PROVISIONAL ANSWER KEY

Question1:-From whom Sri Narayana Guru came to know about the attainments of Thycaud Ayya?

    A:-Dr. Palpu

    B:-Kumaran Asan

    C:-Chattampi Swamikal

    D:-Sahodaran Ayyappan

    Correct Answer:- Option-C

Question2:-Who among the following was elected as the President of Indian National Congress in 1939 by its session at Tripura?

    A:-Subhash Chandra Bose

    B:-Surendra Nath Banerjee

    C:-Jawaharlal Nehru

    D:-Sarojini Naidu

    Correct Answer:- Option-A

Question3:-Subhash Chandra Bose organized his 'Tiger Legion' at

    A:-Singapore

    B:-China

    C:-Germany

    D:-Japan

    Correct Answer:- Option-C

Question4:-Satya Shodak Samaj was founded by

    A:-Sree Narayana Guru

    B:-Baba Amte

    C:-Kabir Das

    D:-Jyotibha Phule

    Correct Answer:- Option-D

Question5:-Debrigarh Wildlife Sanctuary is located in

    A:-Assam

    B:-Odisha

    C:-Bengal

    D:-Rajasthan

    Correct Answer:- Option-B

Question6:-In which year Savarkar organized the revolutionery organization called Abinav Bharat Society?

    A:-1904

    B:-1909

    C:-1916

    D:-1920

    Correct Answer:- Option-A

Question7:-The oldest oil field in India is located at

    A:-Bihar

    B:-U.P.

    C:-Assam

    D:-Himachal Pradesh

    Correct Answer:- Option-C

Question8:-The 12th Five Year Plan completed its term in

    A:-March 2017

    B:-March 2015

    C:-March 2013

    D:-March 2011

    Correct Answer:- Option-A

Question9:-According to Keralolpathi tradition, how many original village settlements are established in Kerala by Parashurama?

    A:-24

    B:-28

    C:-30

    D:-32

    Correct Answer:- Option-D

Question10:-The regulations made during the period of Naduvazhis in Kerala to administer the temple properties were known as

    A:-Anchuvannam

    B:-Kacham

    C:-Manigramam

    D:-Uzhiyam

    Correct Answer:- Option-B

Question11:-The terms 'Deiva Sanrorkal', 'Neeti Sanrorkal' and 'Desai Ventra Sanrorkal' are associated with

    A:-Thycaud Ayya

    B:-Vagbhatananda

    C:-Ayyankali

    D:-Vaikunda Swamikal

    Correct Answer:- Option-D

Question12:-Thycaud Ayya became a member of the _____ in Chennai, which was a congregation of scholars who discussed the matters related to spirituality.

    A:-Ashtapadana Sabha

    B:-Ashta Pradhan

    C:-Sangham

    D:-Jnanayoga

    Correct Answer:- Option-A

Question13:-Chattampi Swami's version of monism is explained in his work called

    A:-Jivitha Karunya Nirupanam

    B:-Christhumatha Saaram

    C:-Vedhadhikara Nirupanam

    D:-Advaitachintha Padhathi

    Correct Answer:- Option-D

Question14:-Which among the following works of Sri. Brahmananda Sivayogi gives an elaborate description of the eight types of yoga?

    A:-Anandopasana

    B:-Mokshapradypa

    C:-Anandadarsha

    D:-Anandavimana

    Correct Answer:- Option-B

Question15:-The 2018 Men's Hockey Champions Trophy has won by

    A:-Australia

    B:-Pakistan

    C:-India

    D:-New Zealand

    Correct Answer:- Option-A

Question16:-Kazuo Ishiguro, the Nobel Prize winner for literature of 2017 belongs to

    A:-South Korea

    B:-China

    C:-Japan

    D:-Switzerland

    Correct Answer:- Option-C

Question17:-On which occasion Sri. Narendra Modi launched the Van Dhan Scheme of Ministry of Tribal Affairs?

    A:-Ambedkar Jayanti

    B:-Mahavir Jayanti

    C:-Guru Nanak Jayanti

    D:-Makar Sankranti

    Correct Answer:- Option-A

Question18:-The brain behind the 'Chittagong Armoury Raid' was

    A:-Keshub Chandra Sen

B:-Surya Sen

C:-Ajith Singh

D:-Bhagat Singh

Correct Answer:- Option-B

Question19:-India's first Aviation Multiskill Development Centre was launched in

A:-U.P.

