

Summative Assessment - (2014-15)

Class - XI
Subject - Mathematics

Time : 2 hrs.

M. M. : 50

General Instructions:-

- (i) The question paper consists of 20 questions divided into three sections A, B and C. Section A comprises 9 questions of one mark each, Section B comprises 3 questions 3 marks each and Section C comprises 8 questions four marks each.
- (ii) There is no overall choice. However, internal choice has been provided.

Section - A

- Q.1. Find the value of $\sin \frac{31\pi}{3}$.
- Q.2. Find the value of $\sin 41^\circ \cos 19^\circ + \cos 41^\circ \sin 19^\circ$.
- Q.3. What is principle of Mathematical Induction.
- Q.4. Find the value of $i^n \cdot i^{n+1} \cdot i^{n+2} \cdot i^{n+3}$.
- Q.5. Find the multiplicative inverse of $4 - 3i$.
- Q.6. Solve $7x+3 < 5x+9$. Show the graph of the solutions on number line.
- Q.7. Solve the inequalities graphically $2x+y \geq 6$.
- Q.8. How many 2 digit even numbers can be formed from the digits 1, 2, 3, 4, 5 if the digits can be repeated.
- Q.9. Find the value of n if $\frac{\ln}{\ln+2} = \frac{1}{6}$.

Section - B

- Q.10. A solution of hydrochloric acid is to be kept between 30° and 35° Celsius. What is the range of temperature in degree Fahrenheit if conversion formula is given by $C = \frac{5}{9}(F - 32)$, where C and F represents temperature in Celsius and degree Fahrenheit respectively.
- Q.11. Prove that $\frac{\cos A}{a} + \frac{\cos B}{b} + \frac{\cos C}{c} = \frac{a^2 + b^2 + c^2}{2abc}$.
- Q.12. A bag contains 5 black and 6 red balls. Determine the number of ways in which 2 black and 3 red balls can be selected.

Section - C

Q.13. Prove that -

$$\cos 2X \cos \frac{X}{2} - \cos 3X \cos \frac{9X}{2} = \sin 5X \sin \frac{5X}{2}$$

or

Find the value of $\tan \frac{\pi}{8}$.

Q.14. Find the general solution

$$\tan x + \tan 2x + \tan 3x = \tan x \tan 2x + \tan 3x$$

Q.15. Prove that by using Principle of Mathematical induction -

$$x^{2n} - y^{2n} \text{ is divisible by } x+y.$$

Q.16. If $(x+iy)^3 = u + iv$ then show that

$$\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2).$$

Q.17. Convert the complex $z = \frac{i-1}{\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}}$ in the polar form.

or

Find the square roots of $1-i$.

Q.18. Solve the system of inequalities graphically.

$$3x + 2y \leq 150 \quad x + 4y \leq 80 \quad x \leq 15 \quad y \geq 0 \quad x \geq 0$$

Q.19. Prove - $n_{cr} + n_{c_{r-1}} = n + 1_{cr}$

Q.20. What is number of ways of choosing 4 cards from a pack of 52 playing cards?

(i) four cards are the same suit.

(ii) four cards belong to four different suits.

(iii) are face cards.

(iv) Cards are the same colour.

or

$$\frac{2n+1}{n} = 2^n (1.3.5 \dots (2n-1)(2n+1))$$