

**GENERAL STUDIES**

19/8/12

Name of Candidate

AJAY LOHACH

Test Code

M-105

Schedule

Registration No.

539

Place

Time

Module

Classroom

Distance Learning

Classroom &amp; Distance Learning

**EVALUATION INDICATORS**

1. Alignment Competence
2. Context Competence
3. Content Competence
4. Language Competence
5. Introduction Competence
6. Structure - Presentation Competence
7. Conclusion Competence

**INDEX TABLE**

Q.No.	Page No.	Maximum Marks	Marks Obtained
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

Total Marks Obtained

Remarks:

Signature of Examiner

**INSTRUCTIONS:**

1. Do furnish the appropriate details in the answer sheet (viz. Name, ID Number and Test Code)  
The Candidate should fill the index table, especially for him/her.
2. In the left margin, she/he should write only question number and in the right margin, nothing should be written.
3. The page number should be coded by the candidate himself and the range of page number related to the answer of the question should be used to complete the index table.
4. All Parts of the questions should be written at one place.
5. No Supplementary sheet shall be provided by the management. So the candidate is advised to accommodate required information within the space provided.
6. The candidate need not write anything in his/her answer that derogates the dignity of an individual or an organization.
7. The candidate should respect the instructions, given by the invigilator.
8. The Examinee has to submit the answer sheet to the invigilator after completion of examination.
9. However, he/she is allowed to take away the question paper.



1.(a) Drug resistance is the resistance shown by disease causing microorganisms to drugs. The process was noticed when Penicillin was found to be ineffective against some microbial species after long successful period.

Drug resistance is of chief concern because

- \* medicines that used to be effective till now do not work any more, marking resurgence of disease
- \* Besides causing unresolved health problems, it entails additional research expenditure to ~~find out~~ discover new drugs.
- \* Drug resistance can pass from one species to another. It makes our fight against diseases even tougher.

Such resistances appear due to molecular changes in active site where our drug used to



act and block it. New changes  
can change shape of active site.  
~~see~~ Mutation also can lead to  
such changes. Further, a  
new active site altogether  
may be formed, decreasing  
importance of old site.

Permeability of cell membrane  
to drug molecules can decrease  
Transfer of resistance  
can be down the generations  
where modified resistant microbes  
multiply. Horizontal gene  
transfer ~~cell debris~~ and absorbing  
genetic material from dead resist-  
ant microbes can also do it.

India has contributed to  
growing drug resistance, as was  
seen in NDM superbug. Reason  
is indiscriminate, unprescribed  
use of drugs. ~~Disposal~~ Disposal  
rules for ~~pharmaceuticals~~ medicines are  
not enforced, and find it way  
into open environment.

To fight this menace, excess medicines must be returned to chemist, and then to pharma company which must properly dispose the medicines so that they do not contaminate environment.

Proper monitoring of drug resistance and disposal practice is needed.

Thus, India can, take lead in fighting drug resistance thus saving life of millions patients worldwide.

1.(c) Recently, researchers at CERN, Geneva announced that they have ~~suffi~~ probably discovered Higgs Boson, the 'God Particle' ~~pro~~ theorized by Peter Higgs.

Higgs boson is the key particle in Standard Model Theory of Particle Physics. Higgs boson are massless particles, which interacts with all pervasive Higgs field, to generate all different weight particles. Higgs field gives particles their weight. Higgs boson is said to have existed in fraction of a second after the Big Bang.

Using Large Hadron Collider (LHC), scientists at CERN attempted to recreate the conditions in the billionth fraction of second after Big Bang. Particles, neutrons were accelerated to near light



Speed and collided and resulting in disintegration and formation of new particles.

Using sensors like OPERA, ATLAS, CMS, these particles were detected. A small bump in graph ~~is~~ for <sup>mass of</sup> particles observed was noticed. This is believed to be <sup>indicative of</sup> Higgs Boson, with more than 95% certainty.