B:-Rajasthan

C:-Misoram

D:-Chandigarh

Correct Answer:- Option-D

Question20:-Which movies among the following was mistakenly announced as best picture in the Oscar of 2017?

A:-Hacksaw Ridge

B:-La La Land

C:-Hell or High Water

D:-Manchester by the Sea

Correct Answer:- Option-B

Question21:-The following holds true for block coefficient (C_B) of a vessel

A:-$C_B <= 1.0$

B:-$C_B > 1.0$

C:-$C_B = 1.0$

D:-None of the above

Correct Answer:- Option-A

Question22:-The girth till load water line is measured at several stations along the length of the ship. The integration of girth will give the following parameter:

A:-Midship section area

B:-Waterplane area

C:-Vessel's displacement

D:-Wetted surface area

Correct Answer:- Option-D

Question23:-The section area curve for a 8.0 m load water line is drawn. The integration of section area curve will give the following parameter for 8.0 m loadwater line:

A:-Midship section area

B:-Waterplane area

C:-Vessel's displacement

D:-Wetted surface area

Correct Answer:- Option-C

Question24:-A vessel is in the form of a triangular prism 32 m long, 8 m wide at the top and 5 m deep. KG = 3.7 m. The initial metacentric height when vessel is floating on an even keel at 4 m draft (forward and aft) is:

A:-$"GM_T" = 0.68 m$

B:-$"GM_T" = 2.69 m$

C:-$"{GM_T}" = 0.12 m$

D:-None of the above

Correct Answer:- Option-A

Question25:-A ship of 6000 metric tonnes displacement has $"KM_T" = 7.3$ m, KG = 6.7 m and is floating upright on an even keel. A weight of 60 metric tonnes already on board is shifted 12.0 m transversely. The resultant list will be

A:-16.89°

B:-11.31°

C:-2.56°

D:-None of the above

Correct Answer:- Option-B

Question26:-A ship 120 metres long at the waterline has equidistantly spaced half ordinates commencing from forward as follows: 0, 3.7, 5.9, 7.6, 7.5, 4.6, 0.1 meters, respectively. The area of the waterline and the TPC (Tonnes Per cm Immersion) at this draft are:

A:-12.37 $"m^2"$, 1207 Metric Tonnes

B:-1207 $"m^2"$, 12.37 Metric Tonnes

C:-25.25 $"m^2"$, 1806 Metric Tonnes

D:-None of the above

Correct Answer:- Option-B

Question27:-Simpson's $\{3h\}/8(y_1+3y_2+3y_3+y_4)$ integration rule assumes that the equation of the curve is of the form:

A:-`a_0+a_1x+a_2x^2+a_3x^3`

B:-`a_0+a_1x+a_2x^2`

C:-`a_0+a_1x`

D:-None of the above

Correct Answer:- Option-A

Question28:-The following relation holds true:

A:-Reynolds number = Inertial force / Viscous force

B:-Froude number = `{V * L}/nu`

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-A

Question29:-The following relation holds true:

A:-`"(Froude number)^2"` = Inertial force / Gravity force

B:-Froude number = `V/ {sqrt (g * L)}`

C:-Froude number = Inertial force / Gravity force

D:-(1) and (2)

Correct Answer:- Option-D

Question30:-The following is true of a truss structure:

A:-The structural members only take axial force

B:-The moment at the pin joints = 0

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-C

Question31:-It is desired to apply high tensile steel to ship structure to reduce lightship weight and increase longitudinal strength. The preferable locations where the high tensile steel shall be used in midship section is:

A:-Deck structure (away from neutral axis)

B:-Bottom structure (away from neutral axis)

C:-Near the neutral axis

D:-(1) and (2)

Correct Answer:- Option-D

Question32:-A rectangular barge is floating in water in even keel. Two objects, each of them of mass m, are shifted away from midship towards the forward and aft end of the barge. There is no change in draft and trim of the vessel. The bending moment acting on the vessel will:

A:-Increase

B:-Decrease

C:-Insufficient information

D:-None of the above

Correct Answer:- Option-C

Question33:-In a LNG tanker spherical shaped independent cargo tanks are provided. Will the independent cargo tank's scantlings contribute to midship section modulus of the LNG carrier?

A:-Yes

B:-No

C:-Insufficient information

D:-None of the above

Correct Answer:- Option-B

Question34:-The following holds true for Type A and Type B freeboard in the context of load line regulations.

