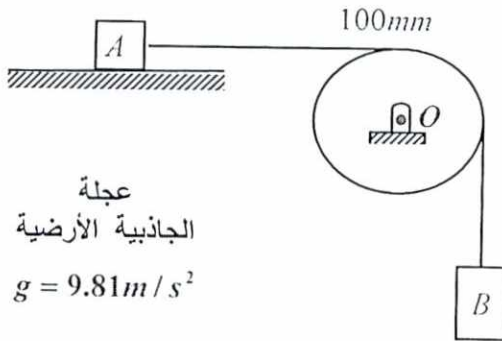


أجب عن الأسئلة الآتية:
السؤال الأول:

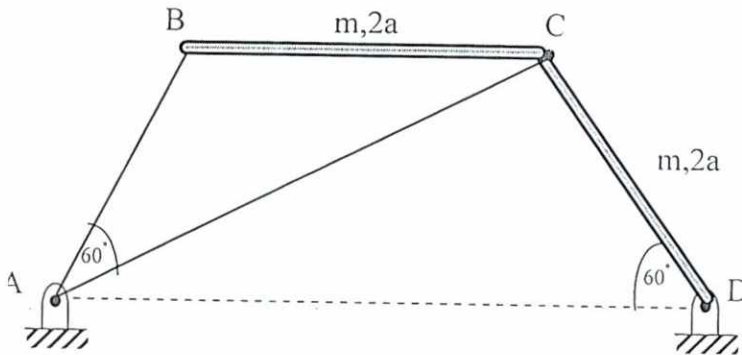
فى التركيب الآلية المبينة فى الشكل تتحرك الزلاقة (C) بسرعة خطية منتظمة $v_C = 3 \text{ m/sec}$. أوجد السرعة الزاوية والعجلة الزاوية لكل من القضيبين (BC) و (AB) عند الوضع المبين بالشكل

السؤال الثانى

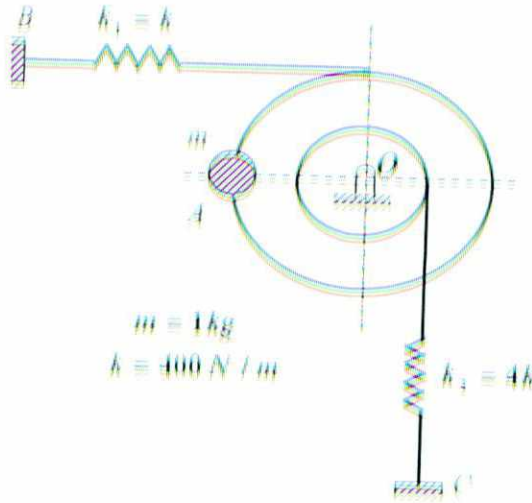


تتصل قطعة خشبية A كتلتها 15 kg بالجسيم B كتلته 20 kg بواسطة حبل خفيف يمر على الأسطوانة O كتلتها 0.5 kg و قطرها 100 mm . إذا بدأت المجموعة الحركة من سكون وكان معامل الاحتكاك الديناميكي بين الكتلة والسطح الأفقي $\mu_k = 0.3$ بفرض أن الحبل لا ينزلق على البكرة علما بأن عزم القصور للأسطوانة هو $I_G = \frac{1}{2} m a^2$.
إحسب: 1. الشد المتولد فى الحبل عند اتصاله بكل من الكتلة A والجسيم B.
2. سرعة الجسيم B عندما يتحرك لأسفل مسافة مقدارها 2 m

السؤال الثالث



قضيبان CD & BC كتلة كل منهما m وطولهما $2a$ يتصلان مفصليا عند C مثبتان بواسطة وصلتين خفيفتين AC & AB عين عجلة الدوران الابتدائية للقضيبين BC & CD فى حالة كسر AC & AB فجأة.