The experiments were repeated with different detectors, and same results were studied.

If Higgs Boson is found to exist, it will be big discovery and uphold validity of Standard Model theory. It will explain why some particles have mass, others don't. It will also hint to existence of dark matter and dark energy.

If it doesn't, scientists can look for other explanations for mass of particles.

and origin of universe  
The discovery of Higgs  
Boson, is therefore, major  
breakthrough of 21<sup>st</sup> century



2(b) West Asia has ~~has~~ been witnessing great turmoil in the past 2 years. In this scenario, India has carefully guarded ~~its~~ foreign policy to protect ~~its~~ interests.

Starting with Tunisian and Egypt revolution in 2011, India welcomed the ~~for~~ democratic revolution, and favoured a peaceful transition to democracy.

In Libya, India favoured democratic transition, but at same time, opposed foreign military intervention. It ~~called~~ stood for Libya's right to resolve internal matters on its own.

In ongoing U.S. - Iran conflict, India has reluctantly sided with USA for ~~the~~ economic sanctions against Iran. It managed to get exemptions, and continues ~~its~~ oil trade, though in limited form.

Again, in Syrian conflict, India initially supported Pres. Assad efforts for ~~peace~~ reforms to democracy. Seeing violent repression, it voted against Syria in UNSC. But has refrained from last round of voting.

India has also maintained friendly ties and defence trade with Israel.

Thus, India's approach is guided by

- \* Energy security
- \* Welfare of Indians abroad
- \* It's passion for democracy
- \* peaceful transition
- \* ~~the~~ Sovereignty of West Asian nations.
- \* friendly ties.

India has thus taken a balanced approach in ~~at~~ West Asia.

3.(b). Biotechnology is a vast emerging field that has impacted every other field of human activity.

Blue Biotechnology means applications in marine life. Using biotechnology to ~~promote~~ <sup>improve</sup> fisheries, increase fish catch, also improve nutritional value of sea food.

Green Biotechnology is application in agriculture leading to drought-resistant, fast growing, pest-resistant, more nutritious, disease-resistant crops.

White Biotechnology is its application in dairy industry. It is used to improve milk yield in animals, enhance shelf life of milk, better milk products.

Thus, Biotechnology has reached out to all other fields and



revolutionized them

3(d) Biodiversity is the diversity of species in ~~an~~ ecosystem. It shows richness of gene pool. It ~~is~~ is however, declining in recent years

Major causes for decline are -

- \* Human encroachment of wild life habitats
- \* Hunting, ~~Poe~~ poaching. ~~Example~~  
eg. - Animals like Tiger, Rhino
- \* Climate change
- \* Pollution eg. - Increasing temp. and pH of water decrease fisheries
- \* Biotechnology. New, stronger species, out compete wild species in growth.

Our attempts to conservation ~~limits~~ have yielded limited success because

- \* Protected areas are still not

Sufficient. Protection is inadequate even in these areas.

- \* Climate change and pollution is increasing at ~~the~~ unprecedented speed.
- \* ~~Not~~ Not all species are documented. In absence of documentation, protection cannot be taken.
- \* Faulty conservation approaches
- \* Pressing need for economic exploitation of species.
- \* Local communities not involved in process.

Corrective measures must be taken to bring biodiversity conservation 'back on track'

4(a)

Automation and robotics are often used interchangeably.

~~Automation means not allowing machine taking de~~

Automation means allowing machine to work without human intervention. It may

or Robotics ~~is~~ may not mean taking intelligent

decisions on its own, since Automation can be pre-programmed and limited in purpose.

Robotics is a step ahead of automation. It aims at constructing automated machines that are able to take intelligent decisions (increasing artificial decision intelligence) and more multipurpose in character.

Automation has limited interaction with environment, Robotic actively



interacts with environment through sensors, take intelligent decisions and act and sense environment again.

(b) With advance of technology various beneficial uses for waste material are found, most important being energy generation.

A common technique is incineration. Combustible material will give heat energy. However, it is polluting.

