya (estd.2015), Calcutta (estd.1961), Indore (estd.1996), Jammu (estd.2016), Kashipur (estd.2011), Kozhikode (estd.1996), Lucknow (estd.1984), Nagpur (estd.2015),Raipur (estd.2010), Ranchi (estd.2010), Rohtak (estd.2010), Shillong (estd.2007), Sambalpur (estd.2015), Sirmaur (estd.2015), Udaipur (estd.2011), Vishakhapattnam (estd.2015), Tiruchiapalli (estd.2011).

Calcutta is the first and the IIM Ahmedabad is the second in India. Both the Institutes were established in 1961 within a couple of months.

The IIMs run Post Graduate Programme in Management (PGP) and Fellow Programme in Management (FPM) that is equivalent to Ph.D,

The admissions to these programmes are made through Common Admission Test (CAT) conducted by IIMs.

Some time separate advertisements appear for programmes other than PGP to each participating IIMs.

The CAT scores are allowed to be used by the listed non-IIM member institutions. This list of non-IIM member Institutions can be seen at the website: www.iimcat.ac.in

Eligibility Criteria For CAT

(a) The aspirant must hold a Bachelor's degree.
(b) The candidates appearing for the final year of Bachelor's degree may also apply.

The Reservation Scheme

(a) 15% for Scheduled Caste
(b) 7.5% for Scheduled Tribe
(c) 27% for other backward Classes belonging to non-creamy layer
(d) 5% for Benchmark Disabilities

Fee for Registration

(a) Rs. 950 for SC, ST, and PwD
(b) Rs.1900 for all other categories

Question Paper

The Test Paper contains 100 questions. These questions are distributed in the following three segments:

(a) **Verbal Ability and Reading Comprehension (VARC):** This section consists of 34 Questions. Each question carries (+3) marks for each correct answer and (-1) mark for each wrong answer.

(b) **Data Interpretation and Logical Reasoning (DILR):** This section consists of 32 Questions. Each question carries (+3) marks for each correct answer and (-1) for each wrong answer.

(c) **Quantitative ability (QA):** This section consists of 34 Questions. Each correct answer is awarded (+3) marks and each wrong invites deduction of (-1) mark.

Each segment is given 1 hour time limit to write.

In year 2018, 2, 04, 267 students competed for 1550+ seats **making** it the most competitive exam in the country.

CAT is an exam where students score an enviable 100 percentile as well. It is not essential to get a 100% but then 99 percentile is the score that is the minimum qualifying criteria if you want to get into an IIM.

IIM aspirants **will** not **have** to wait for a Graduation Degree anymore as **IIM** Indore has launched a Integrated 5 year Post Graduate Diploma in Management with the eligibility for the same being Class **12th**.

Syllabus

Quantitative Aptitude :Number System, LCM and HCF, Geometry, Coordinate Geometry, Trigonometry, Mensuration, Percentage, Profit, Loss, and Discount, Simple interest and compound Interest, Speed, Time and distance, Time and work, Averages, Ratio and Poportion, Linear Equations, Quadratic Equations, Complex Numbers, Logarithm, Progressions, Inequalities, Permutations and Combinations.

Verbal Ability: Reading comprehension, Sentence correction, Critical Reasoning, Para Jumbles, Synonyms and Antonyms, Grammar, Paragraph completion, Fill in blanks, Summarising paragraphs, Verbal reasoning, Judgment and Facts.

Data Interpretation and Logical Reasoning: Tables, Column Graphs, Bar Graph, Line Charts, Pie Chart, Venn Diagrams, Arrangements, Distribution, Games and Tournaments, selections, cubes, logical sequence, logical deduction

Duration

It takes two-years to complete the Post Graduate Programme in Management (PGP).

Certification

The IIMs offer the Post Graduate Diploma in Management (PGDM).

These post-graduate diploma programmes are considered the equivalent of regular MBA programmes. However, since the passage of IIM Act, most IIMs have started offering Master in Business Administration (MBA). Some IIMs also offer a one-year post-graduate diploma programme for graduates with more work experience.

Some IIMs offer the Fellow Programme in Management (FPM), a doctoral programme. The fellowship is considered to be equivalent to a PhD globally. Most IIMs also offer short-term executive education/EMBA courses and part-time programmes. Some IIMs also offer unique programs, like IIM Indore's Five Year Integrated Programme in Management[10] and IIM Lucknow's Working Managers' Programme of three years.

This programme is usually structured into six trimesters spread across two years, starting in June and running until April of the second year. The first year coursework generally consists of core courses in various management disciplines, while in the second year students are allowed to select courses from an exhaustive list of electives.

Designed as a regular MBA programme, which focuses on using the prior work experience of the students, the one-year MBA is named differently by different IIMs. It is called the *Post Graduate Program for Executives* at IIM Calcutta and IIM Shillong (PGPEX for short), and at IIM Ahmedabad and IIM Udaipur (PGPX for short). It is called the *Executive Post Graduate Programme* (EPGP) at IIM Bangalore and IIM Indore, and the *International Programme in Management for Executives* (IPMX) at IIM Lucknow.

Five-year Integrated Programme

Two IIMs, IIM Indore and IIM Rohtak also offer integrated programs which spans for five years. Students join this program just after finishing their school (class XII). The program is called IPM (Integrated Programme in Management) at both the institutes.

Course Fee

The course fee for resident Indians for the first three years of the IPM would be Rs. 4,00,000/- (Rupees four lakh) per annum and Rs. 6,00,000/- (Rupees six lakh) per annum for International applicant. Course fee for the fourth and fifth years would be as per prevailing Post Graduate Programme in Management (PGP) fees. The course fee includes lodging, access to lectures, internet facilities and library.

IIM Indore admits about 120 students to the IPM every year.

CAT Exam Registration

CAT exam registration is only available online. The application form is released by the conducting IIM on the official CAT website and applicants are required to fill out the details.

The Aspirants may expect CAT 2019 Exam date to be announced by July last week.

Author is editor of this e-Bulletin and an acclaimed author and teacher of mathematics

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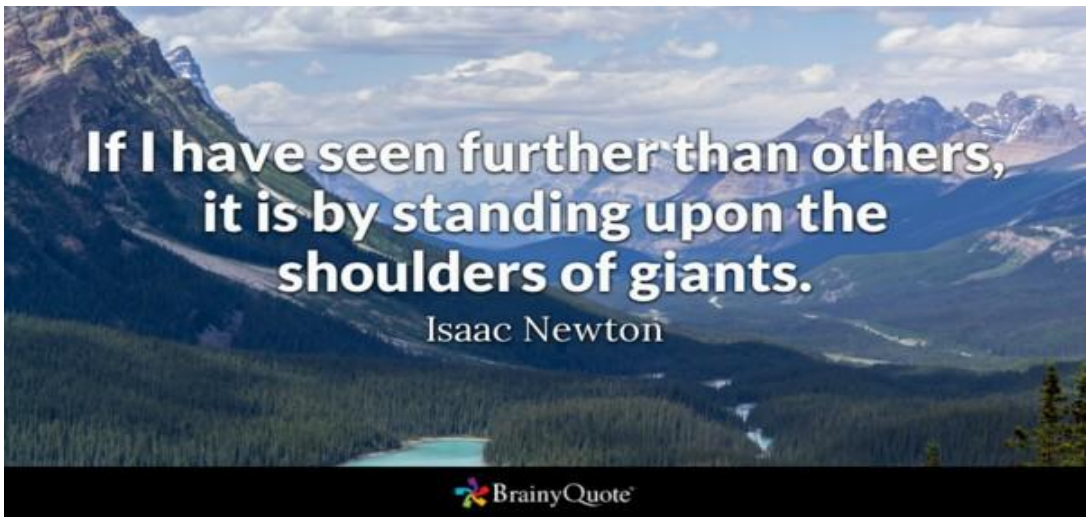

श्रमिक दिवस....

मृणालिनी घुळे

हर इन्सान श्रमिक है बंधु
हर श्रमिक इन्सान।
श्रम ही ईश्वर श्रम धर्म है
श्रम ही है ईमान।
श्रम की पूजा करने से ही
मिल जाए भगवान।
श्रम की वैरी निष्क्रियता है
कर्मठता है महान।
श्रम से ही है साध्य जगत में
कीर्ति और सम्मान।

कवियत्री एक सामाजिक चिंतक एवं विचारक हैं | आपकी कविताएँ वर्तमान पर्यवेक्ष्य में बुद्धि-जीवियों को उनके सामाजिक उत्तरदायित्व के प्रति उन्हें चिंतन के लिए प्रेरित करती हैं | आपकी लेखनी प्रादेशिक एवं राष्ट्रीय स्तर पर प्रकाशित है।
ई-मेल mrinalinighule46@gmail.com

ईश्वर का अहसास

डॉ. संगीता पाहुजा

अहसास ईश्वर के होने का
जगा देता आत्मविश्वास।
हाथ देकर ईश्वर के हाथों में
न करना पड़ता पथ का ध्यान।
स्वयं ही पग बढ़ते जाते
जिस और बढ़ा देते भगवान।

हर मुश्किल में हाथ थामकर
न होने देते,अकेलेपन का भान।
मात पिता,बंधु,सखा बनकर
हर पल देते साथ।
कण कण में उपस्तिथ रहते,
जब भी चाहो, पाओ पास।

सकारात्मकता का आवरण बनकर,
जगा देते नई उमंग और उत्साह।
कठिन पलों में बिखरता प्राणी
ईश्वर स्मरण से हो जाता भवसागर से पार।

है बस इस अहसास की महिमा
जो कर दे हर मुश्किल से पार।
अहसास ईश्वर के होने का
जगा देता आत्मविश्वास।

कवियत्री आयुर्वेदिक चिकित्सक हैं | आपने B.A.M.S. की उपाधि M.D. University, रोहतक से प्राप्त की | आपके दिल्ली एवं नॉएडा में परामर्श केंद्र है | धार्मिक, नारी एवं समाज उत्थान कार्यों में आपकी विशेष रूचि है |
संपर्क: मो. क्र.- 9953967901,
ई-मेल : sangeeta.pahuja3@gmail.com

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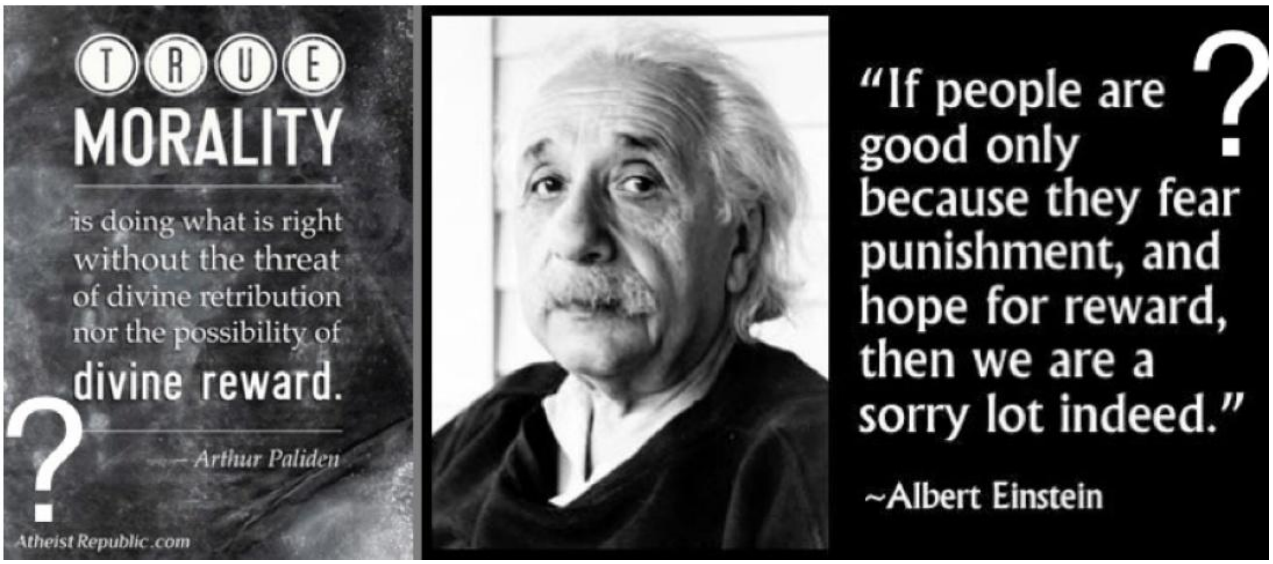
Nothing is more important than education,
because nowhere are our stakes higher;
our future depends on the quality of education of our children today.

