Booklet Serial No. :

Do not write anything in this box

தேர்வு : Combined Civil Services
Examination : Examination - II
[Group-II Services]
Main Written Examination

பாடம் : General Studies
Subject. : [PAPER - II]

Topic: Role and Impact of Science and technology in the development of India and Tamilnadu

Name: ACSHA

தேர்வு நாள் : 4/7/2022
Date of Examination :

Do not write anything in this box

தேர்வு : Combined Civil Services
Examination : Examination - II
[Group-II Services]
Main Written Examination

பாடம் : General Studies
Subject. : [PAPER - II]

தேர்வு நாள் :
Date of Examination :

Preliminary Register No. :

0801034108

A. Acsha

Signature of the candidate with date.

Certificate

I have issued this booklet to this candidate after verifying his / her register No., photo and signature in the hall ticket.

Signature of the Invigilator with date.

Certificate

(To be signed after the completion of the exam.)

I have struck out all the unanswered blank spaces in the question-cum-answer booklet by using black color pen which I have used for writing the answers.

Signature of the candidate with date.

அலகு -1
UNIT – I

(சிறிய அளவில் விடையளிக்கும் வினா வகை)
(Short Answer Type)

குறிப்பு : *Note :*

i) ஒவ்வொரு வினாவிற்கும் 50 **சொற்களுக்கு மிகாமல்** விடையளிக்கவும்
Answer **not exceeding 50 words** each

ii) ஒவ்வொரு வினாவிற்கும் **ஆறு மதிப்பெண்கள்**
Each Question Carries **six marks**

iii) கொடுக்கப்பட்டுள்ள **ஆறு வினாக்களுக்கும் விடையளிக்கவும்**
Answer the given **six questions.**

(6 x 6 = 36)

Q.No.	
1	நியூட்டனின் மூன்றாவது இயக்க விதியைக் குறிப்பிட்டு, இன்றைய வாழ்க்கையில் அதன் பயன்பாட்டை வழங்கவும். State Newton's Third Law of Motion and give its application in day today life.

Newton's Third Law of Motion:

It states that "for every action, there is an equal and opposite reaction".

$F_B = -F_A$ – Magnitude of object A and B are equal but opposite in direction.

APPLICATION:

1. When a person swims he pushes the water backwards (Action) and the water pushes the swimmer in the forward direction (Reaction)
2. When you fire a bullet, the gun recoils backward and the bullet moving forward.

Q.No. 2	SI அலகுகள் என்றால் என்ன? SI மற்றும் CGS அலகுக்கு இடையே ஏதேனும் 3 வித்தியாசத்தைக் குறிப்பிடுக. What is SI units? Give any 3 difference between SI and CGS Unit.

SI units :

It is based on a certain set of fundamental units from which derived units are obtained.

It is the modernised and improved form. Seven fundamental units in the SI units

DIFFERENCE BETWEEN SI AND CGS UNIT

	SI	CGS
1.	International System of Units	CGS - System / Centimetre for length Gram for mass, Second for time.
2.	SI unit of length is metre (m)	CGS of length is centimetre

Q.No. 3	சூரியக் குடும்பத்தில் உள்ள வாயுக் கோள்களை பற்றி விவரிக்கவும், மேலும் இந்தக் கோள்களில் அதிக வாயுக்கள் இருப்பதற்கான காரணங்களைக் குறிப்பிடவும். Give an account of gaseous planets in the Solar system and state the reasons for more gases in these planets.

Jupitar, Saturn, Uranus and Neptune are called the gaseous Planets in the Solar System.

Jupitar :- It is a gas giant, made up of mainly Hydrogen, helium, ammonia
- It has faint rings around it. mixture of gases

Saturn : It consists of hydrogen and helium

Uranus : It is made up of methane, which gives blueish green appearance

Neptune : It is blueish in color, which has methane

Q.No. 4	மையநோக்கு மற்றும் மையவிலக்கு விசைக்கும் இடையே உள்ள வேறுபாடு என்ன மற்றும் பூமியின் ஈர்ப்புவிசையில் அதன் தாக்கம் பற்றி விவரி. Difference between centripetal and centrifugal force and its impact on earth's gravity.