Anaerobic digestion of waste material release gases like  $CH_4$ , which can be 'more cleanly' combusted to give energy. This is applied in biogas plants.

Aerobic digestion by microbes is also used, and it is a faster process.

In cities solid waste management, landfill sites produce combustible gases on

decomposition, which are used for energy.

1.(d) IPv6 standard is new standard for <sup>assigning</sup> ~~giving~~ web addresses and is set to replace IPv4. (Internet Protocol version 4)

IPv4 problem was it was running out of web addresses following exponential rise in web ~~addresses~~ ~~pages~~. IPv6 greatly enhances this limit, and opens way for many more years.

1(e) Deep sea mining is exploration, digging and extracting of deep sea (beyond continental shelf) for ~~extracting~~ economic extraction of minerals.

- It is gaining in importance because-
- \* Most advanced countries have largely exploited their resource base, and need more resources to continue growth.
  - \* Oceans are till now unexploited, and vast in expanse.
  - \* Oceans have vast reserves of minerals.

Pelagic deposits, especially Poly Metallic Nodules (PMNS) offer great opportunity for exploitation.

Mineral fuels, shale gas and crude oil prospects are



key to future energy security

Thus, deep sea mining is growing in importance and holds key to economic growth.

5(d) Indian Space Research Organization (ISRO) is the national space agency. It has taken up various space research projects, aimed to benefit of mankind.

Major focus areas of ISRO have been :-

- \* Communication technologies through INSAT satellite system. This has fuelled telecommunication revolution in India, mobile news-gathering, ~~Direct to Home~~ Satellite TV etc.
- \* Resource mapping of country.
  - mineral mapping, forest cover, soil types, ocean bed

Study

\* ~~Hazard~~ Meteorology. - Study  
ing atmospheric conditions  
and short term and long  
term forecasts eg- Megha  
Tropiques satellite

To diversify it's field  
~~add to this~~, ISRO has  
major upcoming projects

\* Going for space exploration  
ISRO will start Mars Mission  
that will study Moon's Mars  
atmosphere and it's surface

\* Aditya satellite, will  
study coronal heating and  
effect on magnetosphere of earth.

\* Chandrayaan-II mission that  
involves rover on moon to  
study it's rocks.

\* ~~To~~ Augmenting GPS, - It plans  
to set up GAGAN through setting  
up Regional Navigation Satellite  
system, which will help reliable

and more accurate positioning

ISRO has helped country through

- \* Satellite education-Distance learning programs.
- \* Fostering Telecom-revolution
- \* Bringing e-Governance. Panchayat Villages will be given Village Resource Centers for better service delivery.
- \* Hazard prediction (Tsunamis, Cyclones)
- \* Mineral mapping of country
- \* Bringing foreign Exchange by launching foreign satellites
- \* Security of nation by spy Satellites (RISAT-2)

ISRO, has thus, major role in development of nation.

7(c) Global Burden of disease maps the disease distribution geographically and sees ~~to~~ which are the regions where a disease is concentrated



3.(c)

Government has launched a National Mission on Enhanced Energy Efficiency to ~~improve~~ answer challenges to energy security.

It's major highlights are -

- \* Replacing old technologies with more energy efficient technologies in transport, household sector, lighting etc.
- \* Replacing incandescent bulbs with energy saving CFLs
- \* Improving ~~power~~ load factor in discoms. Bringing technological reforms to boost the efficiency of power transmission.
- \* Preventing theft of power.
- \* Efficiency in power generation.  
Reducing flaring of gas.  
Setting up UMPP - Ultra Mega Power Plants which use supercritical technology.