A:-Type A: Oil tanker, Type B: Container carrier

B:-Type A: Oil tanker, Type B: Bulk carrier

C:-Type A: Bulk carrier, Type B: Oil tanker

D:-(1) and (2)

Correct Answer:- Option-D

Question35:-All transverse and longitudinal bulkheads (water tight and oil tight) used for subdivision of the ship extend until this deck

A:-Bulkhead deck

B:-Freeboard deck

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-C

Question36:-The term "Floodable length" is used in the context of:

A:-Ballast tank capacity

B:-Cargo capacity

C:-Intact stability

D:-Damage stability

Correct Answer:- Option-D

Question37:-The purpose of slop tank in an oil tanker is:

A:-To store oil and water mixture after crude oil washing of the cargo tank

B:-To store fresh water for drinking purpose

C:-To store diesel oil for onboard consumption

D:-None of the above

Correct Answer:- Option-A

Question38:-A vessel's "minimum bow height" requirement is greater than the "freeboard". The vessel's operating requirements does not permit it to have sheer. What alternative design option is available for complying with loadline regulation?

A:-Provide a forecastle

B:-Increase the vessel's depth

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-C

Question39:-The damage stability computation of a loaded oil tanker considers the following aspects:

A:-Oil pollution

B:-Cargo permeability

C:-Oil shall be assumed to drain out of the damaged cargo tanks

D:-(1), (2) and (3)

Correct Answer:- Option-D

Question40:-For a loaded double hull oil tanker, a damage situation where oil will not be released out in the sea.

A:-Only breach of outer hull

B:-Not possible. All damage cases result in oil outflow

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-A

Question41:-The following is correct for Type A, Type B and Type C independent tanks in the context of liquefied gas carriers:

A:-Type A: LPG carrier, Type B: LNG carrier, Type C: Pressure vessel

B:-Type A: Pressure vessel, Type B: LPG carrier, Type C: LNG carrier

C:-Type A: LNG carrier, Type B: LPG carrier, Type C: Pressure vessel

D:-None of the above

Correct Answer:- Option-A

Question42:-A pure car carrier has a weather tight foldable closing ramp installed on the side shell at the aft. The lowermost opening of the ramp will be above which deck?

A:-Bulkhead deck

B:-Freeboard deck

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-C

Question43:-For which type of ship the concept of "alternate hold loading" is employed?

A:-Bulk carrier

B:-Passenger ship

C:-Tug

D:-None of the above

Correct Answer:- Option-A

Question44:-What is sloshing? For which ship type this phenomenon is critical?

A:-Random and free motion of liquid inside tank. Oil tanker.

B:-Random and free motion of bulk grain inside cargo hold. Bulk carrier.

C:-Random and free motion of liquidified gas inside tank. Gas carrier.

D:-(1) and (3)

Correct Answer:- Option-D

Question45:-The inert gas is mandatorily used onboard the following ship types:

A:-Container carrier

B:-Oil tanker and gas carrier

C:-Passenger ships

D:-Tugs

Correct Answer:- Option-B

Question46:-The term "angle of repose" is relevant for which ship type and which ship structure?

A:-Bulk carrier. Top side hopper tanks

B:-Bulk carrier. Tank top plate

C:-Oil tanker. Side shell plating

D:-Container ship. Engine room bulkhead

Correct Answer:- Option-A

Question47:-The terms "skew" and "rake" are used in the design of following item

A:-Tumblehome

B:-Sheer strake

C:-Bulbous bow

D:-Propeller

Correct Answer:- Option-D

Question48:-Name the two gases whose emissions are restricted from the ship as per MARPOL regulation.

A:-$"NO\_X, SO\_X"$

B:- $"N\_2"$ and $"H\_2"$

C:-$"N\_2"$ and $"O\_2"$

D:-None of the above

Correct Answer:- Option-A

Question49:-Grain stability rules are applicable for the following:

A:-While loading containers in a container ship

B:-While loading containers in a bulk carrier

C:-While loading bulk grain in a bulk carrier

D:-Passenger ship

Correct Answer:- Option-C

Question50:-The following requirements shall be satisfied by damaged GZ curve of a passenger ship.

A:-Minimum area under damaged GZ curve

B:-Maximum permissible list after damage

C:-Minimum required range of damaged GZ curve

D:-(1), (2) and (3)

Correct Answer:- Option-D

Question51:-The criterion of service numeral $"(C\_S)"$ for passenger ship is computed as $"C\_S" = 72 \ \{(M+2P)\}/\{V\}$. What will be the value of P if all the passenger cabins are above the bulkhead deck?