- Arnold Schwarzenegger



GROWING WITH CONCEPTS

Concepts of an expert are not like a static foundation of a huge structure; rather it is like blood flowing in a vibrant mind.

During growing into an expert, each one must have used best of the books available on subject and received guidance of best of the teachers. Authors might have had limitations to take every concept thread bare from first principle and so also must be the constraint of teacher while mentoring a class with a diversity of inquisitiveness and focus. As a result, there are instances when on a certain concept a discomfort remains. The only remedy is to live with the conceptual problem and continue to visualize it thread bare till it goes to bottom of heart and that is an ***ingenious illustration****.*

In this column an effort is being made to take one topic on Mathematics, Physics and Chemistry in each e-Bulletin and provide its illustration from First Principle. We invite all experts in these subjects to please mail us their ingenious illustrations and it would be our pleasure to include it in the column.

We hope this repository of ingenious illustrations, built over a period of time, would be helpful to ignite minds of children, particularly to aspiring unprivileged students, that we target in this initiative, and in general to all, as a free educational web resource.

This e-Bulletin covers – a) Mathematics, b) Physics , and c) Chemistry. This is just a beginning in this direction. These articles are not replacement of text books and reference books. These books provide a large number of solved examples, problems and objective questions, necessary to make the concepts intuitive, a journey of educational enlightenment.

Looking forward, these articles are being integrated into Mentors' Manual. After completion of series of such articles on Physics it is contemplated to come up representative problems from contemporary text books and Question papers from various competitive examinationsand a guide to theirsolutions in a structured manner, as a dynamic exercise to catalyse the conceptual thought process.

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Answers: Science Quiz- April'19

Kumud Bala

1 (B)	2 (B)	3 (A)	4 (A)	5 (B)	6 (A)	7 (A)	8 (A)	9 (B)	10 ((B)
11 (C)	12 (B)	13 (B)	14 (D)	15 (C)	16 (D)	17 (A)	18 (C)	19 (C)	20 (D)
21 (D)	22 (C)	23 (B)	24 (A)	25 (B)					

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ANSWER: CROSSWORD PUZZLE April'19: NATIONALISM

Prof. S.B. Dhar

		1C				2A			3R															
		H				N			4O	S	C	5A	R	W	I	L	D	E					
		A				N			N			T											
		R				I			A			A					6H						
		7A	P	8J	A	B	D	U	L	K	A	L	A	M			9G	A	D	D	A	F	I
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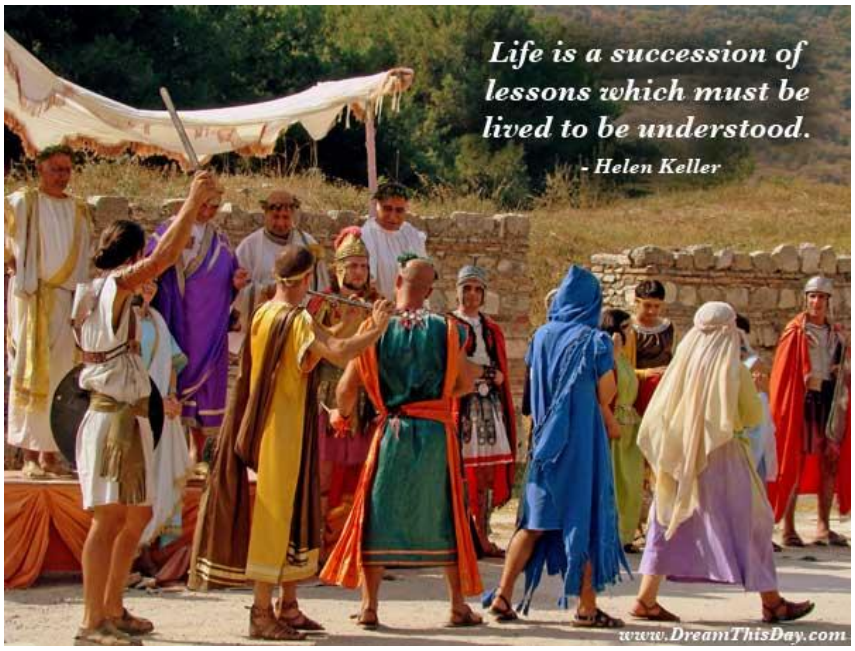


Growing With Concepts - Mathematics

LET'S DO SOME PROBLEMS IN MATHEMATICS-IX (Focus-CAT)

Prof. SB Dhar

The problems in this article relate to the Common Admission Test (CAT). In actual test, there are 100 Questions in all to do in three hours. The paper consists of Three Sections: (a) Verbal Ability and Reading Comprehension (VARC), (b) Data Interpretation and Logical Reasoning (DILR) and (c) Quantitative Ability (QA). The purpose of selecting these problems here is to keep the aspirants aware of the standard of the Test.

Section: Verbal Ability and Reading Comprehension

DIRECTIONS for the question: The four sentences (labeled 1, 2, 3 and 4) given in this question, when properly sequenced, from a coherent paragraph. Decide on the proper order for the sentence and key in this sequence of four numbers as your answer.

Question No. : 1

1. The woodland's canopy receives most of the sunlight that falls on the trees.
2. Swifts do not confine themselves to woodlands, but hunt wherever there are insects in the air.
3. With their streamlined bodies, swifts are agile flyers, ideally adapted to twisting and turning through the air as they chase flying insects – the creatures that form their staple diet.
4. Hundreds of thousands of insects fly in the sunshine up above the canopy, some falling prey to swifts and swallows

Solution: The Correct Answer is 1432

Explanation:- Line 1 introduces the noun, Line 4 introduces "swifts" and thought is continued in line 3.

DIRECTIONS for the question: The four sentences (labeled 1, 2, 3 and 4) given in this question, when properly sequenced, from a coherent paragraph. Decide on the proper order for the sentence and key in this sequence of four numbers as your answer.

Question No. : 2

1. Impartiality and objectivity are fiendishly difficult concepts that can cause all sorts of injustices even if transparently implemented.
2. It encourages us into bubbles of people we know and like, while blinding us to different perspectives, but the deeper problem of 'transparency' lies in the words "…and much more".
3. Twitter's website says that "tweets you are likely to care about most will show up first in your timeline…based on accounts you interact with most, tweets you engage with, and much more."
4. We are only told some of the basic principles, and we can't see the algorithm itself, making it hard for citizens to analyze the system sensibly or fairly or be convinced of its impartiality and objectivity.

Solution: The Correct Answer is 1324

Explanation:- Line 1 introduces the two main subjects, Line 2 will follow Line3 as it is a mandatory pair(noun 'twitter'- pronoun 'it'), Line 2 continues what is mentioned in Line 3. and 4 will be the concluding sentence expressing how Twitter poses as an example to what has been mentioned in line 1.

DIRECTIONS for the question: Identify the most appropriate summary for the paragraph.

Question No. : 3

The conceptualization of landscape as a geometric object first occurred in Europe and is historically related to the European conceptualization of the organism, particularly the human body, as a geometric object with parts having a rational, three-dimensional organization and integration. The European idea of landscape appeared before the science of landscape emerged, and it is no coincidence that Renaissance artists such as Leonardo da Vinci, who studied the structure of the human body, also facilitated an understanding of the structure of landscape. Landscape which had been a subordinate background to religious or historical narratives became an independent genre or subject of art by the end of sixteenth century or the beginning of the seventeenth century.

(A)The Renaissance artists were responsible for the study of landscape as a subject of art.

(B) The study of landscape as an independent genre was aided by the Renaissance artists.

(C) Landscape became a major subject of art at the turn of the sixteenth century.

(D) The three-dimensional understanding of the organism in Europe led to a similar approach towards the understanding of landscape,

Solution: The Correct Answer: D

Explanation: refer lines "The European idea of landscape appeared before the science of landscape emerged, and it is no coincidence that Renaissance artists such as Leonardo da Vinci, who studied the structure of the human body, also facilitated an understanding of the structure of landscape" option b best summarizes the paragraph.

Section : Data Interpretation & Logical Reasoning

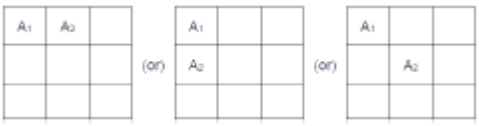
DIRECTIONS for the question: Read the information given below and answer the question that follows.

Question No. : 4

You are given an n×n square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Two cells are called adjacent if they touch each other horizontally, vertically or diagonally. So a cell in one of the four corners has three cells adjacent to it, and a cell in the first or last row or column which is not in the corner has five cells adjacent to it. Any other cell has eight cells adjacent to it. What is the minimum number of different numerals needed to fill a 3×3 square matrix?

Solution: The Correct Answer is 4.

Explanation: Given that n × n square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Also, two cells are called adjacent if they touch each other horizontally, vertically or diagonally. As per the given definition, in the following matrix, the following are the cases of adjacent cells.



As per the information, we've the following diagram for a 3 x 3 matrix to have minimum number of numerals.

1	2	1
3	4	3
1	2	1

So, we require 4 elements to have all different numerals.

DIRECTIONS for the question: Read the information given below and answer the question that follows.

Question No. : 5

An ATM dispenses exactly Rs. 5000 per withdrawal using 100, 200 and 500 rupee notes. The ATM requires every customer to give her preference for one of the three denominations of notes. It then dispenses notes such that the number of notes of the customer's preferred denomination exceeds the total number of notes of other denominations dispensed to her. In how many different ways can the ATM serve a customer who gives 500 rupee notes as her preference?

Solution : The *Correct Answer is 7*

Explanation:- The ATM dispenses only 500, 200 and 100 notes and since 500 rupee notes is the preference, it has to dispense more 500 rupee notes than the other two notes combined. The following ways are possible:

500 rupee notes	200 rupee notes	100 rupee notes
10	0	0
9	2	1
9	1	3
9	0	5
8	5	0
8	4	2
8	3	4

Hence, a total of seven ways are possible. Note: Given that the ATM dispenses 500, 200 and 100 rupee notes. A possible interpretation of this is that at least one note of each denomination is dispensed. However, as there is no additional information supporting this, you should also consider the cases in which not all the three denominations are dispensed

Section : Quantitative Ability

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Question No. : 6

Let x, y, z be three positive real numbers in a geometric progression such that x < y < z. If 5x, 16y, and 12z are in an arithmetic progression then find the common ratio of the geometric progression.