	CENTRIPETAL FORCE	CENTRIFUGAL FORCE
1	Force which acts on a body moving in a circular path and directed towards the centre	Force, arising from the body's intertia which appears to act on a body moving in a path and is directed away from the centre
2	An object under uniform circular motion experience centripetal force	It acts in a direction which is opposite to to the centripetal force

Q.No. 5	சுற்றுப்பாதையின் திசைவேகத்தை வரையறுக்கவும் மற்றும் ஒரு விண்வெளி வீரர் விண்கலத்தில் எப்படி மிதக்கிறார் என்பதனையும் விவரி Define Orbital velocity and how does an astronaut float in a space shuttle

ORBITAL VELOCITY:

The horizontal Velocity that has to be imparted to a satellite at the determined height so that it makes circular orbit around the planet called orbital velocity.

$v = \left(GM/(R+h)\right)$ where G = Gravitational constant

M – Mass of Earth R = Radius of earth, h = height

ASTRONAUT FLOAT IN A SPACE SHUTTLE:

Astronaut are not floating but falling freely due to ~~their~~ orbital velocity. Space shuttle and Astronaut has equal acceleration they are under freefall

Q.No. 6	கிட்டப்பார்வை மற்றும் தூரப் பார்வை இடையே உள்ள வேறுபாடுகளை குறிப்பிடவும் மற்றும் இந்தகுறைபாடுகளை சரிசெய்ய பயன்படுத்தப்படும் கண்ணாடி வில்லையின் வகைகள் என்ன? State the difference between Myopia and Hypermetropia and the types of lenses used to rectify it.

	Myopia	Hypermetropia
1.	Nearby objects can be seen clearly but distant Object cannot be seen clearly.	Distant Object can be seen clearly but nearby object cannot be seen clearly
2.	It occurs due to the lengthening of eye ball	Due to the shortening of eye ball
3.	It is also known as short sightedness	It is also known as long sightedness
4.	Concave lens used to rectify it	Convex lens is used

அலகு -II

UNIT - II

(சுருக்கமாக விடையளிக்கும் வினா வகை)

(Brief Answer Type)

குறிப்பு : *Note :*

i) ஒவ்வொரு வினாவிற்கும் **150 சொற்களுக்கு மிகாமல்** விடையளிக்கவும்
Answer **not exceeding 150 words** each

ii) ஒவ்வொரு வினாவிற்கும் **பன்னிரெண்டு மதிப்பெண்கள்**
Each Question Carries **twelve marks**

iii) கொடுக்கப்பட்டுள்ள **நான்கு வினாக்களுக்கு** விடையளிக்கவும்
Answer the given **four questions.**

(4 x 12 = 48)

Q.No.	
1	செயற்கைக்கோள்கள் எத்தனை வகைப்படும். தொலைத்தொடர்பு மற்றும் விண்வெளி அறிவியல் துறையில் அவற்றின் பயன்பாட்டை ஆராய்க What are the types of satellites and analyze their usage in telecommunication and the space science field

SATELLITES:

Any object in outer space that orbits another object is called Satellites.

TYPES:

There are two types :- 1) Man-Made
2) Natural Satellites.

Natural Satellites:-

- Example: Moon
- Earth's Satellite Moon. it reflects the light of the Sun
- It moves around the planets due to grarity and the centripetal force.

MAN-MADE SATELLITE:

- It is also called Artificial Satellite
- It was fully made by human beings for their essential use.

Example :- Aryabatta.

USES OF SATELLITE:

COMMUNICATION SATELLITES:-

1. They are used to transmit television, radio, internet
2. Multiple satellite used for long distance.

Weather Satellites :-

1. They are used to monitor the weather and climate of Earth
2. It enable to predict rain and dangerous storm.

Navigation Satellites:-

To determine the geographic location of aircrafts or any other objects.

GPS - Global Positing System

It works with the assistance of a satellite network.

It is used in fleet management. wildlife management etc.

FISHERIES :-

Satellite vessel monitoring system helps to identify fishing zones.

- Globally we can connect everywhere it ease the long distance communicat
- It is speedy and precise

Thus, the satellite helps in communication

Q.No. 2	மின்சார பரிமாற்றத்தில் ஏற்படும் இழப்புகளின் வகைகளை விரித்துரை மற்றும் அவை மின்சார வாரியத்தின் வருவாயை எவ்வாறு பாதிக்கிறது என்பதை விளக்குங்கள் Explain the types of Transmission losses in Electricity and how they affect the revenue to the Electricity Board.