- \* Rationalizing pricing of power to ~~being~~ reduce wastages.
- \* Using more efficient fuels (eg. Bharat Stage IV)
- \* International support, collaboration in research and technology sharing
- \* Proper building codes to save energy
- \* Awareness Campaigns and Energy Audits

Thus, it encompasses wide, comprehensive measures for energy efficiency

6(a) Central Water Commission is a proposed central regulatory body to oversee water distribution usage, and ensuring it's efficient use. It can recommend policy interventions to promote efficiency in water use

(b) Eclipse occurs when two apparently same sized body heavenly bodies pass each other. eg. - Moon and Sun

Occultation occur when a larger apparently larger heavenly body completely covers smaller body from view. eg. - Moon and distant star.

Transit when apparently smaller body ~~travels~~ travels in front of larger body eg. - Venus transit of sun.

(c) Fly ash is waste residue from coal mining of coal, other metals. It consists of microscopic particles of oxides of silicon, aluminium etc. It is totally non-organic. Also consists of harmful heavy metals like Arsenic, Cadmium. It can be used to increase



Soil fertility, permeability  
and water ~~retention~~ retention  
capacity after ensuring low levels  
of heavy metals

(d) Mars Science Laboratory  
is a Mars exploration project  
of NASA, launched in Novem-  
ber, 2011. It entered Mars  
atmosphere, and successfully  
landed Curiosity rover in  
Gale Crater in August, 2012.  
Curiosity will explore Mars  
geology, ability to sustain life

(e) Global warming Potential is the  
potential of a Green House Gas  
to ~~can~~ contribute to Green House  
effect and thus, increase global  
temperature. It is high for  
methane, nitrogen oxides, etc

(f) National Large Solar Telescope  
(NLST) is largest Telescope

in country ~~established~~. located  
near Paogong Tso Lake, Jammu &  
Kashmir. It will study sun  
atmosphere.

(b) Fuel cells ~~are use~~ produce  
energy by combustion of  $H_2$  and  
 $O_2$  to give water. These are  
used in ~~so~~ space launch vehicles  
and spacecrafts.

7(a) Ultra High Definition TV is next  
generation of TV that offers high  
quality picture and sound.

7(c) Space Solar Power is used by satellites  
and space station through  
solar panels to power them.  
~~Other~~ It depends on beta angle  
(angle between sun vector and  
orbital plane of satellite). Other  
ways of harnessing solar power  
are solar sails, ~~solar tethers~~

7(f) Space Law/Is international law that governs the space use by countries. It prohibits militarization of space. It also upholds right of country for use of space above them. Countries can lease their space to other countries. It also ~~controls~~ details management of space debris

7(g) Probiotics are dietary supplements to enhance gut flora.  
- Effects

- \* Friendly bacteria help in digestion.
- \* Prevents growth of harmful bacteria.

Side effects

- \* Acute Pancreatitis,
- \* Acidity
- \* ~~kill~~ Mass killing of harmful bacteria lead to toxin secretion
- \* If deviate away from digestion ~~and~~, track, friendly bacteria cause harm



8(b). Certified Emission Reduction unit are granted to projects under Kyoto Protocol that lead to reduction in emissions through carbon sequestration. It is used in Clean Development Mechanism (CDM) of Kyoto Protocol.

8(d) BrahMos-II is next version of India-Russia jointly developed Brahmos missile. It is ~~big~~ under development. It is hypersonic cruise missile that will be faster, more warhead capability and stealth technology than BrahMos-I.

8(e). DATE is a ~~initiative~~ <sup>technology</sup> by CSIR to track Epidemic using social media posts by over million users. It involves study of social behaviours to determine spread of epidemics.

8(g) Eutrophication is uncontrolled growth of algae due to flow of fertilizers from soil. It

increases B.O.D and decreases dissolved oxygen creating dead ~~ocean~~ zones.

8(c) IBM Sequoia is world fastest supercomputer developed by IBM. It will control security of nuclear weapons in USA. It has speed close to 1 petaflop.

9(b) Biomedical Engineering is application of biotechnology in medical science to develop pharmaceuticals study of disease causes, and their cure.

9(c) Hydraulic fracturing is fracturing of rocks under high pressure by water.