A:-0

B:-1

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-A

Question52:-A vessel has draft lines corresponding to Tropical (T): 23.96 m, Summer (S): 24.48 m, Winter (W): 25 m. If all the numeral values are correct, the following may be the correct draft combination:

A:-T: 23.96 m, S: 24.48 m, W: 25 m

B:-T: 25 m, S: 24.48 m, W: 23.96 m

C:-W: 25 m, T: 24.48 m, S: 23.96 m

D:-None of the above

Correct Answer:- Option-B

Question53:-A passenger ship has loadline draft corresponding to two different criterion of service, $"C\_1"$: 8.5 m, $"C\_2"$: 7.8 m. The ship is loaded to its maximum permissible drafts at following two loading condition (a) 1200 passengers, 500 MT cargo, (b) 750 passengers, 550 MT cargo. Pair the drafts $"C\_1"$ and $"C\_2"$ with loading conditions (a) and (b).

A:-$"C\_1"$: 1200 passengers, 500 MT cargo; $"C\_2"$: 750 passengers, 550 MT cargo

B:-$"C\_1"$: 750 passengers, 550 MT cargo; $"C\_2"$: 1200 passengers, 500 MT cargo

C:-$"C\_1"$: 750 passengers, 500 MT cargo; $"C\_2"$: 1200 passengers, 550 MT cargo

D:-None of the above

Correct Answer:- Option-C

Question54:-A vessel has a beam: 60 m, depth: 30 m and draft: 24 m. The double hull water ballast tank is 3.0 m wide on the side. A straight air pipe is at a height of 800 mm from the main deck. The air pipe permits water to enter tank when submerged. What will be the minimum down flooding angle for the vessel?

A:-50.19°

B:-42.35°

C:-4.56°

D:-14.13°

Correct Answer:- Option-D

Question55:-As per gas carrier ship regulation, the probability of exceeding permissible stress limit $<10^{-8}$ for acceptable structural design. The permissible stress for mild steel is $235 N/mm^2$. There are two structural designs. In
(a) Probability (stress $>= 245 N/mm^2) = 10^{-7.8}$, and in
(b) Probability (stress $>= 235 N/mm^2) = 10^{-9.2}$.
Which one of the design is acceptable?

A:-Only (b)

B:-None of (a) and (b)

C:-Both (a) and (b)

D:-Only (a)

Correct Answer:- Option-A

Question56:-The fatigue load needs to be estimated corresponding to 10^8 wave encounters through the operating life of a ship. For shipbuilding steel, the S-N curve (variation of maximum permissible stress amplitude against number of load cycles) characteristics shall be available till:

A:-Number of cycles: 10^{12}

B:-Number of cycles: 10^4

C:-Number of cycles: 10^6

D:-Number of cycles: 10^8

Correct Answer:- Option-D

Question57:-A liquid hydrogen carrier is designed for 500 thermal cycles during its service life. 5% of the thermal cycles, correspond to cargo temperature to 45°C and the balance correspond to cargo temperature to -100°C. Cargo (Liquid hydrogen) temperature -253°C. 45°C and -100°C temperatures may correspond to which operating conditions:

A:-45°C: Drydocking and -100°C: Ballast voyage, -253°C: loaded voyage

B:-45°C: Ballast voyage and -100°C: Drydocking, -253°C: loaded voyage

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-A

Question58:-A floating LNG terminal is designed to be permanently moored off the Nigerian coast. The probability of occurrence of the waves (H_s (m, significant wave height)/ T_p (sec, mean wave period)/p (probability)) are (a) 6.3 / 8 / 0.05 (b) 9.3 / 10 / 0.05 (c) 6.5 / 12 / 0.1 (d) 5.5 / 16 / 0.2 (e) 7.4 / 16 / 0.05 (f) 11.6 / 16 / 0.05 (g) 1 / 12 / 0.25 (h) 2 / 12 / 0.25. The design criteria is, probability (stress level > 235 N/mm^2) $<10^{-8}$. Bending stress on the structure is estimated by numerical simulation using random wave for each one of the above wave condition. The random wave is generated using the wave spectrum suitable for the geographical region. The probabilities (stress level $> 235 N/mm^2$) are estimated as $p_1, p_2, p_3, p_5, p_6, p_4 = p_7 = p_8 = 0$. Write the mathematical expression (inequality) involving $p_1 … p_8$.

