# বেসিক ইলেকট্রিসিটি

1. **What is electricity ? Basically type of electricity?**
   Ans: Flow of electron through a conductor and complete the circuit in called electricity following system.
   a) Static Electricity
   b) Dynamic Electricity

2. What is Ohms law and effect of temperature.
   Ans: Resistance is directly proportional to the voltage (v) and proportional the current if temperature is called ohms law.
   Effect of temperature: If temperature varies the resistance is varies.

3. What is a Battery and explain the main parts of battery.
   Ans: Battery is device which product the DC (Direct Current). From Chemical energy to electrical energy is called battery.
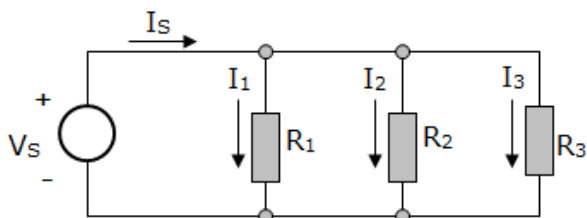   Battery are two types.
   a) Primary battery.
   b) Secondary Battery.
   Main parts of a Battery:
   a) Battery Case
   b) Copper plate
   c) Zink Plate
   d) Positive Terminal
   e) Negative terminal
   f) $H_2SO_4$
   g) Distill Water

4. Draw a parallel Circuit.



**Parallel Circuit**

$$I_S = I_1 + I_2 + I_3$$

$$= V_S/R_1 + V_S/R_2 + V_S/R_3$$

5. Find Out the current (I) in a circuit which voltage (V) = 220 Volt & Resistance (R)= 100 ohms.
   Ans: Here given: V= 220 Volt, R= 100 ohms.

We know I $= \dfrac{V}{R} = \dfrac{220}{100} = 2.2$ amp.

6. What are the main parts of a AC Generator.
   Ans: 1. Stator
   2. Rotor
   3. Rectifier Unit
   4. Main shaft

5. Bearing

6. Slip ring

7. Carbon brush

8. Supply terminal

7. What are the condition mast be follow when to generator are going to be synchronizing for parallel operation?

Ans: There are condition must be follow when to generator are going to be synchronizing for parallel operation-

a) Voltage must be same

b) Frequency must be same

c) Phase must be same


8. What are the main instrument / Item are available in the main switch board in Engine room control panel?

Ans: a) Main Circuit breaker

c) Isolation switch.

d) Distribution Switch

e) Main and Distribution fuse

f) All meters
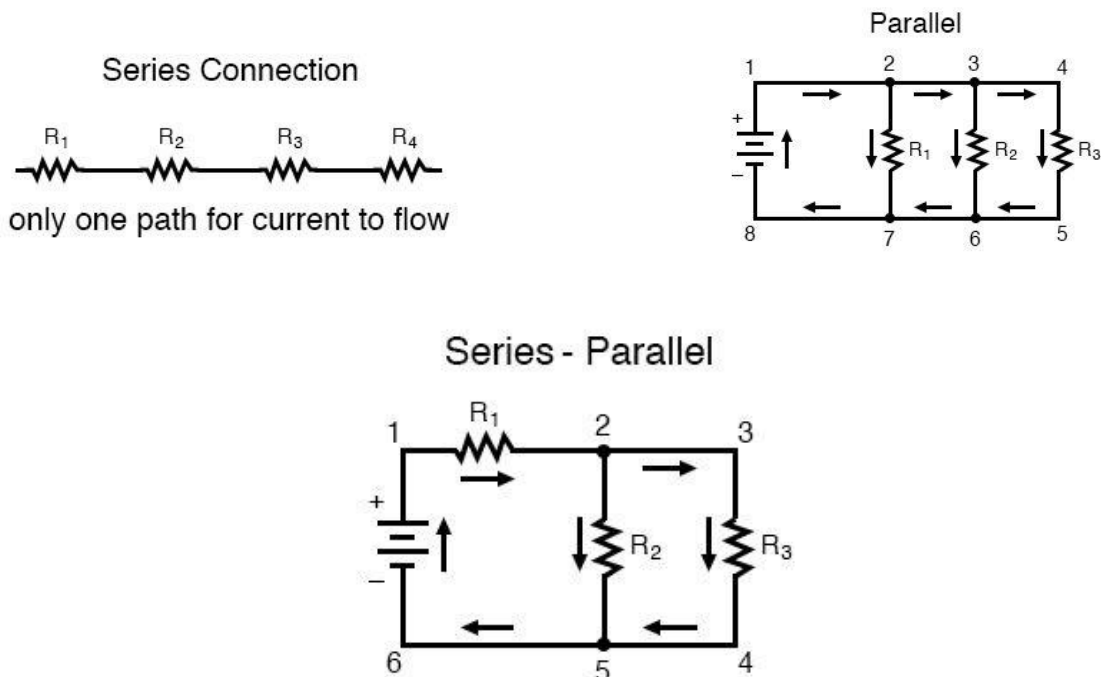
g) Automatic voltage regulator

9. What is the difference between generator and motor?

Ans: Generator is a device which convert trim mechanical energy to chemical energy and motor is a device which convert from electrical energy to mechanical energy.