9(d) SARAL is a satellite launched by ISRO with payload ARGOS and AltiKa that will study atmosphere phenomenon.

Q.(d) Genetic testing is testing of genome to find locate cause of disease so that appropriate gene may be blocked/activated.

Q.(b) Aditya is a upcoming satellite by ISRO to be placed in low Earth Orbit to study <sup>Sun's atmosphere</sup> and <sup>impact of</sup> coronal heating on earth magnetosphere

Q.(i) Black holes are highly dense heavenly bodies that have contracted ~~shrink~~ under own gravitational field so that even light can not escape them.

Q.(k) Eco MARK is scheme by Govt. of India to label products that have been ~~manufactured~~ <sup>manufactured</sup> in eco-friendly manner

Q.(l) Hospi Rimo is ~~robot~~ <sup>robot</sup> by Japanese company that helps old people do exercises. It can speak basic ~~grammar~~ instructions.



12(a)

Interval	Frequency	More than	Less than
> 121	15	15	
116 - 120	35	50	
111 - 115	50	100	
106 - 110	60	160	
101 - 105	100	260	
96 - 100	75	335	240
91 - 95	70	405	165
86 - 90	60	465	95
81 - 85	25	490	35
< 80	10	500	10

Total frequency

(i) 25% most intelligent = 25% of 500  
= 125.

Less interval: 106 - 110.

$$110 - \left( \frac{125 - 100}{60} \right) \times 4$$

$$110 - 1.67 = 108.33$$

(ii) ~~(i)~~. 25% Least Intelligent to = 75% of 500 = ~~300~~ 125- Interval. 86-90:

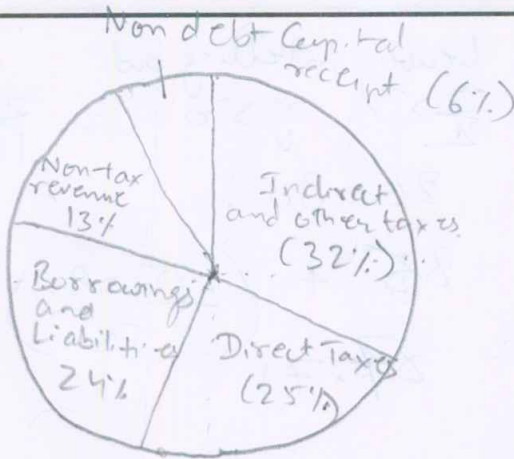
$$1Q. = -86 + \left( \frac{125-95}{70} \right) \times 4 = 87.71$$

(iii) Mode = 50% of distribution Interval: 101-105.