السؤال الرابع
بكرة مزدوجة كتلتها $2m$ ونصف قطري
جزئيه

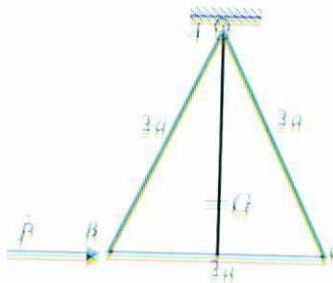
$(a, 2a)$ قابلة للدوران حول محور ثابت (O)
ونصف قطر قصورها $a\sqrt{2}$ لصق جسيم كتلته
(m) عند A ولف زنبرك على محيطي جزئي
البكرة بينما ثبت طرفيها عند (B, C) إذا
كانت معاملات شد الزنبركات هي
كما هو مبين بالشكل، أوجد:

(1) طاقتي الوضع و الحركة للتركيبة للوضع
المبين، $(k_1 = k, k_2 = 4k)$

(2) عين زمن الذبذبات الصغيرة حول موضع اتزانها بدلالة k, m

بأى طريقة واحسبه للحالة العددية $[k = 400 \text{ N/m}, m = 1 \text{ kg}, g = 10 \text{ m/s}^2]$

السؤال الخامس



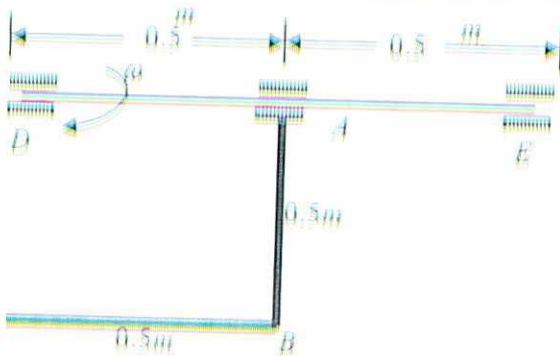
لوحة على شكل مثلث متساوي الأضلاع (ABC) كتلتها
m وطول ضلعها $2a$ يمكن أن تدور حول محور
أفقي المار بالرأس (A) وعمودي على مستواها ،
عندما كانت اللوحة ساكنة في وضع اتزانها المستقر
أثر عليها عند (B) دفع \vec{P} في اتجاه الضلع (BC) ،

(1) أوجد السرعة الزاوية لدوران اللوحة بعد الدفع مباشرة ،

(2) أوجد رد الفعل الدفعي عند المحور (A) ،

علما بأن نصف قطر القصور للوحة المثلثة هو $k = \frac{a}{\sqrt{3}}$

السؤال السادس



قضيب منتظم (ABC) كتله وحده الأطوال هي
 10 kg/m على شكل زاوية قائمة مركب على
محور أفقي DE ويدور حوله بسرعة زاوية
منتظمة $(\omega = 10 \text{ rad/sec})$ ، أوجد ردود الفعل
الديناميكية على الحاملين (E, D) ،

