Class-2

Navigational Aids

Topic: Enhanced Loran (e-Loran)

1. Describe the objective and operation principle of e-Loran system
2. Briefly describe the segments of e-Loran system
3. Enumerate the use of e-Loran in Maritime sector.

Topic: Global Positioning System (GPS)

1. Describe the Segments of Global positioning system
2. Describe how position is determined in GPS.
3. Describe how clock discrepancy between atomic clock and quartz clock is resolved in GPS receiver.
4. What is Pseudo random code. Distinguish between P code and C/A code.
5. Describe the errors of GPS.
6. Describe the limitations of GPS

Topic: Differential GPS (DGPS) including other satellite navigation systems

1. Describes the principle on which the Differential GPS works
2. Briefly describe IRNSS
3. Briefly describe QZSS
4. Briefly describe BeiDou
5. Briefly describe DORIS

Topic: Global Navigation Satellite System (GLONASS)

1. Describes the working principle of GLONASS
2. Briefly describe the segments of GLONASS

Topic: Galileo

1. Describe the working principal of Galileo
2. Describe the segments of Galileo
3. Enumerate the differences between GPS, GLONASS and Galileo

Topic: Automatic Identification System (AIS)

1. Describe the objective and working principle of AIS
2. Describe the types of information available through AIS
3. Briefly describe Class A, Class B, Synthetic and Virtual AIS
4. Describe SOTDMA protocols and its application in AIS
5. Describe the use of AIS

6. Describe the limitations of AIS
7. Briefly describe how the AIS is beneficial to OOW and VTS

Topic: Long Range Identification and Tracking (LRIT)

1. Describe the 2 aspects of LRIT
2. Describe the International Routing rules of LRIT

Topic: Integrated Navigation system (INS) and Integrated Bridge system (IBS)

1. Briefly describe the IBS and its modules
2. Briefly describe the INS and its types and modules

Topic: Voyage Data Recorder (VDR) and Simplified Voyage Data Recorder (S-VDR)

1. Describe the system architecture and working principle of VDR
2. Enumerate the difference between VDR and SVDR
3. Describe usages of VDR data.

Topic: Bridge Navigational watch alarm system (BNWAS)

1. Describe the purpose and operation modes of BNWAS
2. Describe the alarm sequence of BNWAS

Topic: Magnetic Compass

1. Briefly describe ship's permanent and induced magnetism
2. Briefly describe components of Permanent magnetism
3. Briefly describe components of induced magnetism
4. What is Coefficients. List the types of coefficients that to be compensated for ship's magnetic compass
5. Describe tentative method of compass correction
6. What is magnetic degaussing and how it is compensated.
7. Describe the various parts of a magnetic compass and their functions.
8. Briefly explain the operating principle of Transmitting Magnetic Compass (TMC)

Topic: The Principles of the gyro compass

1. Define Gyroscope and free gyroscope. Describe the properties of a free gyroscope
2. Describe apparent motion of a free gyroscope under the influence of earth rotation
3. Define: Tilt, Drift, Angle of tilt and drift, Rate of tilt and drift
4. Describe the top- heavy gravity control system
5. Describe the bottom- heavy gravity control system
6. Describe how a free gyroscope is converted to a north seeking device
7. Describe the damping in Azimuth process
8. Describe the damping in tilt system

9. Describe the damping in Azimuth system
10. Describe how a north seeking device can be converted to north settling device.
11. Describe the working principle of Fibre optic gyro and its advantage on conventional gyro compass
12. Describe the working principle of Laser ring gyro and its advantage on conventional gyro compass

Topic: Gyro compass errors and corrections

1. Describe Following gyro compass errors and compensation for the errors:
   a. Settling/damping error
   b. Latitude, course and speed error
   c. Ballastic deflection
   d. 1st rolling error
   e. 2nd rolling error
2. Outline the performance standards for gyro-compasses

Topic: RADAR and ARPA

1. Explain how ARPA gives inaccuracy due to wrong input of Course & Speed.
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3. State IMO specific requirements for a RADAR range & bearing.
4. What are the effects of Wave length?
5. How would you detect a vessel on the RADAR if it is moving?
6. In what way dose a ARPA displayed picture differs from a conventional RADAR?
7. Describe Range & Bearing Discriminations.
8. How a RADAR is used as a landfall aid ?
9. Describe with prevention procedure; the faults & limitations of ARPA.
10. Your ship is fitted with Raster system of RADAR with all knobs. How to measure Range?
11. Write short notes on : ---

i) Radar PRF	vi)	Shadow Sector
ii) Beam Width	vii)	Side lobe echoes
iii) Sub – Refraction	viii)	Indirect echoes
iv) Super – Refraction	ix)	Multiple echoes
v) Ducting	x)	Second trace echoes

12. Describe Range measurement of RADAR. What are the factors affecting Range & Bearing accuracy?
13. How you will position your RADAR scanner?

Topic : ECDIS

1. What is ECDIS? Limitation of ECDIS?

2. Explain vector and RASTER charts?

3. How ECDIS can be used in four stages of passage planning?

4. Advantage of admiralty raster charts service (ARCS)?

5. Briefly describe warning parameters of ECDIS?

6. List the IMO standards require that alarms are available on ECDIS charts?

7. What types of calculation capable to do by ECDIS?

8. How to correct electives chart?

9. Abbreviation: ARCS, ARPA, CPU, DGPS, IHO, ENC,

10. Describe MGN-285: use of risk assessment when operating ECDIS?

11. Describe the hazards of ECDIS?

12. List the ECDIS alarm & indicator?

13. Different between ENCs & RNCs on charts system?

14. When can ECDIS be considered as both primary & secondary means of Navigation? Describe how to install base CD, permit & ECDIS update? Describe the means by which above mentioned can be obtained?

Total: 84 questions