10.       What are the types of electrical connection on board the vessel?
    Ans:  There are three types of electrical connection.


a) Series connection

b) Parallel connection

c) Series parallel connection



Series Connection



Parallel



Series - Parallel

# Sub: E.K. General

Q-1: What is a pump?

Ans: pump is a device by which we can transferred liquid one place to another place is called pump.

Q-2: How many types of pump?

Ans: There are two types of pump. Such as Centrifugal pump and positive displacement pump.

Q-3: Why not taken suction centrifugal pump?

Ans:  a) Impeller broken   b) Tank is empty  c) valve short down  d)strainer checked  e) Wrong direction rotation.

Q-4: Write down the centrifugal pump parts.

Ans: Pump body, impeller, shaft, bearing, water seal.

Q-5: What is compressor?

Ans: Compressor is a device by which we can developed air pressure stage by stage over water cooling storage in a bottle and some di work is called compressor.

Q-6: How many types of compressor?

Ans: There are two types of compressor. Such as L.P air compressor and H.P air compressor>

Q-7: What is function of L.P air compressor?

Ans: 1) Cleaning purpose  2) Wiper driven  3) Testing of water tight compartment 4) Painting work  5) Sand blasting.

Q-8: Which chemical used in refrigeration pleat and drier?

Ans: in refrigeration pleat used $F_{11}$ $F_{12}$ and in refrigeration drier used in silica jel.

Q-9: write down Newton Law.

Ans:  $1^{st}$ Law: If don't applied any force the fixed object will be fixed and dynamic object will be dynamic with fixed velocity forced.

$2^{nd}$ Law: The rate of change of momentum of an object is proportional to the force applied externally and momentums change in the direction in which is applied.

$3^{rd}$ Law: Every action has an equal and opposite reaction.

Q-10: Write down the Archimedes law.

Ans: If any object put in an any liquid or aerial medium then it lose some weight which is equal to the weight of that liquid or aerial medium to replace the weight.

# E.K motor

1. What is Diesel Engine and classification?

Ans- It is a device by which burn diesel fuel produce heat energy and convert mechanical energy and can do some work.

According to stroke

  a) Four stroke engine
  b) Two stroke engine

2. Write down Electric starting motor system parts.

Ans- a) Battery

  c) Fuse
  d) Push switch
  e) Relay
  f) D.C. motor
  g) Solenoid
  h) Shaft
  i) Gear

3. Write down the working cycle of a 4-stroke Diesel Engine?

Ans-

a) Suction Stroke

b) Compression stroke

c) Power stroke

d) Exhaust stroke

4. Write down the main parts of Diesel Engine.

Ans-

  a) Crank shaft.
  b) Cam shaft
  c) Cylinder liner
  d) Piston
  e) Cylinder head
  f) Fuel injection Value
  g) Inlet air value
  h) Exhaust value etc

5. What is compression ratio?

Ans- Compression Ratio= Stroke Volume + clearance volume/Clearance Volume.

6.What is tappet clearance?

Ans- At the end of compression stroke Inlet and Exhaust value close. It is the clearance in between rocker arm tip and value head.

  7. Write down Engine lubrication system parts.

  Ans-

  a) Suction fitter
  b) Lube oil pump.
  c) By pass value

d) Discharge fitter

e) Cooler

f) Cooling water

g) Lube oil supply to shaft

h) Lube oil sump

8. Write down the engine systems?

Ans-

a) Fuel oil supply system.

b) Fuel injection system.

c) Engine cooling system.

d) Lube oil supply system.

e) Air intake system.

f) Exhaust system.

# Neval Architecture

1. Write down the ship deck machinery?
   Ans-   a) Windlasses
   c) Capstans
   d) Mooring Winches
   e) Cargo Gangling cranes

2. Write down Engine room machinery?
   Ans-
   a) Main Engine one
   b) Auxiliary Engine two bilge pump.
   c) Bilge pump
   d) Sea water pump
   e)  Fire pump
   f)  Engine Cooling water pump
   g) Fuel transfer pump
   h) Hydraulice oil pump
   i)  Gear box
   j)  Propeller shaft

3. What do you understand by tonnage?
   Ans- Internal capacity of ship space.
   a) tonnage
   b) Gross tonnage
   c) Net Tonnage

4. Short Note-
   a) Draught
   b) Free board
   c) Hatches
   d) Fair lead
   e) Anchor
   f) Propeller
   g) Rudder
   h) Stern tube

# IC Engine

1. **Question:** Which devices do you check before a marine diesel engine starting?
**Answer:** Fuel tank, fuel level, Check All Important Parameters: lubrication pump, check lube oil levels and all other running pumps parameters, cooling water pressure, fuel oil temp and pressure, control and starting air pressure/ battery charging etc. to ensure that all are in the accepted range.