A:-$p_1 + p_2 + p_3 + p_5 + p_6 < 10^{-8}$

B:-$p_1 + p_2 + p_3 + p_5 + p_6 > 10^{-8}$

C:-$p_1 * p_2 * p_3 * p_5 * p_6 > 10^{-8}$

D:-None of the above

Correct Answer:- Option-A

Question59:-An offshore supply vessel has very low freeboard in its working deck and a buoyant superstructure at the forward. The working deck gets immersed in water for low heel angles. The GZ curve is computed with "free to sink and trim" and "fixed trim" condition. Which one of the GZ curve you will use for the designing the vessel?

A:-(2), (3) and (4)

B:-Both GZ curves will be same

C:-GZ curve computed with "fixed trim"

D:-GZ curve computed with "free to sink and trim"

Correct Answer:- Option-D

Question60:-As per gas carrier ship regulation, the empty independent tanks must be designed to endure antifloating arrangement. Antifloating arrangement means:

A:-Buoyant force on independent tank > Weight of independent tank

B:-Buoyant force on independent tank < Weight of independent tank

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-A

Question61:-As per MARPOL Crude Oil washing system needs to be provided for the following ship type:

A:-Oil tanker

B:-Container ship

C:-Tug

D:-None of the above

Correct Answer:- Option-A

Question62:-As per MARPOL, for bottom damage, independent calculations for mean outflow shall be done for 0 m and -2.5 m tide conditions. They are combined as follows: `"O_{MB} = 0.7 O_{MB(0)} + 0.3 O_{MB(2.5)}"`. Where: `"O_{MB(0)}"` = mean outflow for 0 m tide condition; and `"O_{MB(2.5)}"` = mean outflow for -2.5 m tide condition, in `"m^3"`. Oil outflow will be more for "0 m" or " -2.5 m" condition?

    A:-0 m

    B:--2.5 m

    C:-(1) and (2)

    D:-None of the above

    Correct Answer:- Option-B

Question63:-A double hull bulk carrier has 7 cargo holds. The vessel's beam is 42.0 m. The width of each side wing tank is 2.5 m. There is no centerline bulkhead in the cargo hold. The probability of side damage occurring between the transverse bulkheads bounding no. 2 space is 0.1266. The following will hold true:

    A:-Insufficient information

    B:-Damage probability (cargo hold) > 0.1266
Damage probability (cargo hold) = Damage probability (wing tank)

    C:-(2) and (4)

    D:-Damage probability (cargo hold) < 0.1266
Damage probability (cargo hold) > Damage probability (wing tank)

    Correct Answer:- Option-D

Question64:-The steering gear can turn a rudder from -35° to +30° in 28 seconds. During Zigzag test (20°/20°) the time taken for moving rudder from -20° to +20° will be _____ secs.

    A:-17.23

    B:-21.32

    C:-14.56

    D:-None of the above

    Correct Answer:- Option-A

Question65:-During a 20°/20° Zigzag test, the ship's initial heading angle was 150°. The first -20° rudder angle command would be executed when the ship's heading angle was _____.

    A:-170°

    B:-130°

    C:--170°

    D:-None of the above

    Correct Answer:- Option-A

Question66:-During a -10° / -10° Zigzag test, the ship's initial heading angle was 135°. The first +10° rudder angle command would have been given when the ship's heading angle was _____.

    A:-115°

    B:-155°

    C:-135°

    D:-125°

    Correct Answer:- Option-D

Question67:-For Q. 47 & 48. A ship's `"L_{bp}"` = 350.0 m. As per IMO regulations, during a turning circle test, the tactical diameter `<=` `"5.0 * L_{bp}"` and advance `<=` `"4.5 * L_{bp}"` .

Q.47 : During a port turning circle test, the ship's initial heading angle was 180°. The maximum permissible transverse displacement of the ship (from its initial position) when its heading angle first becomes _____ (degrees) will be _____ (meters).

    A:-0°, 1750

    B:-32°, 700

    C:-156°, 1050

    D:-180°, 1575

    Correct Answer:- Option-A

Question68:-During a starboard turning circle test, the ship's initial heading angle was 90°. The maximum permissible longitudinal displacement of the ship (from its initial position) when its heading angle first becomes _____ (degrees) will be _____ (meters).