Types of Transmission Losses :-

1. Core loss / Iron Loss
2. Copper Loss
3. Flux leakage

Core Loss :-

When transformer core is magnetized and demagnetized repeatedly by the alternating voltage applied across primary coil. due to which some energy lost

Copper loss :-

Transformer windings have electrical resistance

When electric current flows through some amount of energy lost

Flux leakage :-

Flux linkage happens when the magnetic lines of primary coil are not completely linked with secondary coil

Q.No. 3	ஜேம்ஸ் வெப் ஸ்பேஸ் டெலஸ்கோப் என்றால் என்ன, அது மற்றவற்றிலிருந்து எவ்வாறு வேறுபடுகிறது மற்றும் ஈர்ப்பிலாவெளி ஆய்வில் அதன் பயனை கூறவும் What is James Webb Space Telescope and how does it differ from others and state its application in deep space exploration

JAMES WEBB SPACE TELESCOPE: (JWST)

— It is NASA's infrared flagship observatory.

— It is an international collabration between NARSA, the European Space Agency, and the canadian Space Agency.

COMPARISON OF PREVIOUS SPACE OBSERVATORY WITH JWST:

year: 1990	2003	2009	2021
↓	↓	↓	↓
Hubble	spitzer	Herchel	JWST.

— Primary mirror diameter of JWST is 6.5 meter whereas hubble is 2.4 meter.

— JWST is used in searching of new born galaxes (13.5 billion years ago. but Hubble used in searching of young galaxies.

USES :

- It used to search for first galaxies
- Determine how galaxies are evolved.
- To observe star formation
- To measure physical and chemical properties of planetary system

Q.No. 4	அணு உலை எவ்வாறு இயங்குகிறது மற்றும் கூடங்குளம் அணுமின் நிலையம் பற்றி விரிவாக எழுதுக. How a nuclear reactor works and give a detailed account on the Kudankulam Nuclear power Plant.

NUCLEAR REACTOR :-

It is a device in which the nuclear fission reaction takes place in a self sustained and controlled manner.

The main parts of Nuclear reactors are

1) Fuel
2) Moderator
3) Control rods

Fuel :-

- The fuel is fissionable material, such as Uranium or plutonium
- Neutron is used to initiate the reaction
- Neutron source has mixture of beryllium with plutonium.

Moderators :-

- It is used to convert fast neutrons into slow neutrons
- Water, heavy water (D_2O) and graphite used as moderators.

Control Rods :-

- It is used to adjust the reaction rate

Cadmium or boron acts as control rod material.

Shielding :-

Nuclear reactor surrounded by a ~~control~~ concrete wall of thickness of about 2 to 2.5 m.

Cooling system:

To remove the heat from the reactor

Ordinary, liquid Sodium used as coolant

KUDANKULAM NUCLEAR POWER PLANT:

It was launched by Tamil Nadu govemment ~~with the help~~ coordinating with Russia.

1000 MW power generated.

Note : Answer **not exceeding 250 words** each

ii) ஒவ்வொரு வினாவிற்கும் **பதினைந்து மதிப்பெண்கள்**
Each Question Carries **fifteen marks**

(1 x 15 = 15)

Q.No.	
1	அரை கடத்தி என்றால் என்ன மற்றும் மின்னணுவியலில் அதன் பயன்பாட்டை பற்றி சுருக்கமாக எழுதுக.இந்த துறையில் ஒன்றிய அரசு சமீபத்தில் எடுத்த முயற்சிகள் என்ன மற்றும் இந்தியப் பொருளாதாரத்தில் அவை எவ்வகையான தாக்கத்தை ஏற்படுத்தும் என்பதை பகுப்பாய்வு செய்க. Brief about semiconductors and their usage in electronics. Analyse the recent initiatives taken by Union Govt. in this sector and how they will impact the Indian Economy.

SEMICONDUCTORS:-

- At very low temperature, some conductors conduct electric current without any loss.
- Resistivity value of semi conductors is from 10^{-5} to $10^{6}\ \Omega m$.
- Silicon (Si) and Germanium (Ge) are the elements used

USES :

It is used as chips.
It used in storage.