2 **Question:** What is turbocharger and how does it work?
**Answer**: A Turbocharger is a device fitted to a diesel engine that is designed to improve the overall efficiency and increase performance.
How to work:
Ans- A turbo is made up of two halves joined together by a shaft. On one side, hot exhaust gasses spin the turbine that is connected to another turbine which sucks air in and compresses it into the engine. This compression is what gives the engine the extra power and efficiency

3. **Question:** What is crankshaft?
**Answer** : A crankshaft is a rotating shaft which (in conjunction with the connecting rods) converts reciprocating motion of the pistons into rotational motion. Crankshafts are commonly used in internal combustion engines and consist of a series of cranks and crankpins to which the connecting rods are attached.

4. **Question**: Write down functions of piston (IC Engine).
**Answer**: Piston is a cylindrical block that moves up and down inside the internal combustion engine. the main function of the piston is to convert the heat energy produced inside engine to convert it into linear motion of the piston movement inside the engine.

5. **What do you mean by fuel timing?**
**Answer:** In a spark ignition internal combustion engine, Ignition timing refers to the timing, relative to the current piston position and crankshaft angle, of the release of a spark in the combustion chamber near the end of the compression stroke.

6. **Question:** What is tappet clearance? How much tappet clearance keep in intake & exhaust valve?
**Answer:** This is the clearance available between the rocker arm tip and valve stem when the valves are closed position when engine at cooled condition, i.e. at the compression stroke.
**How much?**
Feeler gauge 0.4 mm thick for suction valve

Feeler gauge 0.5 mm thick for exhaust valve.(depending on your engine, may be different for different engines)

7. **Question:** What do you mean by fuel and lubricant system?
Write down the definition:
**Answer:** Fuel system- The fuel system is made up of the fuel tank, pump, filter, and injectors or carburetor, and is responsible for delivering fuel to the engine as needed.

**Lubricant system**- To supply lubricating oil between the moving parts is simply termed as "lubrication". To reduce friction between the moving parts to a minimum value, thereby to reduce power loss due to friction.

8. **Question: What is valve overlap in IC Engine?**
**Answer:** Valve Overlap is the time during which both the inlet and exhaust valves remain open at the same time. Theoretically the inlet and exhaust valves, open and closes instantaneously at the dead center. This allows the exhaust gas to flow freely from the cylinder by the time the piston commences the exhaust stroke**.**

9. **Question:** How many kinds of piston and piston rings?
There are four kinds of piston- these are :
a) Crown b) Concave c) Flat d) Bevel.
And two types of piston rings, those are- a) Compression ring. B) Oil scraper ring.

10. **Question:** Write down the name of parts of a fuel injector.
**Answer**: a) Nozzle b)Nozzle valve c) cap nut d) Valve spindle e)Valve spring f) Spring cap g) Lock nut h) Adjusting screw i) Bypass screw j) High pressure pipe k) Nut l) Inlet

# বিষয়ঃ ইনল্যান্ড শিপিং অর্ডিনেন্স (আইএসও)।

**প্রশ্ন-১. কোন কোন নৌযানকে সার্ভে ও রেজিস্ট্রি করাতে হবে?**

উঃ প্রতিরক্ষা মন্ত্রণালয়ের অধীনস্থ অভ্যন্তরীণ নৌযান ব্যতীত অন্য সকল অভ্যন্তরীন নৌযান যাহা অভ্যন্তরীন নৌপথে চলে বা চলিতে চায় অথবা ব্যবহৃত হয় বা ব্যবহৃত হতে ইচ্ছুক তবে কাঠের তৈরি দেশীয় যন্ত্রচালিত নৌযান, শ্যালো ইঞ্জিনসহ যে কোন সর্বাধিক ১৬ বি.এইচ.পি ক্ষমতাসম্পন্ন ইঞ্জিন দ্বারা চালিত হয় এমন নৌযান সার্ভে ও রেজিস্ট্রি করার প্রয়োজন নেই।

**প্রশ্ন-২. সার্ভে কত প্রকার ও কি কি?**

উঃ ১. বার্ষিক সার্ভে ২. ড্রাইডকিং সার্ভে ৩. বিশেষ সার্ভে ৪. নূতন নির্মান সার্ভে ৫. প্রারম্ভিক সার্ভে ৬. রুপান্তর সার্ভে ৭. ক্ষয়ক্ষতি ও মেরামত সার্ভে ৮. অচলাবস্থায় রাখা এবং পুনঃসচলকরণ সার্ভে ৯. অনির্ধারিত সার্ভে।

**প্রশ্ন-. যোগ্যতা সনদ বলতে কি বুঝায়?**

উঃ মহাপরিচালক কর্তৃক নির্ধারিত পদ্ধতিতে পরীক্ষা গ্রহন পূর্বক অভ্যন্তরীণ নৌযানের জন্য ইনল্যান্ড ইঞ্জিনিয়ারদের, বিভিন্ন গ্রেডের মাস্টার ও ড্রাইভারদের জন্য যে সনদ ইস্যু করেন তাকে যোগ্যতার সনদ বলে।