Solution : The *Correct Answer is 5/2.*

Explanation: Given 5x, 16y, 12z are in AP. Hence $32y = 5x + 12z$ *-----(1)*

Also x, y, z are in GP. Hence $y^2=xz$ *------(2)*

Squaring both sides of (1), $1024y^2 = 25x^2 + 144z^2 + 120xz$

$1024xz = 25x^2+ 144z^2 + 120xz$

$25x^2+144z^2-904xz=0$

$25x^2-900xz-4xz+144z^2=0$

$25x(x-36z)-4z(x-36z)=0$

$(25x-4z)(x-36z)=0$

Since x,y and z are positive real numbers such that $x=(4/25)z$, *hence the common ratio of the GP be* $r=5/2$

DIRECTIONS for the question: Solve the following question.

Question No. : 7

Humans and robots can both perform a job but at different efficiencies. Fifteen humans and five robots working together take thirty days to finish the job, whereas five humans and fifteen robots working together take sixty days to finish it. How many days will fifteen

humans working together (without any robot) take to finish it?

Solution *: The Correct Answer is 32.*

*Explanation: Let the rates of work of each human and each robot be H and R respectively (both in units/day). 15H+5R=1/30, 5H+15R=1/60. On solving these equations, H=1/480. In a day, 15 humans can complete 15H i.e. 1/32*th *of the job.15 humans can complete the job in 32 days.*

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Question No. : 8

Points E, F, G, H lie on the sides AB, BC, CD, and DA, respectively, of a square ABCD. If EFGH is also a square whose area is 62.5% of that of ABCD and CG is longer than EB, then find the ratio of length of EB to that of CG.

Solution : The Correct Answer is 1:3

Explanation:- Let the area of ABCD be 100. Side of ABCD = 10

Area of EFGH is 62.5 i.e. Side of EFGH = √62.5

Triangles AEH, BFE, CGF and DHG are congruent by ASA.

Let AE = BF = CG = DH = x; EB = FC = DG = AH = 10 – x

$AE^2+AH^2=EH^2$

$x^2+(10-x)^2=(\sqrt{62.5})^2$

Solving, x = 2.5 or 7.5

Since it's given that CG is longer than EB, CG = 7.5 and EB = 2.5.

EB : CG = 1 : 3

DIRECTIONS for the question: Solve the following question.

Question No. : 9

Given an equilateral triangle T1 with side 24 cm, a second triangle T2 is formed by joining the midpoints of the sides of T1. Then a third triangle T3 is formed by joining the midpoints of the sides of T2. If this process of forming triangles is continued, then find the sum of the areas, in sq cm, of infinitely many such triangles T1, T2, T3,...

Solution : The Correct Answer 192√3

Explanation:- Any equilateral triangle formed by joining the midpoints of the sides of another equilateral triangle will have its side equal to half the side of the second equilateral triangle.

Side of T1 = 24 cm

Side of T2 = 12 cm

Side of T3 = 6 cm and so on.

Sum of the areas of all the triangles = $\sqrt{3}/4\ (24^2 + 12^2 + 6^2 + \text{-------}) = 192\sqrt{3}$

DIRECTIONS for the question : Solve the following question.

Question No. : 10

If x is a positive quantity such that $2^x = 3^{\log_5 2}$, then x is equal to

Solution : The Correct Answer is 1 + $\log_5(3/5)$

Explanation: $2^x = 3^{\log_5 2}$

Taking logarithms to base 5 on both sides, we have

$x(\log_5 2)=\log_5 2 \cdot \log_5 3$

$x = \log_5 3 = 1 + \log_5(3/5)$

DIRECTIONS for the question: Solve the following question.

Question No. :11

When they work alone, B needs 25% more time to finish a job than A does. They two finish the job in 13 days in the following manner: A works alone till half the job is done, then A and B work together for four days, and finally B works alone to complete the remaining 5% of the job. In how many days can B alone finish the entire job?

Solution : The Correct Answer is 20.

Explanation:- Let the time taken by A to finish the job be "a" days. Time taken by B to finish the job = 5/4 a days.

Part of the job completed when A and B worked

Part of the job completed when A and B worked together for 4 days =1-(1/2)-(5/100)=9/20 or 9/20=4 [1/a+1/(5a/4)]

Time taken by B alone to complete the entire job = 5a/4 = 20 days.

DIRECTIONS for the question: Solve the following question.

Question No. : 12

Let ABCD be a rectangle inscribed in a circle of radius 13 cm. Find the possible pairs of length and breadth of ABCD.

Solution : The Correct Answer is 24 and 10.

Explanation:- Let the length and the breadth of the rectangle be l and b respectively.

Diameter of the circle=Diagonal of the rectangle

$l^2+b^2=676$

Possible values of l and b are 24 and 10 respectively.

DIRECTIONS for the question: Solve the following question.

Question No. : 13

In a parallelogram ABCD of area 72 sq cm, the sides CD and AD have lengths 9 cm and 16 cm, respectively. Let P be a point on CD such that AP is perpendicular to CD. Then find the area, in sq cm, of triangle APD.

Solution : The Correct Answer 32√3.

Explanation:- Area of the parallelogram ABCD = (base)(height) = (CD)(AP) = 72 sq.cm.

CD)(AP) = 72

9(AP) = 72 ⇒ AP = 8

$DP=16^2-8^2=8\sqrt{3}$

Area of triangle APD=(1/2)(AP)(PD)

DIRECTIONS for the question: Solve the following question.

Question No. : 14

Given that $x^{2018}y^{2017} = 1/2$ and $x^{2016}y^{2019} = 8$, then find the value of value of $x^2 + y^3$.

Solution : The correct answer is 33/4.

Explanation: From the two given equations, $\frac{x^2}{y^2} = \frac{1}{16}$ $\Rightarrow \frac{x}{y} = \pm\frac{1}{4}$

Or $x = \pm\frac{1}{4}y$ *using this value in main equation, we get* $\left(\pm\frac{1}{4}y\right)^{2018} y^{2017} = \frac{1}{2}$ *hence y=2 and the required value is 33/4*

DIRECTIONS for the question: Solve the following question.

Question No. : 15

Let *f(x) = min{$2x^2$, 52−5x}*, where x is any positive real number. Then find the maximum possible value of f(x).

Solution : The Correct Answer is 32

Explanation:- The maximum value of f(x) will occur when $2x^2 = 52 - 5x$ i.e. when $2x^2+5x-52=0$

i.e. when $2x^2+13x-8x-52=0 \Rightarrow (2x + 13)(x - 4)=0 \Rightarrow$ x = -13/2 or 4. But x is any positive real number. So, x = 4. Maximum value of f (x) = $2(4^2) = 32$

DIRECTIONS for the question: Solve the following question.

Question No. : 16

A CAT aspirant appears for a certain number of tests. His average score increases by 1 if the first 10 tests are not considered, and decreases by 1 if the last 10 tests are not considered. If his average scores for the first 10 and the last 10 tests are 20 and 30, respectively, then find the total number of tests taken by him.

Solution : The Correct Answer is 60

Explanation:- Let the average score of the aspirant in all the tests be A. Let the number of tests be N.

The aspirant's average score for the first 10 tests and last 10 tests are 20 and 30 respectively.

(NA-200)/(N-10)=A+1 and (NA-300)/(N-10)=A-1

Solving, N = 60.

DIRECTIONS for the question: Solve the following question.

Question No. : 17

Train T leaves station X for station Y at 3 pm. Train S, traveling at three quarters of the speed of T, leaves Y for X at 4 pm. The two trains pass each other at a station Z, where the distance between X and Z is three-fifths of that between X and Y. How many hours does train T take for its journey from X to Y?

Solution : The Correct Answer is 15.

Explanation:- Let the time taken by S to reach Z be t hours.

Let the speed of T be St. Distance between X and Z is 3/5 of the distance between X and Y.

XZ : ZY = 3 : 2

*(t+1)/(3/4)*St*t=3/2*

t = 8

S takes 8 hours to cover YZ. T would take 8 × (3/4) i.e. 6 hours to cover ZY. T would take t + 1 i.e. 9 hours to cover XZ. T would take 15 hours to reach Y.

Question No. : 18

A right circular cone, of height 12 ft, stands on its base which has diameter 8 ft. The tip of the cone is cut off with a plane which is parallel to the base and 9 ft from the base. Find the volume with π = 22/7, in cubic ft, of the remaining part of the cone.

Solution : The Correct Answer is 198

Explanation:- The radius of the cone is 4 feet. The tip of the cone is a cone of height 3 feet. By similarity, its radius is 1 foot. The volume of the remaining part of the cone=Volume of the cone-Volume o f the tip of the cone=64π-π=63π=63(22/7)=198*

DIRECTIONS for the question: Solve the following question.

Question No. : 19

A wholesaler bought walnuts and peanuts, the price of walnut per kg being thrice that of peanut per kg. He then sold 8 kg of peanuts at a profit of 10% and 16 kg of walnuts at a profit of 20% to a shopkeeper. However, the shopkeeper lost 5 kg of walnuts and 3 kg of peanuts in

transit. He then mixed the remaining nuts and sold the mixture at Rs. 166 per kg, thus making an overall profit of 25%. At what price, in Rs. per kg, did the wholesaler buy the walnuts?

Dr S.B. Dhar, is **Editor of this Quartrerly e-Bulletin**. He is an eminent mentor, analyst and connoisseur of Mathematics from IIT for preparing aspirants of Competitive Examinations for Services & Admissions to different streams of study at Undergraduate and Graduate levels using formal methods of teaching shared with technological aids to keep learning at par with escalating standards of scholars and learners. He has authored numerous books of excellence.

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I don't think anybody anywhere can talk about the future... without talking about education. Whoever controls the education of our children, controls our future.

- Wilma Mankiller

—00—

Take care of your thoughts,
For they are formed and moulded by our thoughts.
Those whose minds are shaped by selfless thoughts,
Give jot when they speak or act.
Joy follows them like a shad,
that never leaves them.

- ***Gautama Buddha***

—00—

Modern cynics and skeptics... see no harm in paying those to whom they entrust the minds of their children a smaller wage than is paid to those to whom they entrust the care of their plumbing.