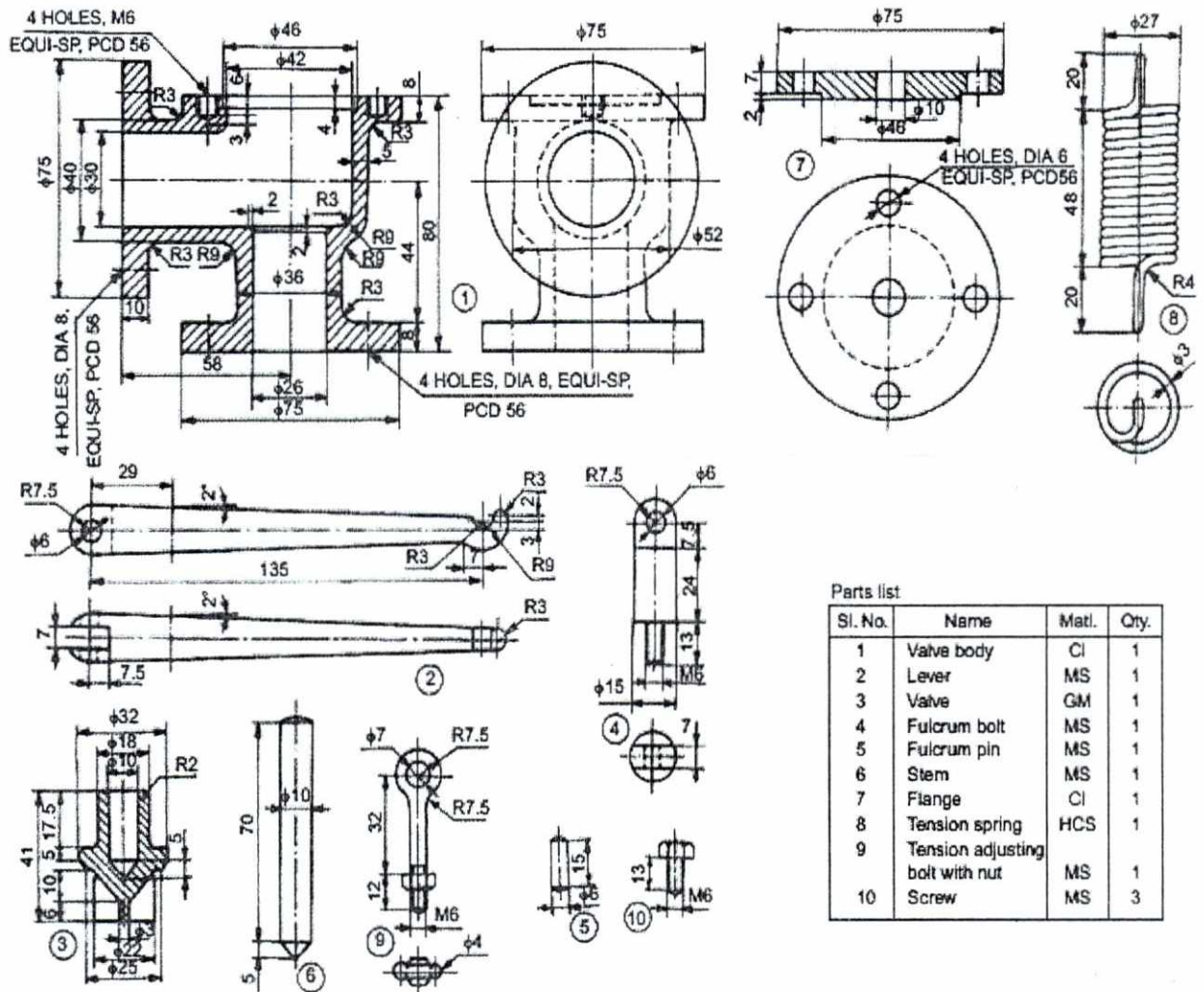


Ship Machinery Drawing [MR 111]
First Year
Time: 3 hours

رسم ماكينات والآت سفن
الفرقة الاولى
الزمن : 3 ساعات

The following Figure shows the details of spring loaded relief valve. Assemble all the parts and draw:

- (i) Sectional elevation,
- (ii) Side view,
- (iii) Plan.



Good Luck,

Exam committee: Dr. Nader Ragab Ammar, Prof. Khalid A. Hafz, Dr. Ahmed Zaid, Dr. Badr Eldin.



Answer the following Questions:

1. With the aid of neat sketches show:
 - a. Horizontal and vertical cores.
 - b. Pressure die casting
 - c. Coining and embossing processes
 - d. Two high mill and three high mill
2. With the aid of neat sketches show:
 - a. Rolling defects
 - b. Direct and indirect extrusion processes
 - c. Punching and blanking processes
 - d. Spinning process
3. With the aid of neat sketches show:
 - a. Die bending process
 - b. Principle of turning process
 - c. Different types of oxyacetylene flames
 - d. Principle of shielded metal arc welding
 - e. Resistance spot welding
 - f. Friction welding

Good luck



Choose the best Answer for the following questions:

1. A box-shaped vessel floats upright on an even keel as shown in fresh water of density 1000 kg per cu. m, and the center of buoyancy is 0.50 m above the keel. Find the height of the center of buoyancy above the keel when the vessel is floating in salt water of density 1025 kg per cubic meter.

A. 4.8 m B. 0.448 m C. 0.448 cm D. None of the previous

If your answer is D please specify =

2. A ship 120 meters 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 and 0.1 meters, respectively

Find the area of the water-plane and the TPC at this draft.