**প্রশ্ন-৪. রেজিস্ট্রেশন সনদ বলতে কি বুঝায়?**

উঃ যখন একজন রেজিস্ট্রার কোন অভ্যন্তরীণ নৌযানের ব্যপারে তর্থ অনুসন্ধান করিয়া সন্তুষ্ট হন উক্ত নৌযানটির সবকিছুই সঠিক নিয়ম ও বিধি মোতাবেক আছে। তখন রেজিস্ট্রার ঐ জাহাজের নামে যে সনদ ইস্যু করেন তাকে রেজিস্ট্রেশন সনদ বলে।

**প্রশ্ন-৫. ডাম্ববার্জ বা যাহা নিজের শক্তি দ্বারা চলতে পারে না বা অন্যের শক্তি দ্বারা চলে বা ঠেলিয়া নেওয়া হয় এর সার্ভে সনদের মেয়াদ কত দিন?**

উঃ ইস্যুর তারিখ হতে ৪ বছর।

**প্রশ্ন-৬. শক্তিচালিত নৌযানের সার্ভে সনদের মেয়াদ কত দিন?**

উঃ ১ বছর।

**প্রশ্ন-৭. রেজিস্ট্রেশন সনদের মেয়াদ কতদিন? রেজিস্ট্রেশন সনদ কিভাবে কত বার নবায়ন করা যায়?**

উঃ ৩০ বছর। বিশেষ ডকিং সার্ভের মাধ্যমে ৫ বছরের জন্য। এভাবে ২ বার করা যায়।

**প্রশ্ন-৮. কোন কোন সময়ে নৌযাত্রা করা নিষেধ?**

উঃ একটি নৌযান নিয়ে অনেক সময় নৌযাত্রা করা যায় না।

যেমন-
- ঝড়ের সংকেত থাকা অবস্থায় ।
- রুট পারমিট, সময়সূচী, ভাড়ার তালিকা, মুদ্রিত টিকেট ছাড়া।
- সার্ভে সনদ, রেজিস্ট্রি সনদ না থাকিলে বা এর মেয়াদ না থাকিলে।
- প্রযোজ্য ক্ষেত্রে বে-ক্রসিং সনদ, টেলিকমিউনিকেশন যন্ত্রপাতি না থাকিলে।
- বিস্ফোরণ, অগ্নিকান্ড ইত্যাদি প্রতিরোধের জন্য নিরাপত্তামূলক ব্যবস্থা না থাকিল।
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**প্রশ্ন-৯. ঝড়ের সংকেত থাকা অবস্থায় নৌ যাত্রা করিলে শাস্তি কি।**

উঃ মাস্টারের ৩ বছর পর্যন্ত কারাদন্ড বা ত্রিশহাজার টাকা পর্যন্ত অর্থদন্ড অথবা উভয় দন্ড হতে পারে।

**প্রশ্ন-১০. সার্ভে সনদে উল্লেখিত যাত্রী থেকে অতিরিক্ত যাত্রী বহন করিলে শাস্তি কি?**

উঃ উপস্থিত মাস্টার বা মালিক বা মালিকের প্রতিনিধিকে অতিরিক্ত যাত্রীর জন্য তিনশত টাকা করে সর্বোচ্চ একলক্ষ টাকা পর্যন্ত জরিমানা করা যেতে পারে।

**প্রশ্ন-১১. (ক)-নাব্য নৌপথে বাধাঁর সৃষ্টি করিলে ও অনুমতি ব্যতীত বিপজ্জনক মালামাল বহন করিলে শাস্তি কি?**

উঃ কোন ব্যক্তির ১ বছর পর্যন্ত কারাদন্ড বা পচিশ হাজার টাকা পর্যন্ত অর্থদন্ড অথবা উভয় দন্ড হতে পারে।

প্রশ্ন-১২. নৌপথ দূষন করিলে শাস্তি কি?

উঃ কোন ব্যক্তির ১ বছর পর্যন্ত কারাদন্ড বা একলক্ষ টাকা পর্যন্ত অর্থদন্ড অথবা উভয় দন্ড হতে পারে এবং ক্ষতিপূরণ হিসেবে যে কোন প্রকার প্রকৃত ক্ষতি আদায় করা যাইবে।

প্রশ্ন-১৩. কোন কোন সময়ে একটি জাহাজের মালিক এবং মাষ্টার প্রত্যেকেরই ২ বছর পর্যন্ত কারাদন্ড বা ৩০,০০০/= টাকা পর্যন্ত অর্থদন্ড অথবা উভয় দন্ড হতে পারে।