    A:-270°, 1750

    B:-135°, 350

    C:-90°, 1575

    D:-180°, 1575

    Correct Answer:- Option-D

Question69:-During a starboard turning circle test, the ship's initial heading angle was 270°. The transverse displacement of the ship (from its initial position) when its heading angle first becomes _____ (degrees) is called _____.

A:-0°, Transfer

B:-270°, Tactical diameter

C:-(1) and (2)

D:-None of the above

Correct Answer:- Option-A

Question70:-Inside a LNG cargo ship tank due to heat ingress the cargo density variation is present. This induces a convective flow in Z direction. In which of the following motions Coriolis acceleration will act on the fluid: roll, pitch and yaw.

A:-Roll and Pitch

B:-Roll and Yaw

C:-Yaw and Pitch

D:-(1), (2), (3)

Correct Answer:- Option-A

Question71:-A fighter jet is speeding on the flight deck of an aircraft carrier (in X axis direction of the ship) at a constant speed of 150 km/hour. The ship is steadily yawing to port side at 5°/sec. the magnitude of Coriolis acceleration acting on the fighter jet. Please ignore all other dynamical effects.

A:-7.272 `"m/s^2"`

B:-9.8 `"m/s^2"`

C:-7.8 `"m/s"`

D:-None of the above

Correct Answer:- Option-A

Question72:-Time derivative of unit vector in rotating coordinate system will be _____.

A:-`doti = omega xx i`

B:-`dotk = omega xx k`

C:-`dotj = omega xx j`

D:-All of the above

Correct Answer:- Option-D

Question73:-The Euler angles used in ship dynamics are orthogonal.

A:-Commutative and orthogonal

B:-No

C:-Yes

D:-None of the above

Correct Answer:- Option-B

Question74:-During a sway harmonic test, 3 complete oscillation cycles are required. The carriage is towed at a steady forward speed of 4.0 m/s. The time period of one complete sway oscillation is 10 sec. The minimum tank length required will be _____ m.

A:-40

B:-120

C:-80

D:-None of the above

Correct Answer:- Option-B

Question75:-In the 6 DoF motion of the ship, which degrees of freedom have the stiffness or restoring term present?

A:-Roll

B:-Pitch

C:-Heave

D:-(1), (2) and (3)

Correct Answer:- Option-D

Question76:-The following procedure will be followed during crash stop maneuver execution in a ship fitted with (i) fixed pitch propeller (ii) controllable pitch propeller.

A:-(i) Stop and reverse main engine
(ii) Only reverse the propeller pitch

B:-(i) Stop and reverse main engine
(ii) Stop and reverse main engine, thereafter reverse the propeller pitch

C:-(i) Give full ahead rpm
(ii) Give full ahead rpm

D:-None of the above

Correct Answer:- Option-A

Question77:-The following parameters are measured during crash stop maneuver execution in a ship

A:-Stopping Ability

B:-Head Reach

C:-Track Reach

D:-All of the above

Correct Answer:- Option-D

Question78:-The instrument used for measuring heading angle and which does not depend on Earth's magnetic field is called _____.

    A:-Gyrocompass

    B:-Magnetic compass

    C:-Tachometer

    D:-Speedometer

    Correct Answer:- Option-A

Question79:-The yaw motion equation for 6 DoF motion is expressed as follows. The terms I_{zx}, I_{zy}, I_{xy} are part of:

I_{zz} dotr $+I_{zx}$ (dotp-rq) $+ I_{zy}$ (dotq + rp) $+I_{xy}$ (p^2-q^2) +

$(I_{yy} - I_{text\{xx\}})$ pq+ mx_G (dotv+ur-wp) = N

    A:-Inertia tensor

    B:-Inertia matrix

    C:-Mass matrix

    D:-(1) and (2)

    Correct Answer:- Option-D

Question80:-The 3 DoF motion equation of surface ship is given below :

$m [dotu-vr-x_{G} r^2] = -A_{11}$ dotu $+X_{text\{uu\}}$ u^2 $+a\_3$ v^2 $+a\_7$ r^2 $+a\_9$ vr+X_P+X_R

$m [dotv +ur-x\_G$ dotr] =

$-A_{22}$ dotv $- A_{26}$ dotr $- A_{11}$ur+b_1v+b_3r+b_{13}v^2r+b_{15} vr^2 $+ b_{26}$ v^3 $+b_{28}$r^3 +Y_P+Y_R

I_{zz} dotr =

$-A_{62}$ dotv $- A_{66}$ dotr $- (A_{22} - A_{11})$ uv $- A_{26}$ ur + f_1 v + f_3 r + f_{13} v^2 r +f_{15} vr^2 + f_{26} v^3 + f_{28} r^3 + N_P + N_R

It is a _____ differential equation.

