



Second Weekly Exam – [Bhadra 08, 2082]

PHYSICAL GROUP

Class: XI

Full Marks: 70

Time: 80 min + 80 min

Attempt all the questions.

Mathematics

Group A

Multiple Choice Questions

[4 × 1 = 4]

Rewrite the best option in your answer sheet.

- The contrapositive of the conditional $p \Rightarrow \sim q$ is
a) $\sim q \Rightarrow \sim p$ b) $q \Rightarrow \sim p$ c) $q \Rightarrow p$ d) $\sim p \Rightarrow q$
- $i^{98} + i^{99} + i^{100} + i^{101} =$
a) i b) -1 c) $-i$ d) 0
- Which of the following is NOT an indeterminate form?
a) $\infty + \infty$ b) $\frac{0}{0}$ c) $\frac{\infty}{\infty}$ d) 1^∞
- $\lim_{x \rightarrow a} \frac{x^m - a^m}{x^n - a^n} =$
a) $\frac{n}{m} a^{m-n}$ b) $\frac{m}{n} a^{n-m}$ c) $\frac{m}{n} a^{m-n}$ d) $\frac{n}{m} a^{n-m}$

Group B

Short Answer Questions.

[3 × 5 = 15]

- For two simple statements p and q , construct the truth table for $(p \vee \sim q) \vee q$. Also, comment on the result. [2+1]
 - Write the truth value and negation of each of the following statements.
 - $3 + 5 = 8$ or 2 is an even number.
 - If 2 is a rational number then 3 is an even number. [1+1]
- Define conjugate of a complex number. Find the conjugate of a complex number $z = \frac{3+4i}{3-4i}$ in the form of $a + ib$. [1+2]

b) Prove that : $(1+i)^4 \left(1+\frac{1}{i}\right)^4 = 16$ [2]

7. Evaluate:

a) $\lim_{x \rightarrow a} \frac{\sqrt{2x} - \sqrt{3x-a}}{\sqrt{x} - \sqrt{a}}$ [3]

b) $\lim_{x \rightarrow 5} \left(\frac{1}{x-5} - \frac{25}{x^3-5x^2}\right)$ [2]

Group 'C'

[2 × 8 = 16]

Long Answer Questions.

8. a) Mention the antecedent of the statement "If 3 is an odd number then 6 is not an odd number". Also, write converse, inverse and contrapositive of above given statement. [2]

b) Find the multiplicative inverse of $3 - 4i$. If $\sqrt{x - iy} = a - ib$, prove that:
 $\sqrt{x + iy} = a + ib$. [1+2]

c) If $f(x) = \frac{ax+b}{x-2}$, $\lim_{x \rightarrow 0} f(x) = -1$ and $\lim_{x \rightarrow \infty} f(x) = 3$, prove that:
 $f(1) = -5$. [3]

9. a) When two statements become logically equivalent? Show that:

$$\sim (p \vee q) \equiv \sim p \wedge \sim q \quad [1+2]$$

b) Define absolute value of a complex number. If $a + ib = \frac{6-8i}{6+8i}$, prove that
 $a^2 + b^2 = 1$. [1+2]

b) Evaluate: $\lim_{x \rightarrow \infty} (\sqrt{x+a} - \sqrt{x})$ [2]

English

1. Read the text and do the given tasks.

A The potential for problems is certainly there. Modern airliners are packed with electronic devices that control the plane and handle navigation and communications. Each has to meet stringent safeguards to make sure it doesn't emit radiation that would interfere with other devices in the plane-standards that passengers' personal electronic devices don't necessarily meet. Emissions from inside the plane could also interfere with sensitive antennae on the fixed exterior.

B But despite running a number of studies, Boeing, Airbus and various government agencies haven't been able to find clear evidence of problems caused by personal electronic devices, including mobile phones. "We've done our own studies. We've found cellphones actually have no impact on the navigation system," says Maryanne Greczyn, a spokeswoman for Airbus Industries of North America in Herndon, Virginia. Not do they affect other critical systems, she says The only impact Airbus

found? "Sometimes when a passenger is starting or finishing a phone call, the pilot hears a wry slight beep in the headset," she says.