উঃ বিভিন্ন সময়ে করা যেতে পারে যেমন-

- সার্ভে সনদ, রেজিস্ট্রেশন সনদ ব্যতীত নৌযাত্রা করিলে।

- মাষ্টার বা ড্রাইভার বা ইঞ্জিনিয়ার ব্যতীত নৌযাত্রা করিলে।

- রুটপারমিট, টাইমটেবিল না নিয়া নির্ধারিত রুট ব্যতীত অন্যরুটে চলিলে।

- অনুমতি ব্যতীত উপকূলীয় জলসীমায় চলাচল করিলে।

- টেলিকমিউনিকেশন যন্ত্রপাতি ব্যতীত নৌযাত্রা করিলে।

- অগ্নিকান্ড, বিস্ফোরক বা সংঘর্স ইত্যাদি প্রতিরোধের জন্য সরঞ্জাম বা যন্ত্রপাতি না রখিলে।

- বীমা বা নৌ দূর্ঘটনা ট্রাস্টফান্ড ব্যতীত নৌ যাত্রা করিলে।

# Subject: Fuel & Lubricants

1. Write down the source of Petroleum?
   Answer: Petroleum is typically found beneath the surface of the earth in accumulations known as fields. Fields can contain oil, gas, tar, water, and other substances, but oil, gas, and water are the most common. In order for a field to form, there must be some sort of structure to trap the petroleum, a seal on the trap that prohibits leakage of the petroleum, and a reservoir rock that has adequate pore space, or void space, to hold the petroleum. To find these features together in an area in which petroleum has been generated by chemical reactions affecting organic remains requires many coincidences of timing of natural processes.

2. What are the main chemical elements and it's percentage form of Petroleum?
   Answer: Petroleum includes not only crude oil, but all liquid, gaseous and solid hydrocarbons. Under surface pressure and temperature conditions, lighter hydrocarbons methane, ethane, propane and butane exist as gases, while pentane and heavier hydrocarbons are in the form of liquids or solids.

   Carbon 83 to 85%,
Hydrogen 10 to 14%,
Nitrogen 0.1 to 2%,
Oxygen 0.05 to 1.5%,
Sulphur0.05 to 6.0%,
Metals(vanadium, sodium, aluminum etc.)<0.1%

3. Write five properties of fuel oil. What is viscosity?
   Answer: Properties of fuel oil is given below,
   - Density
   - Viscosity
   - Flashpoint
   - Pourpoint
   - Water Content
   - Ash
   - Carbon Residue

   **Viscosity:** Viscosity is a physical property of fluids. It shows resistance to flow. In a simple example, water has a low viscosity, as it is "thin". Syrup and tar, on the other hand, have a high viscosity, as they are "thick". A way to test for viscosity is the speed at which the substance runs down a slope. Syrup would reach the bottom very slowly, and water would be much quicker.

# Subject: Marine Pollution

1. a) What is stand for MARPOL 73/78 and IMO ?
   Answer: MARPOL 73/78 stands for "The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978", is one of the most important international marine environmental conventions. It was developed by the International Maritime Organization with an objective to minimize pollution of the oceans and seas, including dumping, oil and air pollution.
   IMO stands for "The International Maritime Organization" is a specialized agency of the United Nations that is responsible for measures to improve the safety and security of international shipping and to prevent marine pollution from ships. The IMO sets standards for the safety and security of international shipping. It oversees every aspect of worldwide shipping regulations, including legal issues and shipping efficiency.

   b) Short note of slop tank?
   Answer: Slop tanks are present onboard tanker to store oily water mixture from cargo tank washing. The number of slop tanks depends on the Dead weight Tonnage (DWT) of the vessel. Slop tanks are the focal point of the Load-On-Top system used on crude oil tankers to prevent pollution of the sea. Design of these tanks and their operating procedures strongly affect the degree of oil-water separation achieved. Slop tanks shall be so designed, particularly in respect of the position of inlets, outlets, baffles or weirs where fitted, so as to avoid excessive turbulence and entrainment of oil or emulsion with the water.

2. Write short note about garbage and harmful substance?
   Answer:
   **Garbage:** Garbage includes all kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship. Garbage, including everyday items such as cigarette butts, plastic bags, bottles, cans and discarded fishing gear, are common causes of marine pollution.
   **Harmful Substance:** By the term harmful substance we mean those substances that are harmful for human and water living organism. There are different types of harmful substance on ship such as, harmful biological substance, harmful biological device, harmful chemical substance, harmful chemical device, harmful radioactive material, harmful radioactive device etc.

3. Write down prevention of pollution Annex II (Environment hazard) category "A" only?

Answer: Every ship of 150 gross tonnage and above certified to carry noxious liquid substances in bulk shall carry on board a shipboard marine pollution emergency plan for noxious liquid substances approved by the Administration.

prevention of pollution Annex II (Environment hazard) is given below,

- Control by Pumping, piping, unloading arrangements and slop tanks.
- Control of discharges of residues of noxious liquid substances.
- Shipboard marine pollution emergency plan for noxious liquid substances.
- Reception facilities and cargo unloading terminal arrangements.
- Categorization and listing of noxious liquid substances and other substances.
- Categorization and listing of noxious liquid substances and other substances.