A. 1702 m², 12.37 tones B. 1207 m², 12.37 tones C. 1702 m², 123.7 tones D. None of the previous

If your answer is D please specify =

3. The areas of a ship's water-planes are as follows:

Draft (m)	0	1	2	3	4
Area of WP (sq. m)	650	660	662	661	660

Calculate the ship's displacement in tones when floating in salt water at 4 meters draft. Also, if the ship's load draft is 4 meters. Find the FWA.

A. 2705.3 tones, 9.99 mm B. 270.53 tones, 9.99 mm C. 2705.3 tones, 9.99 cm D. None of the previous

If your answer is D please specify =

4. A box-shaped vessel is 24m x 5m x 5 m and floats on an even keel at 2m draft. KG = 1.5 m. Calculate the initial metacentric height.

A. 0.554 m B. 0.455 m C. 0.56 m D. None of the previous

If your answer is D please specify =

5. A ship of 5000 tones displacement has KG 4.5 m and KM 5.3 m. The following cargo is loaded:

2000 tones Kg 3.7 m and 1000 tones Kg 7.5 m

Find how much deck cargo (Kg 9 m) may now be loaded if the ship is to sail with a minimum GM of 0.3 m.

A. 650 tones B. 560 tones C. 6500 tones D. None of the previous

If your answer is D please specify =

6. When the vertical center of gravity G rises, there will normally be a loss in the ship's stability. The following list gives reasons for such a rise **except one**:

- A- Free-surface effects in fully filled tanks.
- B- Loading cargo in upper reaches of the vessel.
- C- Raising of a weight from a deck using a mast and derrick.

D- Raising a weight low down in the ship to a higher position within the ship

A. B. C. D.

7. A ship of 6000 tonnes displacement has $KM = 7.3$ m and $KG = 6.7$ m, and is floating upright. A weight of 60 tonnes already on board is shifted 12 m transversely. Find the resultant list.

A. $11^\circ 18 \frac{1}{2}''$ B. $18^\circ 11 \frac{1}{2}''$ C. $11^\circ 11 \frac{1}{2}''$ D. None of the previous

If your answer is D please specify =

8. A box-shaped vessel $65\text{m} \times 12\text{m} \times 8$ m has $KG = 4$ m, and is floating in salt water upright on an even keel at 4 m draft F and A. Calculate the moments of statical stability at (a) 5 degrees and (b) 25 degrees heel.

A. 1990.9, 277.9 B. 287.8, 1970.9 C. 278.9, 1790.9 D. None of the previous

If your answer is D please specify =

9. A ship 126 m long is floating at drafts of 5.5 m F and 6.5 m A. The center of flotation is 3 m aft of amidships. $MCT 1\text{cm} = 240$ tonnes m. Displacement = 6000 tonnes. Find the new drafts if a weight of 120 tonnes already on board is shifted forward a distance of 45 meters.

A. 6.693 A, 5.818 F B. 6.593 A, 5.718 F C. 6.393 A, 5.618 F D. None of the previous

If your answer is D please specify =

10. A box-shaped vessel 60 m long, 10 m beam and 6 m deep is floating in salt water at drafts 4 m F and 4.4 m A. Find how far forward of amidships a weight of 30 tonnes must be loaded if the draft aft is to remain at 4.4 m.

A. 12 m B. 8 m C. 19 m D. None of the previous

If your answer is D please specify =

11. A ship of 8153.75 tonnes displacement has $KM = 8$ m, $KG = 7.5$ m, and has a double bottom tank $15\text{m} \times 10\text{m} \times 2$ m which is full of salt water ballast. Find the new GM if this tank is now pumped out till half empty.

A. 2.2 cm B. 0.2 m C. 22.5 cm D. None of the previous

If your answer is D please specify =

12. A box-shaped vessel $45\text{m} \times 10\text{m} \times 6$ m is floating in salt water at a draft of 4 m F and A. $GM = 0.6$ m. Calculate the dynamical stability to 20 degrees heel.

A. 71.77 m tonnes B. 717.7 m tonnes C. 7.177 m tonnes D. None of the previous

If your answer is D please specify =

13- With increased beam the following effects occur **expect one**:

- A- GM_T and GZ increase.
- B- Range of stability decrease.
- C- Deck edge immerses earlier.
- D- KB remains similar.