- John F. Kennedy

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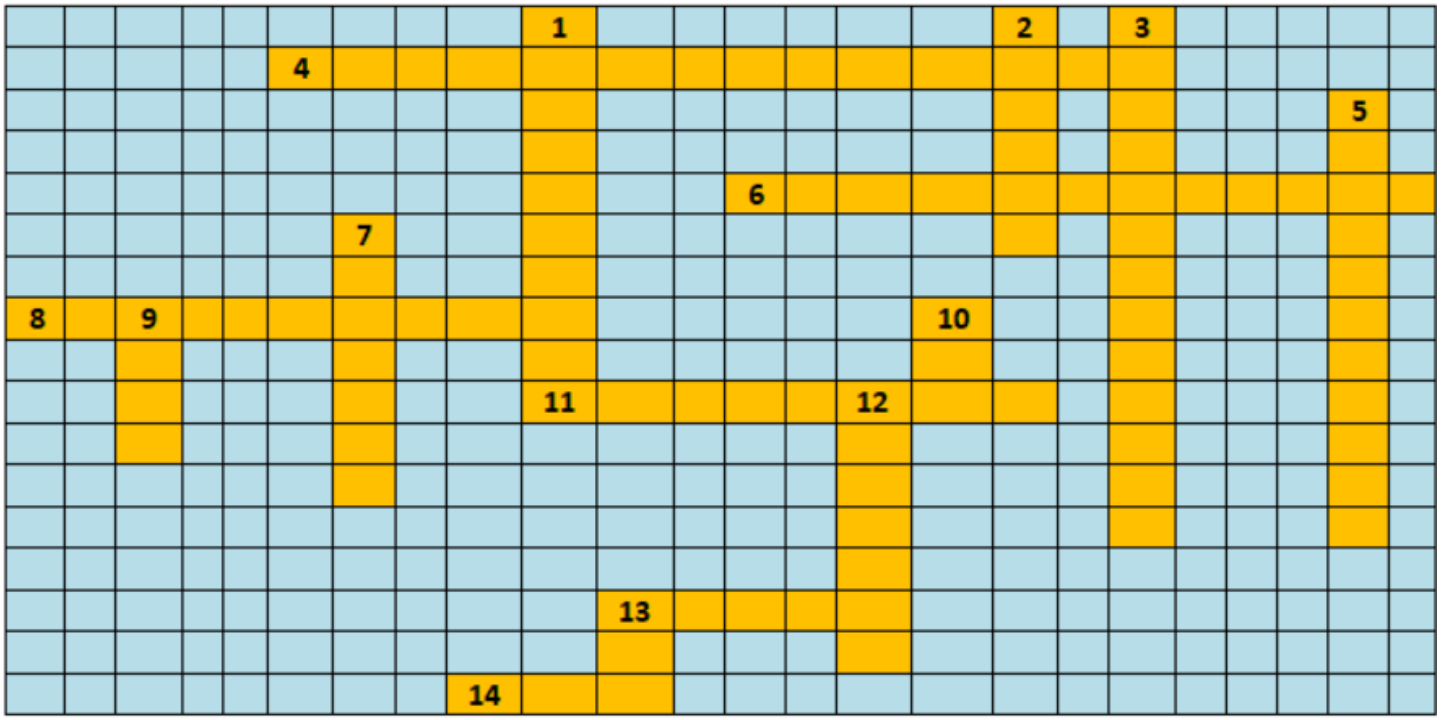
CROSSWORD PUZZLE May'19 : General Election of India

Prof. SB Dhar



Across

4 Constituency where the First VVPAT machine was used

6 Relevant date to calculate the age of Indian Voter

8 Chief Election Commisioner of India

11 Age of being an elector of India

13 Number of categories of Indian voters

13 Number of MPs nominated by Presiodent of India

Down

1 Anglo-Indian Community MP of BJP in 2014 election

2 TV Chanel directed by ECI

3 Biopic relating to Telangana under ECI review

5 Constituency where First EVM was introduced

7 Mizoram's Onl;y MP of INC in 2014 election

9 No of CPI(M) MPs in 2-14 election

10 Swaraj is my birth right and I shall have it

12 Designers of EVM

Answer tho this Crossword Puzzle shall be provided in next issue of this e-Bulletin

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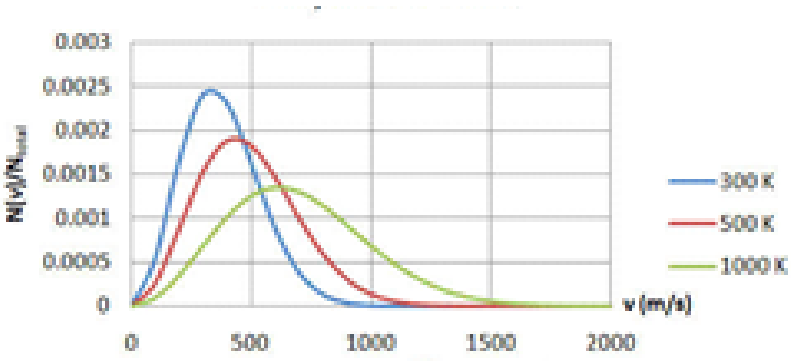
Growing with Concepts : Physics

Derivation of Mean Speed of a Molecule in a Gas

Pursuit of learning in Physics involves many concepts drawn from mathematics and other related physical phenomenon. It constrains authors of books to streamline each of the concepts while elaborating a particular concept. This column has been created and being pursued for nearly Three years to elaborate various concepts right from First Principle to the possible extent. Mean speed of gaseous molecule is one of that and it is different from root mean square (rms) value of the velocity of molecules. Both of these are frequently used in solving problems in Kinetic Theory of Gases.

Mean speed of a gaseous molecule is determined based on Maxwell Distribution as depicted in the figure which is empirically expressed as Maxwell-Boltzmann relation where probability of a certain velocity of a molecule is:

$P(v)=\left(\frac{m}{2\pi kT}\right)^{\frac{3}{2}} 4\pi v^2 e^{\frac{mv^2}{2KT}}$. This $P(v)$ is called Probability Density Function (PDF) and mean speed, which is always positive, of a molecule is $v_{avg}=\int_0^\infty vP(v)\,dv$. This



takes a form : $v_{avg}=\int_0^\infty vP(v)dv=\int_0^\infty v\left(\left(\frac{m}{2\pi kT}\right)^{\frac{3}{2}} 4\pi v^2 e^{\frac{mv^2}{2KT}}\right)dv=4\pi\left(\frac{m}{2\pi kT}\right)^{\frac{3}{2}}\int_0^\infty v^3 e^{\frac{mv^2}{2KT}}dv$. This integration can be simplified by comparing it with a standard integral $v=\int x^3 e^{-ax^2}dx=\frac{1}{2a^2}$ where for instant case $a=\frac{m}{2kT}$.

Thus, it simplifies into $v_{avg}=4\pi\left(\frac{m}{2\pi kT}\right)^{\frac{3}{2}}\int_0^\infty v^3 e^{\frac{mv^2}{2KT}}dv=4\pi\left(\frac{m}{2\pi kT}\right)^{\frac{3}{2}}\times\frac{2k^2T^2}{m^2}=\sqrt{\frac{8kT}{m}}=\sqrt{\frac{8N_Akt}{N_Am}}=\sqrt{\frac{8RT}{M}}$.

Here, Avogadro's number N_A is Avogadro's number and Universal Gas Constant $R=N_Ak$, where k is Boltzmann Constant and Molar Mass $M=N_Am$, where m is the mass of each molecule.

$$\langle v\rangle=\int_0^\infty x^3e^{-ax^2}dx=\frac{1}{2a^2}\Rightarrow\langle v\rangle=4\pi\left(\frac{m}{2\pi kT}\right)^{\frac{3}{2}}\frac{4k^2T^2}{2m^2}\Bigg|_{a=\frac{m}{2kT}}=\sqrt{\frac{8kT}{\pi m}}$$

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Appendix I-a: Derivation of Standard Integral Used in Mean Velocity

Integral $\int_0^\infty x^3e^{-ax^2}dx$ in Appendix A is reduced to a problem of Integration by parts as under:

$$I=\int_0^\infty x^3e^{-ax^2}dx=\int_0^\infty x^2e^{-ax^2}\left(xdx\right)$$

Substituting $u = ax^2 \Rightarrow du = 2axdx \Rightarrow xdx = \frac{du}{2a}$ and $x^2 = \frac{u}{a}$. Accordingly, $I = \int_0^\infty \frac{u}{a} e^{-u} \left(\frac{du}{2a}\right) = \frac{1}{2a^2} \int_0^\infty ue^{-u} du$.

Now by method of Integration by parts $\int (p \cdot q)\, dx = p \int q dx - \int \left(\left(\frac{d}{dx} p \right) q \right) dx$. Applying this formula to solve the instant integral $\int ue^{-u} du = u \int e^{-u} du - \int \left(\left(\frac{d}{du} u \right) e^{-u} \right) du = u\left(-e^{-u}\right) - \int e^{-u} du = -ue^{-u} + e^{-u}$. Thus it leads to:

$I = \frac{1}{2a^2} \int_0^\infty ue^{-u} du = \frac{1}{2a^2} \left[-ue^{-u} + e^{-u} \right]_0^\infty$. Taking the values, elaborated in Appendix I-b, it converges to : $I = \frac{1}{2a^2}\left(-(0-0)+(0-1)\right) = -\frac{1}{2a^2}$. Since average speed is always positive and hence $I = \int_0^\infty x^3 e^{-ax^2} dx = \frac{1}{2a^2}$.

Appendix I-b: Limiting Values (in Appendix I-a)

(i) $e^{-u} = \frac{1}{e^u} \Rightarrow e^{-u} = \frac{1}{e^\infty}\Big|_{u\to\infty} = \frac{1}{\infty} = 0$

(ii) $e^{-u} = \frac{1}{e^u} \Rightarrow e^{-u} = \frac{1}{e^0}\Big|_{u\to 0} = \frac{1}{1} = 1$

(iii) $ue^{-u} = \frac{1}{\frac{e^u}{u}} = \frac{1}{\frac{1+u+\frac{u^2}{2}+\frac{u^3}{3}\ldots}{u}} = \frac{1}{\frac{1}{u}+1+\frac{u}{2}+\frac{u^2}{3}\ldots} = \frac{1}{0+1+\infty+\infty\ldots} = \frac{1}{\infty} = 0$

(iv) $ue^{-u} = \frac{1}{\frac{e^u}{u}} = \frac{1}{\frac{1+u+\frac{u^2}{2}+\frac{u^3}{3}\ldots}{u}} = \frac{1}{\frac{1}{u}+1+\frac{u}{2}+\frac{u^2}{3}\ldots} = \frac{1}{\infty+1+0+0\ldots}\Big|_{u\to 0} = \frac{1}{\infty} = 0$

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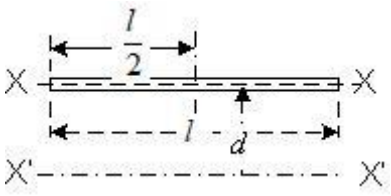
ILLUSTRATIONS OF TYPICAL QUESTIONS ON KINETIC THEORY OF GASES

(Set 2, on *Chapter 2: Heat and Thermodynamics*)

In the spirit of concept of mean spped of gasesous molecules, here solutions are being deliberately called illustration. There could be multiple ways of solving problem, and solution provider chooses one of them, with a presumption that its user has prior knowledge on selection of a particular way leading to the solution. Experience of mentoring unprivileged students has revealed that whatever and whichever way is told to the target students, they tend to remember it. This jeopardizes basic philosophy of reasoning in an out-of-box manner. Therefore, in illustrations below reasoning of the choice of concept, equations and their solutions is advanced from the basics. Every-time taking illustration of basic concepts from first principle is not feasible. However, a reader who has read the Mentors' Manual or a textbook would find it easy to sail into the reasoning behind a solution, if not elaborated in illustrations. Same method is adopted in illustrations of question bank, with a belief that mentor and students in isolated locations wouldt find it easy to evolve methodology of problem solving in an intuitive manner, without either carrying burden of formulae or end results or take shortest route to solve a problem under examination conditions.

Question 1: At what temperature the mean speed of the molecules of hydrogen gas equals the escape speed from the earth?