    A:-Coupled and linear

    B:-Partial

    C:-Coupled and non linear

    D:-None of the above

    Correct Answer:- Option-C

Question81:-The sway + yaw coupled oscillation motion equation and PD autopilot equation at steady forward speed for a ship is given below. When expressed in the state space form $Adotx=Bx+Cz$, the size of A matrix will be:

$[[(m'-Y'_{dotv\}), Y],[-(N'_{dotv\}-m'x'_{CG\}), (I'\_Z-N'_{dotr\})]]$ $((dotv'),(dotr'))$ = $[[(Y'_v), Y'],[(N'_v),m']]$$((v'),(r'))$ + $((Y'_{delta\} delta\_R),(N'_{delta\} delta\_R))$

T'_E dotdelta' = K'_P (psi_d - psi) - T'_D(r') - delta_R

    A:-$4 xx 4$

    B:-No

    C:-Sway

    D:-(1) and (2)

    Correct Answer:- Option-A

Question82:-Explain why a conventional merchant ship heels when the rudder angle is given. Does the direction of heel angle change as the ship's sway + yaw dynamics build up?

    A:-Roll moment is induced because rudder is offset from ship's vertical centre of gravity. Yes

    B:-Pitch moment is induced because rudder is offset from ship's vertical centre of gravity. No

    C:-Incorrect statement

    D:-(1) and (2)

    Correct Answer:- Option-A

Question83:-For a moving ship rudder is more effective at the _____ of a ship.

    A:-Forward

    B:-Pitch

    C:-Aft

    D:-(1) and (2)

    Correct Answer:- Option-C

Question84:-During a sway harmonic test, the hydrodynamic sway force and the ship speed are measured. Assume sway force and sway motion as $Y_H = Y_{\dot{v}}$ `*` $\dot{v} + Y_v$ `*` $v + Y_{\text{vvv}}$ `*` $(v)^3$ and y (in meters) $= A$ `*` $\sin(\{2\pi\}/\{T\} t)$ respectively. The carriage moves ahead at uniform speed u during the test. To determine $Y_{\dot{v}}$, Y_v and Y_{vvv} following analysis is required:

A:-Conformal mapping

B:-Impulse response analysis

C:-Broaching

D:-Fourier analysis

Correct Answer:- Option-D

Question85:-The sway + yaw coupled oscillation at steady forward speed is given below.

$[[(m'-Y'_{\dot{v}}),m'],[-(N'_{\dot{v}}-m'x'_{CG}),(I'_Z-N'_{\dot{r}})]]$ `((dotv'),(dotr'))` $+[[(-Y'_v),-Y],[-(N'_v),-(N'_r-m'x'_{CG})]]$ `((v'),(r'))` $= ((Y'_{\delta} \delta_R),(N'_{\delta} \delta_R))$

A:-The equation is linear

B:-The equation is nonlinear

C:-The equation is coupled

D:-(1) and (3)

Correct Answer:- Option-D

Question86:-For the ship rolling motion equation: $(I'_{\text{xx}}+A'_{44}) \ddot{\phi}' + b'_{44} \dot{\phi}' + C'_{44}\phi = 0$

A:-A'_{44} :Added mass moment of inertia in the roll axis direction

B:-b'_{44} : roll damping

C:-C'_{44} : Restoring moment coefficient

D:-(1), (2) and (3)

Correct Answer:- Option-D

Question87:-To transform the body fixed dynamics of a surface ship u, v and r (surge speed, sway speed and yawing rate) to the NED (North East Down) coordinate system the following parameter is required.

A:-Roll angle

B:-Pitch angle

C:-Heading angle

D:-None of the above

Correct Answer:- Option-C

Question88:-Determine the inertia tensor (matrix) about the coordinate centre for a unit which consists of two small particles, each of mass m, connected by the light but rigid slender rods. Each one of the particle is attached at the forward and aft end of the rod at a distance of $(l, 0, 0)$ m and $(-l, 0, 0)$ m from the coordinate centre.