A. B. C. D.

14- With increased freeboard the following effects occur **expect one**:

- A- GM_T and GZ increase.
- B- Range of stability increases.
- C- Deck edge immerses later at greater θ .

D- KB increase.

A. B. C. D.

15- When a mass of 25 tones is shifted 15 m transversely across the deck of a ship of 8000 tones displacement, it causes a deflection of 20 cm in a pendulum line 4 m long. If the KM = 7 m, calculate the KG.

A. 5.05 m B. 5.16 m C. 5.06 m D. None of the previous

If your answer is D please specify =

16- A ship 120 m long and 9100 tons displacement floats at a level, keel draught of 6.50 m in fresh water of 1.000 t/m³. , MCTI cm 130 tons m, TPC in sea water 16.5, LCB 2.30 m forward of midships. LCF 0.6 m aft of midships. Calculate the new draughts if the vessel moves into sea water of 1.024 t/m³ without change in displacement.

A. d_F 6.343, d_A 6.392 B. d_F 6.434, d_A 6.392 C. d_F 6.343, d_A 6.923 D. None of the previous

If your answer is D please specify =

17- A ship has a displacement of 9000 tons, and a KM of 7 meters, which can be assumed to be constant. The MCT 1cm is 145, the LCF is 78 m from AP and the initial trim is 1.4 meters by the stern. The initial KG is 6.75 meters. Determine GM at the critical instant.

A. 0.55 m B. 0.5 m C. 0.05 m D. None of the previous

If your answer is D please specify =

18- The effect of increasing KG on the shape of the curve of statical stability includes all of the following except:

A- Initial GM is reduced (by an amount equal to GGV);

B- All GZ values across the range of stability are reduced, particularly at the larger angles of heel;

C- Dynamical stability (area under the curve) is reduced making the ship less able to resist heeling by external forces;

D-Angle at which deck edge immersion takes place is reduced.

A. B. C. D.

19- The effect of an increase in beam on the shape of the curve of statical stability includes all of the following except:

A- Initial GM is increased as a result of the decreasing BM.

B- GZ values will be increased initially.

C- Dynamical stability (area under the curve) is increased initially.

D- Range of stability may increase or decrease.

A. B. C. D.

20- In the upright condition a ship has a metacentric radius of 2.84 m, a center of gravity of 7.15 m and a vertical center of buoyancy of 4.26 m. Calculate the angle of which the ship will incline.

A. $\theta_{\text{heel}} = 10.63^\circ$ B. $\theta_{\text{list}} = 10.63^\circ$ C. $\theta_{\text{loil}} = 10.63^\circ$ D. None of the previous

If your answer is D please specify =

Good Luck



Course title: Ind. Safety Number(HSX 52)
Year: First
Time allowed: 3 Hours

اسم المقرر أمن صناعي والرقم الكودي (HSX 52)
السنة الدراسية: الأولى
الزمن: 3 ساعات

تعليمات الإجابة Answer All Questions

Question 1): Choice the correct answer (12 marks)

1. How often are "abandon Ship" drills required to be held on cargo vessel according to SOLAS
 - A. Once every 6 month
 - B. Once every year
 - C. Once every month
 - D. Once every week
2. Which international convention deals with fire-fighting equipment etc
 - A. SOLAS
 - B. STCW
 - C. ILO
 - D. none of the above.
3. What subject must be removed to extinguish the fire in engine room
 - A. Oxygen
 - B. Combustible material
 - C. Heat source
 - D. All of the above
4. When IMO use the term safety, it will include:
 - A. Safety and health of persons
 - B. Safety of vessel
 - C. Environmental aspects
 - D. All of the above.
5. The function of the ISM Code is to provide
 - A. Safe ships operation
 - B. Pollution prevention from ships
 - C. Safe ships operation and pollution prevention from ships
6. Fire precautions on board ship can be
 - A. Smoke only in authorized places.
 - B. Never overload circuits with too many appliances (single electrical plug).
 - C. Fires sometimes result from faulty electrical appliances or fittings.
 - D. Familiarity with the surroundings and equipment is highly important.
 - E. All of the above

