

**NATIONAL UNIVERSITY OF MODERN LANGUAGES**  
**Faculty of Engineering & Computer Science**  
**Department of Mathematics**



**Entry Test : BS (Mathematics)**

*Sample Paper*

**INSTRUCTIONS**

- The duration of the test is 60 Minutes (1 Hour).
- This test has SIX Sections “A”, “B”, “C”, “D”, “E” and “F”.
- First THREE sections “A”, “B” and “C” are compulsory for all applicants.
- Choose either Section “D” or Section “E”, or Section “F”.
- A candidate has to score minimum 50% marks in aggregate to pass the test. Furthermore, a candidate is also required to score minimum of 30% marks in each of the sections he/she has attempted.
- Fill in the appropriate circles/ovals. Multiple entries will NOT be entertained.
- After completion of the test, you have to return Question Paper & Answer Sheet both to the invigilators.
- Calculators & Mathematical tables are NOT allowed.
- Answers to all sections are to be attempted on answer sheets, which are being provided separately with the question papers. Rough work can be done on the back side of answer book, extra sheets will also be provided.
- Make sure that you do NOT write or mark anything on the question paper and/or answer sheet otherwise this will lead to cancellation of your paper.
- Keep your mobile phone turned off. Any mobile phone found Active / ON will be confiscated and candidate will be disqualified from the test.

**Section: A MATHEMATICS(35 questions)**

**Q No:1** The cross product of two parallel vectors is ?

- (a). 0
- (b). 1
- (c). parallel
- (d). perpendicular

**Q No:2** Which of the following numbers gives 240 when added to its own square?

- (a). 15
- (b). 16
- (c). 18
- (d). 20

**Q No:3** Evaluation of  $8^3 \times 8^2 \times 8^{-5}$  is .....

- (a). 1
- (b). 0
- (c). 8
- (d). None of These

**Q No:4** A rule that assigns each element of  $x \in X$  to a unique element of  $y \in Y$  is called

- (a). Domain
- (b). Range
- (c). Function
- (d). Value

**Q No:5** A polynomial function which has degree one is called

- (a). Identity function
- (b). Linear function
- (c). Constant function
- (d). None of these

**Q No:6**  $2 + 2 - 2 \times 2 \div 2 = ?$

- (a). 0
- (b). 1
- (c). 2
- (d). 4

**Q No:7** If the domain of function  $f: x \rightarrow x^2 + 1$  is  $\{0,1\}$  the range of  $f$  is

- (a).  $\{0,1\}$
- (b).  $\{1,2\}$
- (c).  $\{2,3\}$
- (d).  $\{3,4\}$

**Q No:8** A clock strikes once at 1 o'clock, twice at 2 o'clock, thrice at 3 o'clock and so on. How many times will it strike in 24 hours?

- (a). 78
- (b). 136
- (c). 156
- (d). 196

**Q No:9** What comes next in the sequence: 2, 4, 10, 28, \_\_\_\_ ?

- (a). 64
- (b). 70
- (c). 76
- (d). 82

**Q No:10**  $-(-3)^3 =$  \_\_\_\_\_

- (a). -9
- (b). 27
- (c). 9
- (d). -27

**Q No:11**  $1^0$  is equal to \_\_\_\_\_ .

- (a). -1
- (b). 0
- (c). 1
- (d). None of these

**Q No:12**  $x \rightarrow 0$ , means that

- (a).  $x$  is zero
- (b).  $x$  is very close to zero
- (c).  $x$  is negative
- (d). None of these

**Q No:13** If  $g(x) = \frac{1}{x^2}$ , then  $gog(x)$  is

- (a).  $x^4$
- (b).  $4x + 4$
- (c).  $x^2$
- (d).  $\frac{1}{x^4}$

**Q No:14** If  $f(x) = \frac{x}{x^2-4}$ , then  $f$  is not defined at

- (a). 4
- (b). 2
- (c). 0
- (d). -4

**Q No:15** A function is not continuous at  $x = c$ , then it is called \_\_\_\_\_

- (a). Discontinuous
- (b). Stationary
- (c). Defined
- (d). None of these

**Q No:16**  $(a + ib)(c - id) =$

- (a).  $(ac - bd) + i(ad + bc)$
- (b).  $(ac + bd) + i(ad - bc)$
- (c).  $(ac + bd) - i(ad - bc)$
- (d).  $(ac - bd) + i(ad - bc)$

**Q No:17** The range of  $\operatorname{cosec} x$  is

- (a).  $[-1, 1]$
- (b).  $R$
- (c).  $R - \{x \mid -1 < x < 1\}$
- (d).  $[0, 1]$