A:-$([0,0,0],[0,2ml^2,0],[0,0,2ml^2])$

B:-$([2ml^2,0,0],[0,0,0],[0,0,2ml^2])$

C:-$([0,ml^2,0],[ml^2,0,0],[0,0,0])$

D:-$([0,0,0],[0,2ml^2,2ml^2],[0,2ml^2,2ml^2])$

Correct Answer:- Option-A

Question89:-Determine the center of the circle and its radius given by the equation:

$x^2 + y^2 - 4x + 6y - 3 = 0$

A:-Centre (2, -3), Radius: 4

B:-Centre (-3, 2), Radius: 8

C:-Centre (-3, 2), Radius: 2

D:-None of the above

Correct Answer:- Option-A

Question90:-A pulley driving a belt has a diameter of 300 mm and is turning at 2700/π revolutions per minute. Find the angular velocity of the pulley and the linear velocity of the belt assuming that no slip occurs.

A:- ω = 45 rad/sec, v = 6.5 m/sec

B:- ω = 90 rad/sec, v = 13.5 m/sec

C:- ω = 13.5 rad/sec, v = 90 m/sec

D:-None of the above

Correct Answer:- Option-B

Question91:-A towing carriage is travelling at 4.0 m/s and has wheels of diameter 1000 mm. Assume no slipping of wheel occurs. Determine the angular velocity of the wheels.

A:-76.4 rpm

B:-358.9 rpm

C:-716.2 rpm

D:-25 rpm

Correct Answer:- Option-A

Question92:-During propeller open water test, it is necessary to measure the following:

    A:-Tow force on the open water boat

    B:-Propeller thrust

    C:-Towing speed

    D:-(2) and (3)

    Correct Answer:- Option-D

Question93:-A 5 bladed overlapping propeller is kept on a table with its face pointing up. Its outline is then drawn on the table. The resulting shape will be the _____ of the blade.

    A:-Developed area

    B:-Expanded area

    C:-Projected area

    D:-None of the above

    Correct Answer:- Option-D

Question94:-Consider a straight line in XY plane parallel to X axis. Take three coordinates in this line i.e. {(-6.0, 1.0, 0.0), (0.0, 1.0, 0.0), (6.0, 1.0, 0.0)} in meters. Consider that this line is the chord of a controllable pitch propeller blade section at radius 7.5 m at 0° pitch angle. Wrap this chord along a cylinder of radius 7.5 m. The centre of cylinder is: (0, 1, -7.5). The coordinates of the point (0, 1.0, 0.0) do not change. The coordinates of the other two points will be:

    A:-X: 5.3802,   Y: 1.0,   Z: -2.2747;
X: -5.3802, Y: 1.0,   Z: -2.2747

    B:-X: 0.3802,   Y: -1.0,   Z: 2.2747;
X: -0.3802, Y: -1.0,   Z: 2.2747

    C:-X: -0.3802,   Y: -1.0,   Z: 2.2747;
X: -0.3802, Y: -1.0,   Z: 2.2747

    D:-None of the above

    Correct Answer:- Option-A

Question95:-The stability of a rectangular barge will _____ after its double bottom is damaged. The double bottom height is much lower than the intact water line and waterplane remains intact after the double bottom damage.

    A:-Increase

    B:-Decrease

    C:-Not change

    D:-None of the above

    Correct Answer:- Option-A

Question96:-The propeller open water efficiency (eta_O) is defined as follows:

    A:-$\{T_O * V_A\}/\{2 Pi n Q_O\}$

    B:-$\{K_{TO} * J\}/\{2 Pi K_{QO}\}$

    C:-$\{2 Pi K_{QO}\}/\{K_{TO} * J\}$

    D:-(1) and (2)

    Correct Answer:- Option-B

Question97:-Following parameter can be varied for a controllable pitch propeller:

    A:-Propeller pitch

    B:-Propeller chord

    C:-Propeller diameter

    D:-(1), (2) and (3)

    Correct Answer:- Option-A

Question98:-Following parameter can be varied in a fixed pitch propeller:

    A:-Propeller pitch

    B:-Propeller chord

    C:-Propeller diameter

    D:-None of the above

    Correct Answer:- Option-D

Question99:-For computing propeller mass and the mass moment of inertia about the rotation axis, following parameters are essential:

    A:-Section area of the propeller blade

    B:-Propeller power

    C:-Propeller rpm

    D:-None of the above

    Correct Answer:- Option-A

Question100:-The following is one of the design criteria for preventing forward bottom slamming:

    A:-Waterplane area

    B:-Yield stress of mild steel

C:-Midship section area
D:-Minimum draft
Correct Answer:- Option-D