Illustration: Mean speed of a hydrogen molecule $v_{avg}=\sqrt{\frac{8RT}{\pi\times 0.002}}$, since molar mass of hydrogen is $M_H=2\,\text{g}=0.002\,\text{kg}$ 2 g=0.002 kg. And escape velocity of hydrogen is determined from the potential energy of the molecule to displace it from earths surface to infinity. Accordingly,



$$\frac{1}{2}mv_{esc}{}^2=\int_r^\infty\frac{GMm}{x^2}dx=GMm\left[-\frac{1}{x}\right]_r^\infty=-GMm\left[\frac{1}{\infty}-\frac{1}{r}\right]=\frac{GM}{r}m=\frac{GM}{r^2}rm=grm\Rightarrow v_{esc}{}^2=2gr\Rightarrow v_{esc}=\sqrt{2gr}$$

. **Thus answer is 11800 K**.

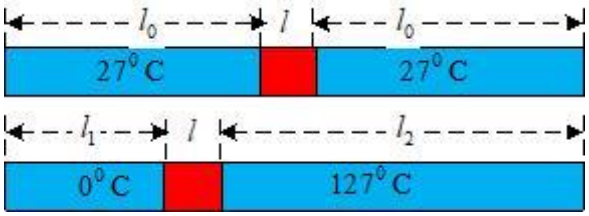
Question 2: Air is pumped into the tube of a cycle rikshaw at a pressure 2 atm. The volume of each tube at this pressure is 0.002 m^3. One of the tube gets punctured and the volume of the tube reduces to 0.0005 m^3. How many moles of air have leaked out? Assume that the temperature remains constant at 300 K and that the air behaves as an ideal gas.

Illustration: In the problem let amonu of gas filled in the tube be n_1 moles, at pressure $p_1=2\,\text{atm}=2\times10^5\,\text{Pa}$ and volume of air at this pressure is $v_1=0.002\,\text{m}^3$. When tube get punctured its pressure comes to equilibrium with atmospheric pressure $p_1=1\text{atm}=10^5\,\text{Pa}$ and volume reduces to $v_1=0.0005\,\text{m}^3$ and let amount of air is n_2 moles. Further it is given that temperature remains same $T_1=T_2=300\,\text{K}$.

Now as per ideal gas equation $pv=nRT$. Therefore, gas inside tube $n_1=\frac{p_1v_1}{RT}=\frac{\left(2\times10^5\right)\times0.002}{8.31\times300}=0.16\,\text{mol}$. And after leaking $n_2=\frac{p_2v_2}{RT}=\frac{\left(1\times10^5\right)\times0.0005}{8.31\times300}=0.02\,\text{mol}$. Therefore amount of gas leaked $\Delta n=n_1-n_2$ mol. **Thus answer is** $0.16-0.02=0.14\,\textbf{mol}$

Question 3: A glass tube, sealed at both ends, is 100 cm long. It lies horizontally with the middle 10 cm containing mercury. The two ends of the tube contain air at 27^0C and at a pressure of 76 cm of mercury. The air column on one side is maintained at 0^0C and the other side is maintained at 127^0C. Calculate the length of the air column on the cooler side. Neglect the changes in the volume of the mercury and of the glass.

Illustration: In initial case on both sides of the mercury pallet, at the centre of the tube pressure $\left(p_0=\rho g\times0.76=0.76\rho g\right)$, temperature $\left(T_0=27^0\text{C}=273+27=300\text{K}\right)$,volume of the gas $\left(v_0=l_0A=\frac{1-0.10}{2}=0.45\text{m}\right)$ here A is the cross-sectional area of the tube,and hence number of moles of gas (n) are also equal. By geometry, volume of air at 0^0C is $v_1=l_1A$and $v_2=l_2A$. Further in case of equilibrium of the mercury pallet when both sides are maintained at different temperatures. $p_1=p_2=p$. As per Ideal Gas Equation



$$pv=nRT\Rightarrow\frac{pv_1}{T_1}=\frac{pv_2}{T_2}\Rightarrow\frac{0.76\rho g\times0.45\,\text{A}}{273+27}=\frac{p\times l_1\,\text{A}}{273+0}=\frac{p\times l_2\,\text{A}}{273+127}$$. It leads to $1.14\times10^{-3}\times\rho g=\frac{p\times l_1}{273}=\frac{p\times l_2}{400}$.

Thus $\frac{l_2}{l_1}=\frac{400}{273}\Rightarrow\frac{l_2+l_1}{l_1}=\frac{400+273}{273}$. Since mercury is incompressible and hence $l_1+l_2=2l_0=2\times0.45=0.90\,\text{m}$.

Therefore, $\frac{l_1}{2l_0}=\frac{273}{673}\Rightarrow l_1=\frac{0.9\times273}{673}=0.365\,\text{m}$. **Hence answer is 36.5 cm.**

N.B.: It is given that change in volume of mercury and glass are negligible, therefore for any variation in pressure due to volume in the sealed tube shall always be $l_1+l_2=1.0-0.1=0.90\,\text{m}$. It is enough to lead to the answer. Thus applying IGE for base case is not required

Question 4: Figure shows a large closed cylindrical tank containing water. Initially the air is trapped above the water surface has a height h_0 and pressure $2p_0$, where p_0 is the atmospheric pressure. There is a hole in the wall of the tank at a depth h_1, below the top from which water comes out. A long vertical tube is connected as shown. (a) Find the height h_2 of the water in the long tube above the top initially. (b) Find the speed with which water comes out of the hole. (c) Find the height of the water in the long tube above the top when water stops coming out of the hole.

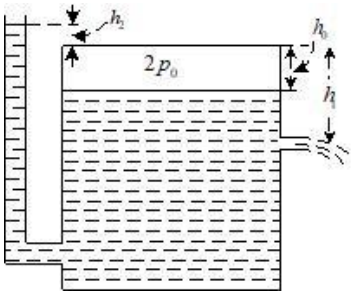
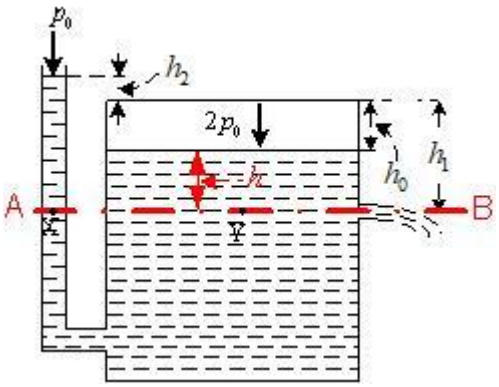


Illustration: Initially pressure exerted by air trapped inside tank above water surface is $2p_0$ where p_0 is the atmospheric pressure. It is required to determine height of water level h_2, above the top of the water tank, in long tube connected to the tank. This can be determined by the equilibrium of hydrostatic pressure above any line say AB passing through center of hole. Taking points X and Y in the tank where $p_X=p_0+\rho g\left(h_2+h_0+h\right)$ and $p_Y=2p_0+\rho g\left(h\right)$, here ρ is density of water. Thus, at equilibrium $p_X=p_y$ which leads to $p_0+\rho g\left(h_2+h_0+h\right)=2p_0+\rho g\left(h\right)$. It, further, solves into $\rho g\left(h_2+h_0\right)=p_0\Rightarrow h_2=\frac{p_0}{\rho g}-h_0$. **This is the part (a) of the answer.**



As regards part (b) velocity would be determined by the kinetic energy of water as per principle of conservation of energy at the outlet i.e. equating total energy at incoming water which is pressure energy and it is $TE_i=2p_0+\left(h_1-h_0\right)gh$ and total energy at at outlet which sum of kinetic energy and pressure energy and it is $TE_o=\frac{1}{2}\rho v^2+p_0$. Accordingly, $KE=PE\Rightarrow\frac{1}{2}\rho v^2+p_0=2p_0+\rho g\left(h_1-h_0\right)\Rightarrow v^2=\frac{2\left[p_0+\rho g\left(h_1-h_0\right)\right]}{\rho}$. It leads to $v=\sqrt{\frac{2\left[p_0+\rho g\left(h_1-h_0\right)\right]}{\rho}}\,\text{m}\times\text{s}^{-1}$. **This is part (b) of the answer.**

As regards part (c) of the answer for water to stop coming at outlet kinetic energy is Zero. This can happen when $v=\sqrt{\frac{2\left[p_0+\rho g\left(h_1-h_0\right)\right]}{\rho}}=0\Rightarrow p_0+\rho g\left(h_1-h_0\right)=0\Rightarrow\rho gh_0=p_0+\rho gh_1\Rightarrow h_0=h_1+\frac{p_0}{\rho g}$. Substituting this value of h_0 in the answer of part (a) above, $h_2=\frac{p_0}{\rho g}-\left(h_1+\frac{p_0}{\rho g}\right)=\left(\frac{p_0}{\rho g}-\frac{p_0}{\rho g}\right)-h_1=-h_1$ **This is part (c) of the answer.**

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Growing with Concepts: Chemistry

Law of Mass Action

Kumud Bala

Guldberg and Waage, the two Norwegian chemists in 1864, put forward a law concerning the dependence of the rate of the reaction on the concentration of the reactants. This law is known as law of mass action. It states as follows: "the rate at which a substance reacts is proportional to its active mass and hence the rate of a chemical reaction is proportional to the products of the active masses of the reactants".

Explanation of the term 'active mass':- The term active mass used in the above definition means molar concentration, i.e. number of moles dissolved per litre of the solution. For example, suppose Xg of NaOH is dissolved in V litres of the solution, then we can say that concentration of NaOH solution = Xg in V litres = $\frac{X}{40} moles\ in\ V\ litres$ = $\frac{X}{40 \times V}$ moles/ litres (molar mass of NaOH = 40 $gmol^{-1}$). This is the active mass of the given NaOH solution. The active mass of a substance is usually represented by putting the formula of the substance in square brackets. Thus, in the above case, we can write [NaOH]= $\frac{X}{40 \times V}$ M (M stands for molar concentration, i.e. mol/litre).

Mathematical expression:- consider the reaction A+B→ products. According to law of mass action, rate at which A reacts (r) α (A), rate at which B reacts (r) α (B) ∴rate at which A and B react together (r) α [A][B] = k [A] [B], where k is a constant of proportionality and is called velocity constant or rate constant. Now if the concentration of each of the reactants involved in the reaction is unity i.e. [A] = [B] =1, then rate of reaction (r) =kx1x1 =k. Thus, rate constant of a reaction at a given temperature may be defined as the rate of the reaction when the concentration of each of the reactants is unity. For a general reaction, aA + bB + cC + ------- → Products, rate of reaction α $[A]^a$ $[B]^b$ $[C]^c$ ----- thus, the law of mass action may be redefined as: "the rate of a chemical reaction is proportional to the product of the active masses of the reactants, each raised to the power equal to its stoichiometric coefficient as represented by the balance chemical equation".