# Sub: English

1. Question: **Job Application: Write a job application to the G.M. of a Private Company for the post of a Cadet Engineer.**

**Answer:**

**04 April, 2020**
General Manager
Sea Resources ltd.
Karnafuly, Chattogram.

Subject: Application for the post of **a Cadet Engineer.**

**Dear Sir**
In response to your advertisement published in The Daily Star on **25 March, 2020**, I came to know that you are going to appoint a Cadet Engineer in your reputed company. I would like to offer myself as a candidate for the post. For your kind consideration, **my curriculum vitae / resume / bio-data** and other necessary particulars are enclosed herewith.

Therefore, it would be a great pleasure if you kindly allow me to attend the interview board so that I can prove my worth for the relevant **post /position**.

Sincerely Yours
...............................

Enclosure:
1. CV / Resume / Bio-data
2. Attested photocopies of all certificates
3. 2 copies attested passport size photos

### Curriculum vitae / Resume / Bio-data

1. Name                     : Paul Hunter
2. Father's Name            : Tony David
3. Mother's Name            : Maria Lone
4. Date of Birth            : 20 January, 1995
5. Present Address          : 7/A, Court Papa, Jhenaidah
6. Permanent Address        : 7/A, Court Papa, Jhenaidah
7. Nationality              : Bangladeshi
8. Marital Status           : Unmarried
9. Contact No.              : 01779381080
10. Email                   : **paul07@gmail.com**
11. Academic Background:

| Name of Exam | Group / Department | Result | Board /University | Passing Year |
|---|---|---|---|---|
| HSC | Science | GPA- 5 (A+) | Jashore Board | 2013 |
| SSC | Science | GPA- 5 (A+) | Jashore Board | 2011 |

12. Experience: Working as a Greaser/Laskar in T.S. Siddique.
Computer   : Able to perform MS Word, MS Excel, Power Point and Internet
                Browsing.

 (Paul Hunter)
**………………**
**Signature**

2. Write a Paragraph about Tree Plantation.

# Tree plantation

Tree plantation means planting trees in large number. Nowadays it has become a social movement in our country. Trees are a great boon to us. They are related with our life and well-being. The boons and benefits derived from them are too many to count. Trees provide us shelter, food, fruits, firewood, timber and oxygen. We get vitamins from fruits. They prevent soil erosion, air pollution and floods. They also effectively prevent the spread of the desert and landslides. They are essential to maintain ecological balance and preservation of fauna. We all should plant and grow more and more trees and protect them. Social forestry should be taken on a large scale and trees should be grown all around where in space. Trees add to the beauty and quality of our life and living. We have to plant trees in every bare space of land, the sea beaches, the low –lying areas, the road sides should be brought under deforestation. We cannot think our existence without trees. People should grow more and more trees to improve our adverse situation. The result of tree plantation will be positive for human being in every sphere of life.

3. Write a paragraph about Your Self.

# Myself

My name is Mahinur Akter Monika. I am 18 years old. I live in Dhaka city. I am a student of class 10. I read in Shahajuddin Sarker Model School. My school starts at 8 am and finishes at 1 p.m. I am studying Bangla , English, Math, Social science, General science, Religion in the school. I go to school on foot and return home by rickshaw. All the teachers of my school are very friendly and helpful. I love my school very much. I live with my parents. I have one brother and one sister. They are students too. My father is a businessman. My mother is a housewife. On holidays, she cooks special dishes. She works at home. My hobby is gardening. I work in my garden in the afternoon. I enjoy cricket very much. During leisure I read novels , story books an watch T.V. I always help the poor. I teach the illiterate when I go to my village home during holidays.

4.. Parts of Speech.



**PARTS OF SPEECH**

There are eight kinds of words and they are called Parts of Speech in English:

1. **Noun**  (name of everything)  —  She is good _girl_.
2. **Pronoun**  (used in place of a noun)  —  _They_ played cricket.
3. **Verb**  (express an action or state)  —  I _eat_ an ice-cream,
4. **Adverb**  (add value to the verb)  —  She speak _loud_.
5. **Adjective**  (describing word of noun)  —  The parrot is _green_.
6. **Preposition**  (show relation with noun/pronoun)  —  The book is _on_ the table.
7. **Conjunction**  (join two words / sentences)  —  One _and_ one makes two,
8. **Interjection**  (express emotions/feelings)  —  _Wow !_ It's so beautiful,

5.. Suppose, you are Nahid/Nahida and you are a candidate of J.S.C /S.S.C /H.S.C Examination. Your friend is Salam/Salma who lives in 25, Hazi Mohsin Road, Jessore. He/She is very much interested to know about your preparation for the coming J.S.C/S.S.C/H.S.C Examination. Now, write a letter to your friend describing it.

