

I SEMESTER EXAMINATION– 2017-18

Subject : Mathematics

STD : XI-SCI

Marks :50

Date : 7 /10 / 2017

Time : 2 Hrs

- Note: i) All questions are compulsory
ii) The question paper consist of 20 questions divided into four sections A, B, C, D.
iii) Section A contains 6 MCQ questions of 1 mark each
Section B contains 5 questions of 2 marks each
Section C contains 5 questions of 3 marks each
Section D contains 5 questions of 4 marks each
iv) Use of logarithmic tables is allowed.
v) Use of calculator is not allowed.

Section A (5 marks)

Select and write the most appropriate answer from the given alternative [5]

- Q.1 If $\sin \theta = -\frac{1}{2}$ and $\tan \theta = 1$, then θ is in which quadrant?
a) First b) Second c) Third d) Fourth
- Q.2 $\sin 15^\circ + \cos 105^\circ = ?$
a) 0 b) $2 \sin 15^\circ$ c) $\cos 15^\circ + \sin 15^\circ$ d) $\sin 15^\circ - \cos 15^\circ$
- Q.3 The value of $(1 + i)^5 \times (1 - i)^5$ is
a) -8 b) 8I c) 8 d) 32
- Q.4 If $i = \sqrt{-1}$, then $1 + i^2 + i^3 - i^6 + i^8$ is equal to
a) $2 - i$ b) 1 c) 3 d) -1
- Q.5 If $a = \log 12$, $b = \log 24$ and $c = \log 36$, then $1 + abc$ is equal to
a) $2ab$ b) $2ac$ c) $2bc$ d) 0

Section B (10 marks)

- Q.6 Find the value of a) $\sin 75^\circ$ b) $\tan 75^\circ$
- Q.7 Eliminate θ , if $x = a \cdot \sec \theta$, $y = b \cdot \tan \theta$
- Q.8 Evaluate : $\frac{1}{1 + i} + \frac{1}{1 - i}$
- Q.9 Represent $(4 + 4\sqrt{3}i)$ in the polar form

OR

Find the modulus and amplitude for $7 + 24i$

- Q.10 Prove that $2 \cdot \sin(\theta + \phi) = \cos \theta + \sin \phi$

Section C (15 marks)

Q.11 Find the square root of $6 + 8i$.

Q.12 Prove that $\frac{\cos 2A}{1 + \sin 2A} = \frac{1 - \tan A}{1 + \tan A}$

Q.13 Find the radius of the circle in which a central angle of 60° intercepts an arc of length 37.4 cm.

Q. 14 Find the trigonometric functions of $(-)^c$

Q. 15 If $z_1 = 1 + i, z_2 = 2 - 3i$, verify that

a) $\overline{z_1 + z_2} = \overline{z_1} + \overline{z_2}$ b) $\overline{z_1 \cdot z_2} = \overline{z_1} \cdot \overline{z_2}$ c) $\overline{z_1 - z_2} = \overline{z_1} - \overline{z_2}$

OR

If w is the complex cube root of unity, then show that :- a) $(2 - w)(2 - w^2) = 7$
 b) $(1 + w - w^2)^6 = 64$ c) $(1 + w)^3 - (1 + w^2)^3$

Section D(20 marks)

Q.16 Prove that $\cos^6 A + \sin^6 A = 1 - 3\sin^2 A \cdot \cos^2 A$

Q.17 If $\frac{a}{x} = \frac{b}{y} = \frac{c}{z}$, show that $x^{b+c} y^{c+a} z^{a+b} = 1$

OR

Prove that $\frac{\cos 2x}{1 + \sin 2x} = (2\cos x - 1)(2\cos 2x - 1)$

Q.18 If $(x + iy)^3 = y + vi$, then show that $(- + -) = 4(x^2 - y^2)$

Q.19 Find area of a sector whose arc length is 30đ cm and the angle of the sector is 40°

Q.20 Prove that $\tan 20^\circ \cdot \tan 40^\circ \cdot \tan 60^\circ \cdot \tan 80^\circ = 3$