Law of chemical equilibrium:- Law of chemical equilibrium is a result obtained by applying the law of mass action to a reversible reaction in equilibrium. For example, consider the general reversible reaction A + B ↔ C + D. At equilibrium, suppose the active masses of A,B,C and D are represented as [A],[B],[C] and [D] respectively. Applying the law of mass action, rate at which A and B react together, i.e. rate of the forward reaction α [A][B] = k_f [A][B], where k_f is a constant of proportionality and is called velocity constant for the forward reaction. Similarly, rate at which C and D react together, i.e. rate of the backward reaction α [C][D] = k_b [C][D], where k_b represents the velocity constant for the backward reaction. At equilibrium, rate of forward reaction = rate of backward reaction. Therefore, k_f [A][B] = k_b [C][D] or $\frac{[C][D]}{[A][B]} = \frac{k_f}{k_b}$ =K . At constants temperature, as k_f and k_b are constant, therefore, k_f/k_b = K is also constant at constant temperature and is called 'equilibrium constant'. Again, consider the more general reversible reaction aA + bB + ----- ↔ xX + yY + ----- . Applying the law of mass action, as before, we get $\frac{[X]^x}{[A]^a}$ $\frac{[Y]^y}{[B]^b}$ = K or K_c where K is equilibrium constant. It is constant at constant temperature. The above mathematical equation is called the law of chemical equilibrium. It may be defined as follows: "the products of the molar concentrations of the products, each raised to the power equal to its stoichiometric coefficient divided by the product of the molar concentrations of the reactants, each raised to the power equal to its stoichiometric coefficient is constant at constant temperature and is called equilibrium constant". K_c is equilibrium constant expressed in terms of concentrations. Where there is no doubt that K is in terms of concentration 'c' is omitted. When the reactants and the products are gaseous, the equilibrium constant can be expressed either in terms of concentration in moles per litre or in terms of the partial pressures of the reactants and the products. If expressed in terms of partial pressures, it is denoted by K_p. Thus, if A, B, X and Y are gases in the above general reaction, we can write $K_p = \frac{P_X^x}{P_A^a} \frac{P_Y^y}{P_B^b}$ where P^a, P^b, P^x and P^y are partial pressures of A, B, X and Y respectively in the reaction mixture at equilibrium. It may be noted that the pressure in the above equation are taken in atmosphere or bars or Pascal (in SI units).

Relationship between K_p and K_c:- consider the general reversible reaction: aA + bB ↔ xX + yY. If the equilibrium constant for this reaction is expressed in terms of concentrations, we may write $K_c = \frac{[X]^x}{[A]^a} \frac{[Y]^y}{[B]^b}$ or simply as $K_c = \frac{C_X^x}{C_A^a} \frac{C_Y^y}{C_B^b}$ ------ (i)

Here C_A, C_B , C_X and C_Y represent the molar concentration of A, B, X and Y respectively. If A,B, X and Y are gaseous, the equilibrium constant for the above reaction may be expressed in terms of pressure as $K_p = K_p = \frac{P_X^x}{P_A^a}\frac{P_Y^y}{P_B^b}$ ----------(ii) .

If the gases are supposed to be ideal, then we can apply the ideal gas equation, viz, PV = nRT or P = $\frac{n}{V}$ RT = CRT [$\frac{n}{V}$ = no . of moles per litre] = C (molar concentration).

∴ for the gases A, B, X and Y , we may write $P_A = C_A$ RT , $P_B = C_B$RT , $P_X = C_x$RT and $P_Y = C_Y$RT. Putting these values in equation (ii) , we get $K_p = \frac{(C_X\ RT)^x}{(C_A\ RT)^a}\frac{(C_Y\ RT)^y}{(C_B\ RT)^b} = \frac{C_X^x}{C_A^a}\frac{C_Y^y}{C_B^b}\frac{(RT)^{x+y}}{(RT)^{a+b}} = \frac{C_X^x}{C_A^a}\frac{C_Y^y}{C_B^b}(RT)^{(x+y)-(a+b)} = K_c\,[RT]^{\Delta n}$. Here Δn = (x+y) – (a+b) = no. of moles of products – no. of moles of reactants = change in the number of moles. Hence, $K_p = K_c\,(RT)^{\Delta n}$. As the partial pressures are taken in atmospheres, the value of R to be used in the above equation will be 0.0821 litre atmospheres/ degree/ mole. Temperature (T) will, of course, be in degree Kelvin (K), 1Pascal (Pa) = $1Nm^{-2}$ but 1 bar = 10^5Pa, R= 0.0831 litre bar K^{-1} mol^{-1}.

Example: At 773 K, the equilibrium constant K_c for the reaction N_2 (g) + 3 H_2 (g) ↔ $2NH_3$ (g) is $6.02X10^{-2}L^2$ mol^{-2}. Calculate the value of K_p at the same temperature.

Solution: Δn_g = 2-4 = -2, $K_p = K_c\,(RT)^{\Delta n}$ = 6.02 x $(0.0821\ L\ atm.K^{-1}\ mol^{-1} X\ 773K)^{-2} = 1.5\ X\ 10^{-5}\ atm^{-2}$.

Example: For the equilibrium, 2NOCl (g) ↔ 2 NO(g) + Cl_2(g), the value of the equilibrium constant K_c is $3.75X\ 10^{-6}$ at 1069K. Calculate K_p for the reaction at this temperature.

Solution: for the given reaction, Δn = (2+1) -2 = 1 $K_p = K_c\,(RT)^{\Delta n} = 3.75X10^{-6}$ x .0831X 1069 = $3.33X\ 10^{-2}$

Characteristics of equilibrium constant:

(1) The value of the equilibrium constant for a particular reaction is always constant depending only upon the temperature of the reaction and is independent of the concentrations of the reactants with which we start or the direction from which the equilibrium is approached. For example, for reaction $CH_3COOH + C_2H_5OH \leftrightarrow CH_3COOC_2H_5 + H_2O$, K_c at 25°C = $[CH_3COOC_2H_5]\,[H_2O]/[CH_3COOH]\,[C_2H_5OH]$ = 4.0 .

(2) If the reaction is reversed, the value of the equilibrium constant is inversed. For example, if the above reaction is written in the reverse manner, i.e. as $CH_3COOC_2H_5 + H_2O \leftrightarrow CH_3COOH + C_2H_5OH$, the value of equilibrium constant will be $K_c' = [CH_3COOH]\,[C_2H_5OH]/\,[CH_3COOC_2H_5]\,[H_2O] = \frac{1}{K_c} = \frac{1}{4}$ = 0.25 at 25°C.

(3) If the equation (having equilibrium constant K) is divided by 2, the equilibrium constant for the new equation is the square root of K (i.e.$\sqrt{K}$). For example, if K is the equilibrium constant for the reaction, $N_2 + 3H_2 \leftrightarrow 2NH_3$ ------ (i),

Then for the reaction ½ $N_2 + \frac{3}{2}\,H_2 \leftrightarrow \frac{2}{2}\,NH_3$ --------- (ii)

The value of equilibrium constant, K' =$\sqrt{K}$. It is obvious because K for reaction (i) = $\frac{[NH_3]^2}{[N_2][H_2]^3}$, and K' for reaction (ii) = $\frac{[NH_3]}{[N_2]^{\frac{1}{2}}}\frac{1}{[H_2]^{\frac{3}{2}}} = \sqrt{K}$.

(4) If the equation (having equilibrium constant K) is multiplied by 2, the equilibrium constant for the new equation is the square of K (i.e. K^2). In general, if an equation is multiplied by 'n', the new equilibrium constant will be K^n. For example, if equilibrium constant for the equilibrium, $H_2 + I_2 \leftrightarrow 2HI$ is K, then for $nH_2 + nI_2 \leftrightarrow 2nHI$, equilibrium constant =$K^n$.

(5) If the equation (having equilibrium constant K) is written in two steps (having equilibrium constant K_1 and K_2) then K_1 x K_2 = K. For example, consider the reaction: $N_2 + 2O_2 \leftrightarrow 2NO_2$, here K = $\frac{[NO_2]^2}{[N_2][O_2]^2}$

Suppose the above reaction takes place in two steps as $N_2 + O_2 \leftrightarrow 2NO$ and $2NO + O_2 \leftrightarrow 2NO_2$. For 1st step, $K_1 = \frac{[NO]^2}{[N_2]}\frac{1}{[O_2]}$, for the 2nd step, $K_2 = \frac{[NO_2]^2}{[NO]^2[\ ]}\frac{1}{[O_2]}$ ∴ K_1 x $K_2 = \frac{[NO]^2}{[N_2]}\frac{1}{[O_2]} X \frac{[NO_2]^2}{[NO]^2[\ ]}\frac{1}{[O_2]} = \frac{[NO_2]^2}{[N_2]}\frac{1}{[O_2]^2}$ = K . Variation of equilibrium constant with variation of the reaction equation (K= equilibrium constant for original reaction) is shown in the Table below.

When the reaction is	The new equilibrium constant is
Reversed	1/K
Divided by 2	√K
Multiple by 2	K^2
Divided into 2 steps	$K = K_1 x\ K_2$

(6) The value of the equilibrium constant is not affected by the addition of a catalyst to the reaction. This is because the catalyst increases the speed of the forward reaction and the backward reaction to the same extent. Example: K_p for the reaction, N_2 (g) + 3 H_2 (g) ↔ $2NH_3$ is 49 at a certain temperature. Calculate the value of K_p at the same temperature for the reaction NH_3 (g) ↔ ½ N_2 (g) + 3/2 H_2 (g). Solution: Given that N_2 (g) + $3H_2$ ↔ $2NH_3$ (g), K_p = 49 . For the reverse reaction, $2NH_3$ (g) ↔ N_2(g) + $3H_2$ (g), K_p = 1/49 . On dividing by 2, we have NH_3 (g) ↔ ½ N_2 (g) + 3/2 H_2 (g), $K_p = \sqrt{1/49} = \frac{1}{7}$

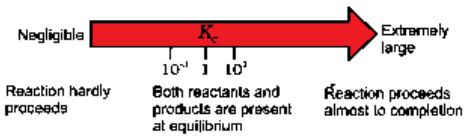
Type of chemical equilibria:

(i) Homogeneous equilibria- when in an equilibrium reaction, all the reactants and the products are present in the same phase (i.e. gaseous or liquid), it is called homogeneous equilibrium. Examples are:
(a) in which the number of moles of products is equal to the number of moles of reactants. $H_2 + I_2 \leftrightarrow HI$, $N_2 + O_2 \leftrightarrow 2NO$, $CO + H_2O \leftrightarrow CO_2 + H_2$.
(b) In which the number of moles of products is not equal to the number of moles of reactants. $N_2 + 3\,H_2 \leftrightarrow 2NH_3$, $2SO_2 + O_2 \leftrightarrow 2SO_3$, $PCl_5 \leftrightarrow PCl_3 + Cl_2$, $N_2O_4 \leftrightarrow 2NO_2$.
(c) In liquid phase, $CH_3COOH + C_2H_5OH \leftrightarrow CH_3COOC_2H_5 + H_2O$, $Fe^{+3}(aq) + SCN^-(aq) \leftrightarrow [Fe(SCN)]^{+2}(aq)$.
(ii) Heterogeneous equilibrium: when in a equilibrium reaction, the reactants and the products are present in two or more than two phases, it is called a heterogeneous equilibrium.
$CaCO_3(s) \leftrightarrow CaO + CO_2(g)$, $3Fe(s) + 4\,H_2O(g) \leftrightarrow Fe_3O_4(s) + 4H_2(g)$, $C(s) + H_2O(g) \leftrightarrow CO(g) + H_2(g)$.
In writing expression for the equilibrium constant, the most important convention to be kept in mind is that the active mass of a pure solid is constant irrespective of its amount and if a pure liquid is present in excess (e.g. as a solvent), its active mass is also constant. In either case, we put their active mass equal to 1 (because their constant values are included into the equilibrium constant), i.e. we put [pure solid] =1, [pure liquid] = 1.
Examples-
(i) $3H_2(g) + N_2(g) \leftrightarrow 2NH_3(g)$ $K_c = \frac{[NH_3(g)]2}{[N_2(g)]} \cdot \frac{1}{[H_2(g)]^3}$, $K_p = \frac{P^2_{NH_3}}{P_{N_2} \times P^3_{H_2}}$
(ii) $CaCO_3(s) \leftrightarrow CaO(s) + CO_2(g)$, $K = \frac{[CaO(s)][CO_2(g)]}{[CaCo_3(s)]}$ but by convention, we put [CaO (s)] = 1 and $[CaCO_3(s)] = 1$ hence, $K = [CO_2(g)]$, since the concentration of a gas is usually expressed in terms of partial pressures hence we can better write $K_p = P\,CO_2$. This explains why pressure of CO_2 becomes constant when equilibrium is attained in the decomposition of $CaCO_3$ in a closed vessel.
(iii) $NH_3(aq) + H_2O(l) \leftrightarrow NH_4^+(aq) + OH^-(aq)$, $K = \frac{[NH_4^+(aq)][OH-(aq)]}{[NH_3(aq)][H_2O(l)]}$, as H_2O is present in excess (being the solvent), therefore by convention, $[H_2O]$ is constant and put equal to 1. Hence, we write $K = \frac{[NH_4^+(aq)][OH^-(aq)]}{[NH_3(aq)]}$