C The best evidence yet of a problem comes from a report released this year by Britain's Civil Aviation Authority. Its researchers generated simulated cellphone transmissions inside two Boeing aircraft. They concluded that the transmissions could create signals at a power and frequency that would not affect the latest equipment, but exceeded the safety threshold established in 1984 and might, therefore, affect some of the older equipment on board. This doesn't mean "mission critical" equipment such as the navigation system and flight controls. But the devices that could be affected, such as smoke detectors and fuel level indicators, could still create serious problems for the flight crew if they malfunction.

D Many planes still use equipment certified to the older standards, says Dan Hawkes, head of avionics at the CAA's Safety Regulation Group. The CAA study doesn't prove the equipment will actually fail when subjected to the signals but does show there's a danger. "We've taken some of the uncertainty out of these beliefs," he says. Another study later this year will see if the cellphone signals actually cause devices to fail.

E In 1996, RTCA, a consultant hired by the Federal Aviation Administration in the US to conduct tests, determined that potential problems from personal electronic devices were "low". Nevertheless, it recommended a ban on their use during "critical" periods of flight, such as take-off and landing. RTCA didn't actually test cellphones, but nevertheless recommended their wholesale ban on flights. But if "better safe than sorry" is the current policy, it's applied inconsistently, according to Marshall Cross, the chairman of Mega Wave Corporation, based in Boylston, Massachusetts. Why are cellphones outlawed when no one considers a ban on laptops? "It's like most things in life. The reason is a little bit technical, a little bit economic and a little bit political," says Cross.

F Some engineers, however, such as Bruce Donham of Boeing, say that common sense suggests phones are more risky than laptops. "A device capable of producing a strong emission is not as safe as a device which does not have any intentional emission," he says. Nevertheless, many experts think it's illogical that cellphones are prohibited when computers aren't. Besides, the problem is more complicated than simply looking at power and frequency. In the air, the plane operates in a soup of electronic emissions, created by its own electronics and by ground-based radiation. Electronic devices in the cabin-especially those emitting a strong signal-can behave unpredictably, reinforcing other signals, for instance, or creating unforeseen harmonics that disrupt systems.

A. Mark the statements True, False, or Not Given. [5×1= 5]

TRUE If the statement agrees with the information given in the text.

FALSE If the statement contradicts the information given in the text.

NOT GIVEN If there is no information in the text.

a. Studies have proved evidently that electronic devices are problematic in flights.

b. CAA study shows that cellphone signals actually cause devices to fail.

- c. RTCA recommended a ban on the use of electronic device after their successful test.
- d. Marshall Cross filed a lawsuit as no none considered a ban on laptops.
- e. Boeing supports the usage of electronic devices on board.

B. Complete the following summary using NO MORE THAN THREE WORDS from the Reading Passage for each answer. Also, underline the answers. [5×1= 5]

The would-be risk surely exists, since the avionic systems on modern aircraft are used to manage flight and deal with Those devices are designed to meet the safety criteria which should be free from interrupting..... or interior emission. The personal use of a mobile phone may cause the sophisticatedoutside of the plane to dysfunction. Though definite interference in piloting devices has not been scientifically testified, the such as those which perform or indicate fuel load could be affected.

C. Use the information in the passage to match the Organization (listed a-e) with opinions or deeds (listed i-v) by its side. [5×1= 5]

- | | |
|-------------------------------------|--|
| a. British Civil Aviation Authority | i. Mobile usages should be forbidden in specific fame. |
| b. Maryanne Greczyn | ii. Computers are more dangerous than cell phones. |
| c. RTCA | iii. Finding that the mobile phones pose little risk on flight's navigation devices. |
| d. Marshall Cross | iv. The disruption of laptops is not as dangerous as cellphones. |
| e. Boeing company | v. The mobile signal may have an impact on earlier devices. |

2. Write a short answer to the following question. [2×1=2]

- a. What made the Selfish Giant return to his own castle from the place of Cornish Ogre? (*The Selfish Giant*)

3. Write a long answer to the following question. [5×1=5]

- a. Explain the plot of this story as a fairy tale. (*The Selfish Giant*)

4. Write a couple of paragraphs on the topic: "Importance of AI in Modern Era."

[7×1=7]

5. Identify the word class of the underlined words. [6×1=6]

- a. He admitted to stealing.
- b. My father is working inside and I am waiting outside.
- c. I am tired because of overwork.
- d. I think that he is fine.
- e. That film was boring which you had recommended.
- f. The guy sitting in the garden was friendly.

The End