15 Shamoli Road, Dhaka
January 30, 2020

My dear Salam,

Welcome to you. Take my sincere love. I am glad to know that you are keeping sound mind in a sound body by the grace of Almighty Allah. Yesterday I received your letter. In this letter you have wanted to know about my preparation for the coming *J.S.C/S.S.C/H.S.C* Examination. Now I am going to describe it.

Our *J.S.C/S.S.C/H.S.C* Examination is knocking at the door. It will start from November 2, 2020. You will be very glad to hear that I have prepared quite well in all subjects except Bengali 2nd papers. For Bengali 2nd paper, I am under a Bengali teacher and have been trying to recover the weakness. I hope I shall be able to recover the weakness within 2 weeks. You need not to be worry because I shall be able to do very well in the *J.S.C/ S.S.C/ H.S.C* Examination by getting G.P.A-5. Pray to Allah for my sound health and brilliant result.

No more today. I am so so. Please convey my best regards to your mother and ask her to pray my future success and love to the younger. I am waiting for your good reply.

Yours ever
Nahid

| | Stamp |
|---|---|
| From,<br><br>    Name: A<br><br>    Address: B<br><br>    Phone: C | To,<br><br>    Name: D<br><br>    Address: E<br><br>    Phone: F |

# Math

1. $x - y = 2$ এবং $xy = 24$ হলে, $x + y$ এর মান কত?

সমাধান: $(x + y)^2 = (x - y)^2 + 4xy = (2)^2 + 4 \times 24 = 4 + 96 = 100$

$\therefore x + y = \pm\sqrt{100} = \pm 10$

2. যদি $a^4 + a^2b^2 + b^4 = 3$ এবং $a^2 + ab + b^2 = 3$ হয়, তবে $a^2 + b^2$ এর মান কত?

সমাধান: $a^4 + a^2b^2 + b^4$

$= (a^2)^2 + 2a^2b^2 + (b^2)^2 - a^2b^2$

$= (a^2 + b^2)^2 - (ab)^2$

$= (a^2 + b^2 + ab)(a^2 + b^2 - ab)$

$= (a^2 + ab + b^2)(a^2 - ab + b^2)$

$\therefore 3 = 3(a^2 - ab + b^2)$ [মান বসিয়ে]

বা, $a^2 - ab + b^2 = \dfrac{3}{3} = 1$

এখন, $a^2 + ab + b^2 = 3$ এবং $a^2 - ab + b^2 = 1$

যোগ করে পাই, $2(a^2 + b^2) = 4$

বা, $a^2 + b^2 = \dfrac{4}{2} = 2$

$\therefore a^2 + b^2 = 2$

3. প্রমাণ কর যে, $(a + b)^4 - (a - b)^4 = 8ab(a^2 + b^2)$

সমাধান: $(a + b)^4 - (a - b)^4$

$= \{(a + b)^2\}^2 - \{(a - b)^2\}^2$

$= \{(a + b)^2 + (a - b)^2\}\{(a + b)^2 - (a - b)^2\}$

$= 2(a^2 + b^2) \times 4ab$ [অনুসিদ্ধান্ত ৫ এবং অনুসিদ্ধান্ত ৬ ব্যবহার করে]

$= 8ab(a^2 + b^2)$

$\therefore (a + b)^4 - (a - b)^4 = 8ab(a^2 + b^2)$

4. $a + b + c = 15$ এবং $a^2 + b^2 + c^2 = 83$ হলে, $ab + bc + ac$ এর মান কত?

সমাধান:

$2(ab + bc + ac) = (a + b + c)^2 - (a^2 + b^2 + c^2) = (15)^2 - 83 = 225 - 83 = 142$

$\therefore ab + bc + ac = \dfrac{142}{2} = 71$

5. $a + b + c = 2$ এবং $ab + bc + ac = 1$ হলে, $(a + b)^2 + (b + c)^2 + (c + a)^2$ এর মান কত?

সমাধান: $(a + b)^2 + (b + c)^2 + (c + a)^2$

$= a^2 + 2ab + b^2 + b^2 + 2bc + c^2 + c^2 + 2ca + a^2$

$= (a^2 + b^2 + c^2 + 2ab + 2bc + 2ca) + (a^2 + b^2 + c^2)$

$= (a + b + c)^2 + (a + b + c)^2 - 2(ab + bc + ca)$

$= (2)^2 + (2)^2 - 2 \times 1 = 4 + 4 - 2 = 8 - 2 = 6$

6. $(2x + 3y)(4x - 5y)$ কে দুইটি বর্গের বিয়োগফলরূপে প্রকাশ কর।

সমাধান: ধরি, $2x + 3y = a$ এবং $4x - 5y = b$

$\therefore$ প্রদত্ত রাশি $ab = \left(\dfrac{a + b}{2}\right)^2 - \left(\dfrac{a - b}{2}\right)^2$

$= \left(\dfrac{2x + 3y + 4x - 5y}{2}\right)^2 - \left(\dfrac{2x + 3y - 4x + 5y}{2}\right)^2$ [$a$ ও $b$ এর মান বসিয়ে]