Units of equilibrium constant:- The equilibrium constant expression in values the concentrations or partial pressures of the reactants and the products. The units of K will depend upon the number of moles of reactants and products involved in the reaction as discussed ahead:
(i) When total number of moles of products is equal to the total number of moles of reactants, K has no units. For example, consider the reaction,
(a) $N_2(g) + O_2(g) \leftrightarrow 2NO(g)$, $K = \frac{[NO(g)]^2}{[N_2(g)][O_2(g)]} = \frac{[mol\ L^{-1}]^2}{[mol\ L^{-1}][mol\ L^{-1}]}$ = no units
(b) $2HI(g) \leftrightarrow H_2(g) + I_2(g)$, $K = \frac{[H_2(g)][I_2(g)]}{[HI(g)]^2} = \frac{[mol^{-1}][mol^{-1}]}{[mol-1]^2}$ = no units
(ii) When total number of moles of products is different than the total number of moles of reactants. In such a reaction K has units. For example, consider the reaction,
$N_2(g) + 3H_2(g) \leftrightarrow 2\,NH_3(g)$, $K = \frac{[NH_3(g)]2}{[N_2(g)][H_2(g)]3} = \frac{[mol\ L^{-1}]^2}{[mol\ L^{-1}][mol\ L^{-1}]^3} = L^2\,mol^{-2}$

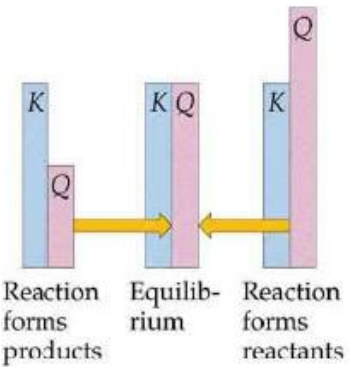
Application of equilibrium constant:-

(1) Predicting the extent of reaction: the magnitude of the equilibrium constant gives an idea of the relative amounts of the reactants and the products. Large value of the equilibrium constant ($K > 10^3$) shows that forward reaction is favored i.e. concentration of products is much larger than that of the reactants at equilibrium. For example, $H_2(g) + ½\,O_2(g) \leftrightarrow H_2O(g)$, $K_c = 2.4X\,10^{47}$ at 500K , $H_2(g) + Cl_2(g) \leftrightarrow 2HCl(g)$, $K_c = 4.0\,X\,10^{31}$, $H_2(g) + Br_2(g) \leftrightarrow 2HBr$, $K_c = 5.4\,X\,10^{18}$. This shows that at equilibrium, concentration of the products, i.e. H_2O, HCl and HBr is very large, the reaction proceeds nearly to completion.
If K is in the range of 10^{-3} to 10^3 appreciable concentration of both reactants and products are present. For example, $H_2(g) + I_2(g) \leftrightarrow 2HI(g)$, $K = 57.0$, $N_2O_4(g) \leftrightarrow 2NO_2(g)$, $K_c = 4.64\,X\,10^{-3}$ at 298K.



Low value of $K = < 10^{-3}$ shows that backward reaction is favored, i.e. concentration of reactants is much larger than that of the products, i.e. the reaction proceeds to a very small extent. For example $N_2(g) + O_2(g) \leftrightarrow 2NO(g)$, $K_c = 4.8\,X\,10^{-31}$ at 298K. This shows that at equilibrium, the mixture contains mainly N_2 and O_2 and very little of NO. $H_2O(g) \leftrightarrow H_2(g) + ½\,O_2(g)$, $K_c = 4.1\,X\,10^{-48}$.

(2) Predicting the direction of reaction: for the reaction, aA + bB ↔ xX + yY , at any stage of the reaction other than the stage of chemical equilibrium, concentration ratio, as given by the expression for the law of chemical equilibrium is called concentration quotient or reaction quotient Q_c or Q. $Q_c = \frac{[X]^x\,[Y]^y}{[A]^a\,[B]^b}$ or $Q_p = \frac{P_X^x}{P_A^a}\frac{P_Y^y}{P_B^b}$ in terms of pressures. If Q =K, the reaction is in equilibrium. If Q > K , Q will tend to decrease so as to become equal to K. As a result, the reaction will proceed in the backward direction. If Q< K , Q will tend to increase. As a result the reaction will proceed in the forward direction.



(3) Calculating equilibrium concentration: knowing the initial concentration of reactants, equilibrium concentration of all the reactants and products can be calculated through the following steps:

Step 1- write the balanced equation for the reaction.
Step 2- assume 'x' as the amount of the reactant reacted or a product formed.
Step 3- calculate the equilibrium concentration of each reactant and product from the stoichiometry of the equation.
Step 4- write expression for K_c or K_p
Step 5- substitute equilibrium concentration and calculate 'x'
Step 6- check the result by substituting calculated values of equilibrium concentrations to get the values of K_c or K_p.

For example: 2A + B → C + 2D
Initial concentration: a mol L^{-1} b mol L^{-1}
At equilibrium : (a-x) (b- x/2) x/2 x

$K_c = \frac{[C][D]^2}{[A]^2[B]} = \frac{\left[\frac{x}{2}\right][x]^2}{[a-x]^2[b-\frac{x}{2}]}$. Calculate 'x'

Example: 0.1 mole of PCl_5 is vaporized in a litre vessel at 260°C. Calculate the concentration of Cl_2 at equilibrium, if the equilibrium constant for the dissociation of PCl_5 is 0.0414.

Solution: suppose the concentration of Cl_2 at equilibrium is 'x' mol/liter.
Then we will have PCl_5 ↔ PCl_3 + Cl_2
Initial concentration 0.1 mol 0 0
At equilibrium 0.1-x x x
by applying law of chemical equilibrium, we get $K_c = \frac{[PCl_3][Cl_2]}{[PCl_5]} = 0.0414 = \frac{x.x}{(0.1-x)} = \frac{x^2}{(0.1-x)}$

$x^2 = (0.1\text{-}x)\,(0.0414) = 0.00414 - 0.0414x$, $x^2 + 0.0414x - 0.00414 = 0$ (using the formula $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$)

$x = \frac{-0.0414 \pm \sqrt{(0.0414)^2 - 4x1(-0.00414)}}{2.1} = \frac{-0.0414 \pm \sqrt{(o.o414)^2 - 4x1(-0.00414}}{2x1} = \frac{-0.0414 \pm \sqrt{0.00173 - 0.01656}}{2} = \frac{-0.0414 \pm \sqrt{0.018273}}{2} = \frac{-0.0414 + .135}{2} = \frac{.0936}{2} = 0.468$ mol L^{-1}

(the negative value of x is meaningless and hence rejected). Concentration of Cl_2 at equilibrium will be = 0.0468 mol L^{-1}

Assignment

1. According to law of mass action, the rate of reaction is directly proportional to --------

   (A) molarities of the reactants
   (B) normality of the reactants
   (C) molality of the reactants
   (D) mole fraction of the reactants

2. In a chemical equilibrium, the equilibrium constant is found to be 2.5. If the rate constant of backward reaction is 3.2 X 10^{-2}, the rate constant of forward reaction is -------

   (A) 8.2 x 10^{-2} (B) 4.0 x 10^{-2}
   (C) 3.5 x 10^{-2} (D) 7.6 x 10^{-3}

3. K_1 and K_2 are rate constants of forward and backward reactions. The equilibrium constant K of the reaction is ---------

   (A) K_1 x K_2 (B) $K_1 - K_2$
   (C) $\frac{K_1}{K_2}$ (D) $\frac{K_1+K_2}{K_1-K_2}$

4. The value K_p for the reaction H_2 (g) + I_2 (g) ↔ 2HI (g) is 50. What is the value of K_c?
   (A) 30 (B) 40 (C) 50 (D) 70

5. In which of the following reaction, the value of K_p will be equal to K_c?

(A) N_2 (g) + O_2 (g)↔ 2NO (g)
(B) PCl_5 (g) ↔ PCl_3 (g) + Cl_2 (g)
(C) $2NH_3$ (g) ↔ N_2 (g) + $3H_2$ (g)
(D) $2SO_2$ (g) + O_2 (g) ↔ $2SO_3$ (g)

6. Select the correct expression regarding the relation between K_p and K_c for the reaction:
$aX_{(g)} + bY_{(y)} \leftrightarrow bZ_{(g)} + aW_{(g)}$.

(A) $K_p = K_c (RT)^{a+b}$ (B) $K_p = \frac{K_c}{(a+b)^2}$
(C) $K_p = K_c RT$ (D) $K_p = K_c$

7. The equilibrium constant K_c for the decomposition of PCl_5 is 0.625 mol/ litre at 300°C. Then the value of K_p will be -------

(A) 29.402atm. (B) 0.0625 atm.
(C) 6.25 atm. (D) 0.00625 atm.