7. **Fire fighting at sea includes one distinct stage or many distinct stages;**
 - A. Detection.
 - B. Alarm.
 - C. Control and extinguishing the fire.
 - D. All of the above.
8. **If you detect a fire on board the ship, dependent on the situation, which of the following actions is the first to be taken?**
 - A. Contact the engineer officer of the watch and inform him immediately.
 - B. Sound the fire alarm.
 - C. Control and extinguishing the fire.
 - D. None of the above.
9. **Which of the following is frequent cause of fires in accommodation?**
 - A. Smoking in bed.
 - B. Covering of electric fires with blankets.
 - C. Overloading electric plugs.
10. **Fire fighting on board a ship must be included;**
 - A. Portable marine fire fighting equipments.
 - B. Fixed fire fighting system, main fire pump and emergency fire pump.
 - C. All of the above.
11. **The use of safety helmet may reduce injuries in the following work related activities;**
 - A. Repair, service, maintenance in engine room.
 - B. Work in tanks, cofferdams, cargo holds, and pump rooms.
 - C. All of the above.
12. **Which of the following extinguisher should not be used on an electrical fire**
 - A. CO₂ extinguisher
 - B. Water extinguisher
 - C. Dry Powder extinguisher
13. **The primary noise source onboard is;**
 - A. Accommodations
 - B. Main engine
 - C. Cargo holds
 - D. All of the above.
14. **What type of nozzles for fire hoses must be used aboard ships?**
 - A. Dual purpose (jet/spray) type incorporating shutoff
 - B. Jet type incorporating shutoff
 - C. Spray type incorporating shutoff.
15. **A notices must be displayed & board at the head of the gangway /accommodation ladder stating;**
 - A. NO Unauthorized Persons
 - B. NO Smoking & NO Naked Lights
 - C. All of the above.

16. **Wearing of ear protection is required:**
- A. In engine room
 - B. In accommodations
 - C. In bridge
 - D. All of the above.
17. **Seasickness has negative effects such as:**
- A. Reduced mental capacity, physical capacity and performance
 - B. Sliding and loss of balance
 - C. All of the above.
18. **Drug and Alcohol test must be applied for:**
- A. Officers
 - B. Ratings
 - C. Cadets
 - D. All crewmembers
19. **An important step in fighting any electrical fire is to**
- A. Stop ventilation
 - B. Stop the vessel and engine
 - C. Switch off the circuit
 - D. Apply foam to extinguish the fire
20. **Which one of the listed fire-extinguishing medium is most effective against an open oil fire?**
- A. Foam
 - B. CO2
 - C. None of the above
21. **It is necessary to close the ventilation to a compartment where there is a fire to**
- A. Cooling
 - B. Starvation
 - C. Smothering
22. **Fire can be transferred by**
- A. Conduction
 - B. Radiation
 - C. Convection
 - D. All of the above
23. **Which of the following can burns**
- A. Solid
 - B. Liquid
 - C. All of the above
24. **Where on board would you find out which fire sections are enclosed by "A" or "B" bulkheads?**
- A. On the fire control plans
 - B. On muster list
 - C. All of the above

Question 2: (15 marks)

True/False Questions (If the answer is correct, please mark T, otherwise, mark F and correct the wrong statements in your answer sheet)