$= \left(\dfrac{6x - 2y}{2}\right)^2 - \left(\dfrac{8y - 2x}{2}\right)^2 = \left\{\dfrac{2(3x - y)}{2}\right\}^2 - \left\{\dfrac{2(4y - x)}{2}\right\}^2$

$= (3x - y)^2 - (4y - x)^2$

$\therefore (2x + 3y)(4x - 5y) = (3x - y)^2 - (4y - x)^2$

7. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

প্রমাণ: $a^3 + b^3 = (a + b)^3 - 3ab(a + b)$

$= (a + b)\{(a + b)^2 - 3ab\}$

$= (a + b)(a^2 + 2ab + b^2 - 3ab)$

$= (a + b)(a^2 - ab + b^2)$

8. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

প্রমাণ: $a^3 - b^3 = (a - b)^3 + 3ab(a - b)$

$= (a - b)\{(a - b)^2 + 3ab\}$

$= (a - b)(a^2 - 2ab + b^2 + 3ab)$

$= (a - b)(a^2 + ab + b^2)$

9. $2x + 3y$ এর ঘন নির্ণয় কর।

সমাধান: $(2x + 3y)^3$

$= (2x)^3 + 3(2x)^2 \cdot 3y + 3 \cdot 2x(3y)^2 + (3y)^3$

$= 8x^3 + 3 \cdot 4x^2 \cdot 3y + 3 \cdot 2x \cdot 9y^2 + 27y^3$

$= 8x^3 + 36x^2y + 54xy^2 + 27y^3$

10. $2x - y$ এর ঘন নির্ণয় কর।

সমাধান: $(2x - y)^3$

$= (2x)^3 - 3(2x)^2 \cdot y + 3 \cdot 2x \cdot y^2 - y^3$

$= 8x^3 - 3 \cdot 4x^2 \cdot y + 3 \cdot 2x \cdot y^2 - y^3$

$= 8x^3 - 12x^2y + 6xy^2 - y^3$

11. $x = 37$ হলে, $8x^3 + 72x^2 + 216x + 216$ এর মান কত?

সমাধান: $8x^3 + 72x^2 + 216x + 216$

$= (2x)^3 + 3 \cdot (2x)^2 \cdot 6 + 3 \cdot 2x \cdot (6)^2 + (6)^3$

$= (2x + 6)^3 = (2 \times 37 + 6)^3$ [মান বসিয়ে]

$= (74 + 6)^3 = (80)^3 = 512000$

12. যদি $x - y = 8$ এবং $xy = 5$ হয়, তবে $x^3 - y^3 + 8(x + y)^2$ এর মান কত?

সমাধান: $x^3 - y^3 + 8(x + y)^2$

$= (x - y)^3 + 3xy(x - y) + 8\{(x - y)^2 + 4xy\}$

$= (8)^3 + 3 \times 5 \times 8 + 8(8^2 + 4 \times 5)$ [মান বসিয়ে]

$= 8^3 + 15 \times 8 + 8(8^2 + 4 \times 5)$

13. উৎপাদকে বিশ্লেষণ কর: ক) $8a^3 + 27b^3$ খ) $a^6 - 64$

সমাধান:

ক) $8a^3 + 27b^3 = (2a)^3 + (3b)^3$

$\quad = (2a + 3b)\{(2a)^2 - 2a \times 3b + (3b)^2\}$

$\quad = (2a + 3b)(4a^2 - 6ab + 9b^2)$

খ) $a^6 - 64 = (a^2)^3 - (4)^3 = (a^2 - 4)\{(a^2)^2 + a^2 \times 4 + (4)^2\}$

$\quad = (a^2 - 4)(a^4 + 4a^2 + 16)$

কিন্তু $a^2 - 4 = a^2 - 2^2 = (a + 2)(a - 2)$

এবং $a^4 + 4a^2 + 16 = (a^2)^2 + (4)^2 + 4a^2$

$\quad = (a^2 + 4)^2 - 2(a^2)(4) + 4a^2$

$\quad = (a^2 + 4)^2 - 4a^2$

$\quad = (a^2 + 4)^2 - (2a)^2$

$\quad = (a^2 + 4 + 2a)(a^2 + 4 - 2a)$

$\quad = (a^2 + 2a + 4)(a^2 - 2a + 4)$

$\therefore a^6 - 64 = (a + 2)(a - 2)(a^2 + 2a + 4)(a^2 - 2a + 4)$

বিকল্প নিয়ম: $a^6 - 64 = (a^3)^2 - 8^2$

$\quad = (a^3 + 8)(a^3 - 8)$

$\quad = (a^3 + 2^3)(a^3 - 2^3)$

$\quad = (a + 2)(a^2 - 2a + 4)(a - 2)(a^2 + 2a + 4)$

$\quad = (a + 2)(a - 2)(a^2 + 2a + 4)(a^2 - 2a + 4)$