8. For N_2 (g) +3 H_2 (g) ↔ $2NH_3$ (g) + heat……..

(A) $K_p = K_c$ (B) $K_p = K_c$ .RT (C) $K_p = K_c (RT)^{-2}$
(D) $K_p = K_c (RT)^{-1}$

9. The unit of equilibrium constant for the reaction H_2 + I_2 ↔ 2HI is ------
(A) mol^{-1} liter (B) mol^{-2} litre (C) mol litre
(D) none

10. $\frac{K_p}{K_c}$ For the gaseous reaction-------- (a) 2A + 3B ↔ 2C (b) 2A ↔4B (c) A + B + 2C ↔ 4D would be respectively

(A) $[RT]^{-3}$, $[RT]^2$, $[RT]^0$
(B) $[RT]^{-3}$ $[RT]^{-2}$, $[RT]^{-1}$
(C) $[RT]^{-3}$, $[RT]^2$, [RT]
(D) none of the above

11. The equilibrium constant for the reaction Zn(s) + CO_2 (g) ↔ ZnO(s) + CO (g) is -------

(A) $\frac{P_{CO}}{\frac{P_{Zn}\ P_{CO\,2}}{P_{ZnO}\ P_{CO\,2}}}$ (B) $\frac{[ZnO]}{[Zn]}$ (C) $\frac{P_{ZnO}\ P_{CO}}{P_{Zn}\ P_{CO\,2}}$ (D)

12. For the reaction C (s) + CO_2 (g) ↔ 2CO (g) the partial pressure of CO_2 and CO are 2.0 and 4.0 atm. respectively at equilibrium. The K_p for the reaction is ------

(A) 0.5 (B) 4.0 (C) 8.0 (D) 32.0

13. Equilibrium concentration of HI, I_2 and H_2 is 0.7, 0.1 and 0.1 moles/litre. Calculate the equilibrium constant for the reaction: I_2 (g) + H_2 (g) ↔ 2HI (g)

(A) 0.36 (B) 36 (C) 49 (D) 0.49

14. In the reaction C_2H_4 (g) + H_2 (g) ↔ C_2H_6 (g) , the equilibrium constant can be expressed in units of ----

(A) $litre^{-1}mol^{-1}$ (B) mol^2 $litre^{-2}$ (C) litre mol^{-1}
(D) mol $litre^{-1}$

15. A two litre flask contains 1.4gm Nitrogen and 1.0 gm hydrogen. The ratio of active mass of nitrogen and hydrogen would be -------

(A) 1: 3 (B)1: 5 (C) 1.4: 1 (D) 1:10

Answers:

1. (A)	2. (A)	3. (C)	4. (C)	5. (A)	6. (D)	7. (A)	8. (C)	9. (D)	10. (A)
11. (A)	12. (C)	13. (C)	14. (C)	15. (D)					

Author is M.Sc. (Chem.), M.Ed. and Advanced Diploma in German Language (Gold Medallist). She retired as a Principal, Govt. School Haryana, has 3-1/2 years' experience in teaching Chemistry and distance teaching through lectures on Radio and Videos. She has volunteered to complement mentoring of students for Chemistry through Online Web-enabled Classes of this initiative.

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—00—

SCIENCE QUIZ : May-2019

Kumud Bala

1. Why some fibers are called synthetic?
(A) Made by humans being
(B) Obtained from plants and animals
(C) Cellulose
(D) None of these.

2. Rayon is different from synthetic fibres because ------
(A) It has a silk-like appearance
(B) It is obtained from wood pulp
(C) It's fibers can also be woven like those of natural fibres
(D) None of these.

3. Synthetic fibres are synthesized from raw material called------
(A) Petrochemicals (B) Cellulose
(C) Artificial silk (D) Wool

4. Like synthetic fibres, plastic is also a ------
(A) Polyester (B) Fiber
(B) (C) Polymer (D) polythene

5. Which of the below fibre is also called as "Artificial silk"?
(A) Nylon (B) Rayon
(C) Polymer (D) Acrylic

6. Which of the below is generally used for making parachutes and ropes for rock climbing?
(A) Nylon (B) Rayon
(C) Polyester (D) Acrylic

7. We should not wear synthetic clothes while working in the kitchen or in a laboratory because ---
(A) Synthetic clothes are very costly
(B) Stain on synthetic clothes are hard to clean/ wash
(C) If the synthetic clothes catch fire the fabric melts and sticks to the body of the person wearing it
(D) Both A and B

8. Which of the below set of fibres are example of thermoplastics?
(A) Polythene and melamine
(B) Melamine and PVC
(C) Polythene and PVC
(D) Melamine and bakelite

9. Bakelite is used in making electrical appliance because it is a -----
(A) Thermoplastics
(B) Good conductor of heat
(C) Good conductor of electricity
(D) Good insulator of electricity

10. Select the true statement from the following:
(A) Melamine is a thermoplastics where as bakelite is a thermosetting plastic
(B) Bakelite and melamine both are thermosetting plastics
(C) Bakelite and melamine both are thermoplastics
(D) Bakelite is a thermoplastic whereas melamine is a thermosetting plastics.

11. The common characteristic properties of plastics are:
(A) Durable, good conductor of electricity and non-reactive
(B) Good conductor of heat, light in weight and good conductor of electricity
(C) Durable, light in weight and non-reactive
(D) Durable, good conductor of heat and non-reactive.

12. Which of the below correctly states 4R principle?
(A) reduce, reuse, retire and recover
(B) reduce, reuse, recycle and recover
(C) release, reflect, reuse and reduce
(D) reactive, reuse, recycle and recover

13. Uniforms of firemen are made of -------- plastic to make them flame resistant.
(A) Teflon (B) Melamine
(C) Bakelite (D) PVC

14. ---------- is a special plastic on which oil and water do not stick. It is used for nonstick coating on cook wares.
(A) Teflon (B) Melamine
(C) Bakelite (D) PVC

15. ------- is a synthetic fibre used for making woolen clothes.
(A) Acrylic (B) Polyester
(C) Fiber (D) Cotton

16. Polyester is repeating units of ------
(A) Ether (B) Beads
(C) Carbon (D) Ester

17. Which of the following is non-biodegrable?

(A) Plastic (B) Cotton
(C) Paper (D) Leftover food stuff

18. Silk is obtained from ------- of the silk moth.
(A) Cocoon (B) Pupa
(C) Larva (D) Caterpillar

19. Which of the following groups contain all synthetic substances?
(A) Nylon, terylene and wool
(B) Cotton, polycot and rayon
(C) PVC, polythene and bakelite
(D) Acrylic, silk and wool.

20. The material similar to silk in appearance is -----
(A) Nylon (B) Rayon
(C) Polyester (D) Terylene

21. Polycot is obtained by mixing -------
(A) Nylon and wool (B) Polyester and wool
(C) Nylon and cotton (D) Polyester and cotton

22. The nylon was prepared first time in ------
(A) 1921 (B) 1931
(C) 1941 (D) 1951

23. The raw materials used in making nylon are------
(A) Wood pulp (B) Cellulose
(C) Coal, water and air (D) All of these

24. A synthetic fiber that works like wool is……..
(A) Nylon (B) Polyester
(C) Acrylic (D) PVC

25. --------- is the polyester which is used for making bottles, utensils and films.
(A) Nylon (B) PET
(C) Plastic (D) Leather

26. Which fiber is also known as regenerated fibre?
(A) Plastic (B) Polymer (C) Rayon (D) Acrylic

27. The fibers that are obtained from cotton, jute and silk are known as -------
(A) Man-made or synthetic fiber
(B) Natural fibers
(C) artificial fibers
(D) Plastics.

(Answers to this Science Quiz shall be provided inMonthly e-Bulletin)

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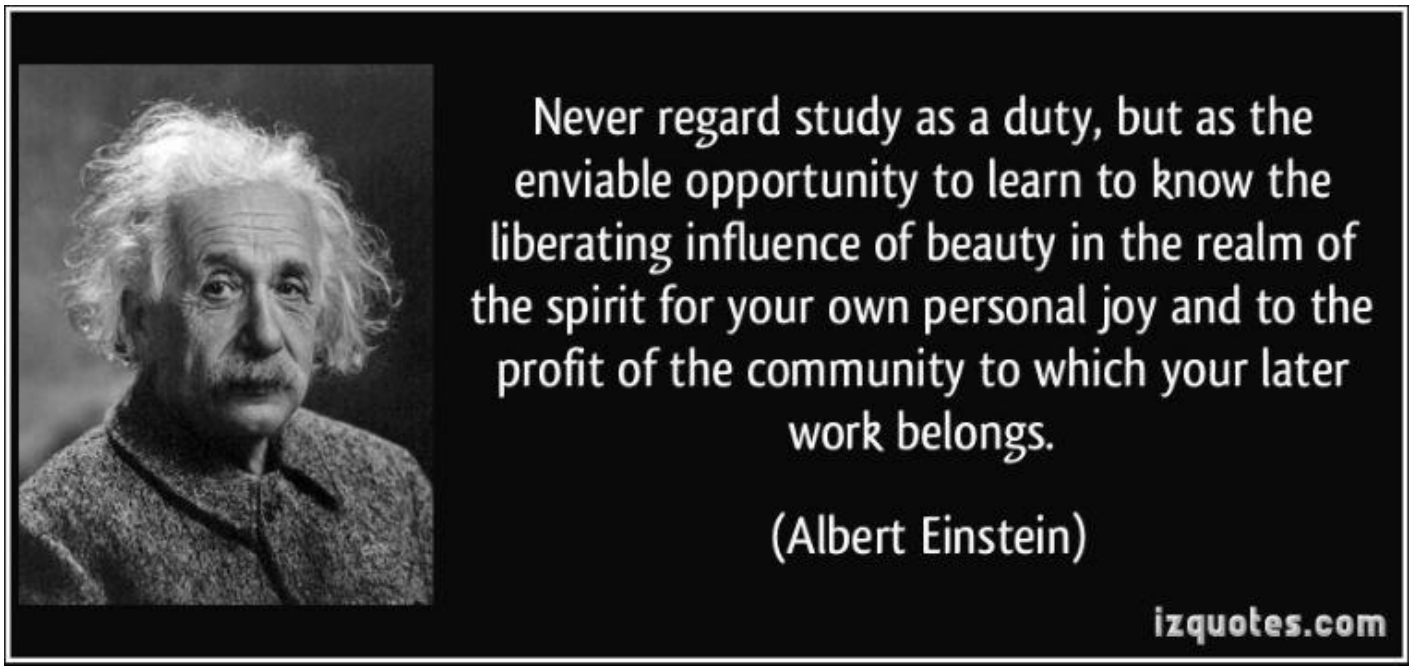

Theme Song :

**PREMISE:*We are pleased to adopt a song*" इतनी शक्ति हमें देना दाता....."*from a old Hindi Movie Do Aankhen Barah Haath दो आँखें बारह हाथ of year 1957, directed by The Late V. Shantaram. The lyrics are by Shri Bharat Vyas, singer Melody Queen Sushri Lata Mangeshkar, and Music Direction by Vasant Desai. It has become a widely accepted inspirational song and/or prayer in many educational institutions and socially inspired initiatives engaged in mentoring of unprivileged children. This newly formed non-organizational initiative, being selflessly operated by a small set ofcompassionate persons, finds its philosophy in tune with the song and conveys its gratitude to all he eminent persons who brought out the song in a manner that it has attained an epitome of popularity. While working its mission and passion, the group invites one and all to collectively complement in grooming competence to compete among unprivileged children. The song/prayer goes as under -*

इतनी शक्ति हमें देना दाता, मन का विश्वास कमजोर होना
हम चले नेक रस्ते पे हम से, भूलकर भी कोई भूल होना ||

दूर अज्ञान के हो अंधेरे, तू हमें ज्ञान की रोशनी दे
हर बुराई से बचते रहें हम, जितनी भी दे भली ज़िन्दगी दे
बैर होना किसी का किसी से, भावना मन में बदले की होना ||

इतनी शक्ति हमें देना दाता, मन का विश्वास कमजोर होना
हम चले नेक रस्ते पे हम से, भूलकर भी कोई भूल होना ||

हमना सोचें हमें क्या मिला है, हम ये सोचे किया क्या है अर्पण
फूल खुशियों के बाँटे सभी को, सबका जीवन ही बन जाए मधुबन
अपनी करुणा का जल तू बहा के, कर दे पावन हर एक मन का कोना ||

इतनी शक्ति हमें देना दाता, मन का विश्वास कमजोर होना
हम चले नेक रस्ते पे हम से, भूलकर भी कोई भूल होना ||

Together **E**ach **A**chieves **M**ore
(**TEAM**)

Every end, so also end of this e-Bulletin, is a pause for a review, before Resuming of the journey far beyond ...