1. The causes of engine room fires can usually be traced back to a lack of maintenance or bad watch keeping practices.
2. Shipboard fires are usually caused by fuel spills, overheating components or careless use of welding processes.
3. Fire is classified depending on the fuel that causes fire, Class A: Electrical cables, electrical motors and switchboards & Class B: Flammable liquids such as petrol, oil, diesel, hydrocarbons and paint.
4. There are three main types of portable fire extinguishers on board ships all colored red, with a different colored band around the top of the body, denoting the type of medium it contains. All types of fire fighting extinguishers can be used for any type of fires on board ships.
5. There are two basically different types of equipment are available on board ship for the control of fires. These are small portable extinguishers and large fixed fire fighting system.
6. large fixed fire fighting system is for small fires in ship's engine room.
7. The emergency fire pump is powered from the main power system, which can be used to take over fires in emergency and in case of main power failure.
8. An emergency fire pump will be located in the machinery space (engine room) and will be powered only from the main power system.
9. The main objective of the SOLAS Convention is to specify minimum standards for the construction, equipment and operation of ships.
10. At least one fire control plans that should be permanently stored in a prominently marked watertight enclosure outside the deckhouse for the assistance of shore side fire fighting personnel.
11. Only a visual alarm is the signal actuated by a fire detection system?
12. Unseaworthy ship is one that is fit for any normal perils of the sea, including the fitness of the vessel itself as well as any equipment on it and the skills and health of its crew.
13. The effectiveness of foam is based on cooling only.
14. Fire fighting at sea includes three distinct stages: detection; alarm and extinguishing the fire.
15. The most common causes of shipboard fire are the most obvious: smoking , lack of attention and electrical faults are the major causes.
16. Leaky pipes carrying oil, overheated bearings and even the accumulation of spontaneous combustion in the engine room is the common fire risk from flashbacks in ships.

17. Class "B" fire doors shall prevent the passage of smoke and flame and the average temperature of the unexposed side shall not rise more than 180 degrees Celsius within 60 minutes
18. Motor propelled lifeboats are required to have sufficient fuel to operate continuously at 6 knots for 6 hours.
19. Lifeboat engine shall be capable of starting within 20 minutes.
20. Each lifejacket light shall have a source of energy capable of providing a luminous for a period of at least 8 minutes.
21. The abandon ship drill must include the lowering of the boat into the water.
22. The abandon ship drill must be conducted every year, and within 24 hours of the ship leaving port if more than 25% of the crew has not participated in a drill on board that particular ship the previous month.
23. A lifejacket shall be constructed to allow the wearer to jump from a height of at least 4.5 m into the water without injury and without dislodging or damaging the lifejacket.
24. Search And Rescue Transponder (SART) is not mandatory for all commercial vessels.
25. Search And Rescue Transponder (SART) is used in conjunction with other safety and survival marine devices in order to enhance rescue operations
26. Automatic identification system (AIS) is used to alert the search and rescue services in the event of an emergency.
27. Emergency Position Indicating Radio Beacon (EPIRB) is designed to be capable of providing information about the ship to other ships and to coastal authorities automatically.
28. Global Positioning System (GPS) is important in marine navigation for the ship's officer to know the vessel's position while in open sea and also in congested harbors and waterways.
29. The most common causes of fatigue known to seafarers are lack of sleep, good quality of rest, stress and excessive workload.
30. Ultimate consequences of fatigue decrease human error.

Question 3 - (18 marks):

- A. What are the personal protective clothing and equipment on board ships?
- B. Enumerate equipment must be on board "Cargo Vessel" ship for fire-fighting?
- C. What are the precautions must be taken to prevent fires on board ships?
- D. What are the precautions must be done before CO₂ release to ship's machinery space?
- E. How can you avoid the electrical shock on board ship?
- F. What are the actors that have an influence on safety of the shipping industries?

Question 4 - (10 marks):

- A. Sketch the international shore connection with following specifications:
[Outside diameter (178 mm), Inner diameter (64 mm), Bolt circle diameter (132 mm), 4 Holes (19 mm) & flange thickness (14.5 mm).
- B. Firefighting equipment on board a ship must be included the international shore connection, why?

Question 5 - (15 marks):

Calculate the (CO₂) cylinders required to protecting each space (machinery and cargo holds) for a bulk carrier vessel (45 000 DWT) with the following particulars and how many minimum CO₂ Cylinders must be provided on board ship.

Protected Space	Gross Volume (m ³)	Permeability Ratio (%)
Machinery	26200	40
Cargo Hold # 1	12600	35
Cargo Hold # 2	23900	
Cargo Hold # 3	30400	
Cargo Hold # 4	24500	
Cargo Hold # 5	26300	

Note:

- a. 100 m³ of compressed air in machinery space
- b. Free CO₂ volume (0.56 m³/kg)
- c. Each CO₂ Cylinder (45 kg).

Good luck