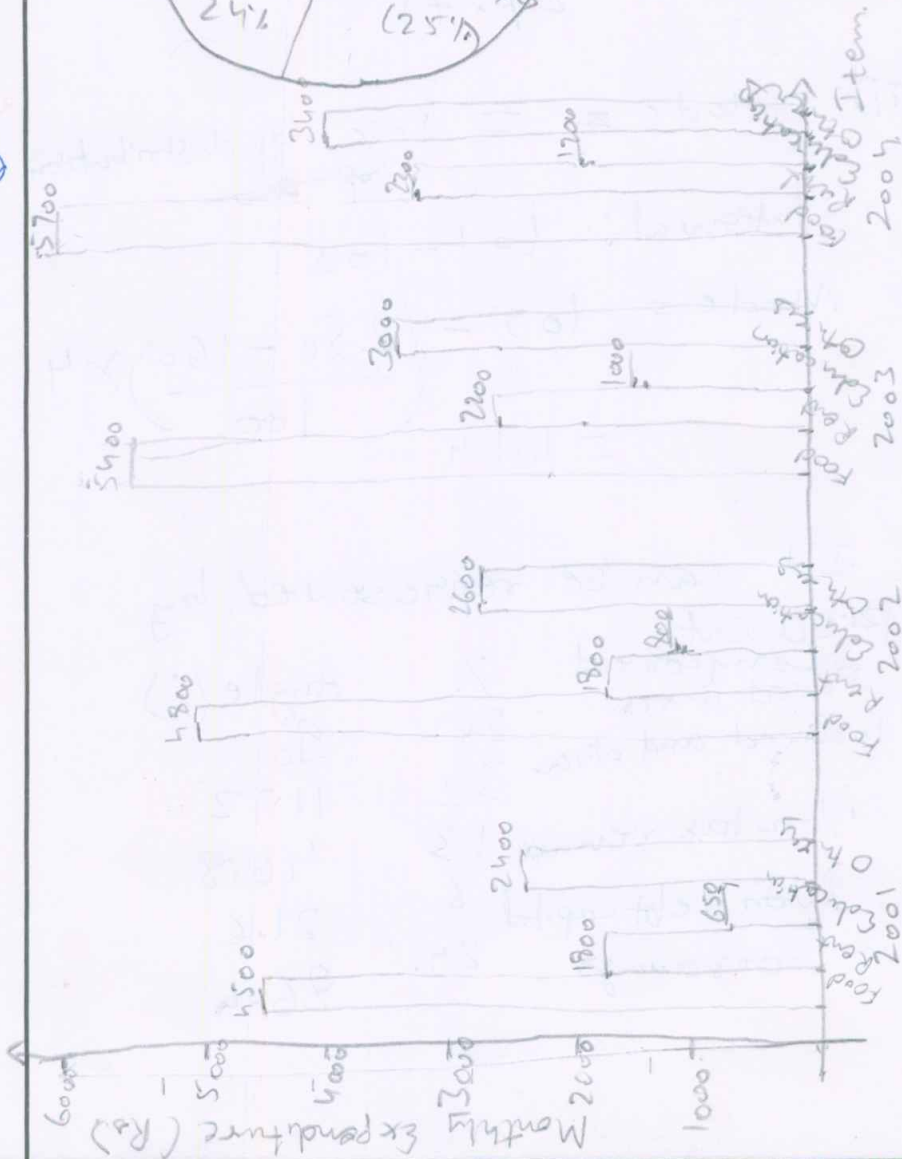
$$\text{Mode} = 105 - \left( \frac{250-160}{100} \right) \times 4 = 101.4$$

11.6) It can be represented by Pie chart.

Component	%	Angle (°)
Direct Taxes	25	90
Indirect and other	32	115.2
Non-tax revenue	13	46.8
Non debt capital	6	21.6
Borrowings	24	86.4



11 (a)





Write only  
Question  
numbers on  
this margin

(प्रश्न संख्या)

10(a) Mean is the average of a given distribution. It is affected by end values (if highly skewed, mean may deviate from centre)

Median represents the point in frequency for which 50% of frequency distribution lies above and 50% below this value ~~is~~ when arranged in increasing / decreasing order

10(b) Mode is the value in distribution having maximum frequency.

If Median = 20.6

Mode = 26

mean will be between 20.6 and 26

10(b)

5 sigma accuracy is used in regression analysis to determine accuracy of curve ~~is~~ over a distribution

It was recently in news for Higgs Boson discovery was given with probability in sigma scale

DO NOT write anything in this margin.

Examiner will give marks here

(इस हासिये में कुछ ना लिखें।)

Write only  
Question  
numbers on  
this margin  
(प्रश्न संख्या)

Quartile represent the point  
at which 25% of distribution  
lies below the value

Expenditure (Rs.)	Family frequency	f
0-10	14	14
10-20	12	26
20-30	27	53
30-40	18	71
40-50	15	86

Bottom 25% of frequency = 21.5.

This lies in range 10-20

$$\begin{aligned} \text{Quartile} &= 10 + \frac{(21.5 - 14)}{12} \times 10 \\ &= 16.25 \end{aligned}$$

DO NOT write  
anything in this  
margin.

Examiner will  
give marks here

(इस हासिये में कुछ  
ना लिखें।)