**Q No:18** The period of  $\cos x$  is

- (a).  $\pi$
- (b).  $\frac{\pi}{2}$
- (c).  $\frac{\pi}{4}$
- (d).  $2\pi$

**Q No:19** If  $A = \{a, b\}$  and  $B = \{2, 3, 4\}$  then  $A \times B =$

- (a).  $\{(a, a), (a, 3), (a, 4), (b, 2), (b, 3), (b, 4)\}$
- (b).  $\{(a, 2), (a, 3), (a, 4), (b, 2), (b, 3), (b, b)\}$
- (c).  $\{(a, 2), (a, 3), (a, 4), (b, 2), (b, 3), (b, 4)\}$
- (d).  $\{(2, a), (3, a), (4, a), (2, b), (3, b), (4, b)\}$

**Q No:20** The set  $\{\{1, 2, 3\}, \{4, 5\}, \{a, b\}\}$  has

- (a). Two elements
- (b). Three elements
- (c). Five elements
- (d). None of these

**Q No:21** For a set  $A$  and the Universal set  $U$ ,  $A \cap A^c =$

- (a).  $A$
- (b).  $A^c$
- (c).  $U$
- (d).  $\emptyset$

**Q No:22** For all points  $(x, y)$  in 2<sup>nd</sup> quadrant

- (a).  $x > 0, y > 0$
- (b).  $x < 0, y < 0$
- (c).  $x > 0, y < 0$
- (d).  $x < 0, y > 0$

**Q No:23** The common difference of the sequence 5,8,11,14,... is

- (a). 3
- (b). -3
- (c). 0
- (d). 1

**Q No:24** If  $A, G, H$  are the arithmetic, geometric and harmonic means between  $a$  and  $b$  respectively, then

- (a).  $H > G > A$
- (b).  $H \geq G > A$
- (c).  $H \geq G \geq A$
- (d).  $A > G > H$

**Q No:25** If  $n$  is any positive integer, then  $1 + 3 + 5 + \dots + (2n - 1) =$

- (a).  $n$
- (b).  $n + 1$
- (c).  $2n + 1$
- (d).  $n^2$

**Q No:26**  $\frac{d}{dx}(ax^n + bx^m) =$  \_\_\_\_\_

- (a).  $anx^{n-1} + bmx^{m-1}$
- (b).  $anx^n + bmx^m$
- (c).  $(ax^{n-1} + bx^{m-1})$
- (d).  $(a + b)mx^n + nx^m$

**Q No:27** The solution of differential equation  $\frac{dy}{dx} = \sin x$  is \_\_\_\_\_

- (a).  $y + \cos x + c = 0$
- (b).  $y - \sin x + c = 0$
- (c).  $y + \cot x + c = 0$
- (d).  $y - \cos x + c = 0$

**Q No:28** The slope of a line with inclination  $180^\circ$  is

- (a). 1
- (b). 0
- (c). -1
- (d). undefined

**Q No:29** The differential equation  $\frac{dy}{dx} - x = xy^2$  is of

- (a). Order 2 degree 1
- (b). Order 1 degree 2
- (c). Order 2 degree 2
- (d). Order 1 degree 1

**Q No:30** The distance of point  $(7, 3)$  from x-axis is

- (a). 3
- (b). 7
- (c). -3
- (d). 7

**Q No:31** The number of words that can be found out of the letters of the word PESHAWAR is

- (a). 2!
- (b). 8!
- (c).  $2!/8!$
- (d).  $8!/2!$

**Q No:32**  $(G,*)$  is a commutative or abelian group, if for all  $a, b \in G$

- (a).  $a * b = b * a$
- (b).  $a * b \neq b * a$
- (c).  $a + b = b * a$
- (d).  $a + b = b + a$

**Q No:33** Amjad bought a car valued at \$7700. One year later the car's value had decreased by  $\frac{2}{7}$ . What is the new value of the car?

- (a). \$2200
- (b). \$5500
- (c). \$9900
- (d). \$4400

**Q No:34** Any real number  $a =$

- (a).  $ia$
- (b).  $(0, a)$
- (c).  $(a, 0)$
- (d).  $(a, 1)$

**Q No:35** The multiplicative inverse of  $\frac{1}{2}$  is

- (a). 2
- (b). -2
- (c). 0
- (d). 1

**Section: B English (15 questions)**

**Q No:36** Jack \_\_\_\_\_ English, Spanish and a bit of French.

- (a). speak
- (b). is speaking
- (c). speaks
- (d). spoke

**Q No:37** I \_\_\_\_\_ tennis every Sunday morning.

- (a). Playing
- (b). play
- (c). am playing
- (d). am play

**Q No:38** Don't make so much noise. John \_\_\_\_\_ to study for her ESL test!

- (a). try
- (b). tries
- (c). tried
- (d). is trying

**Q No:39** \_\_\_\_\_ many times every winter in Frankfurt.

- (a). It snowed
- (b). It snows
- (c). It is snowing
- (d). It is snow

**Q No:40** Babies \_\_\_\_\_ when they are hungry.

- (a). cry
- (b). cries
- (c). cried
- (d). are crying

**Q No:41** Jane: "What \_\_\_\_\_ in the evenings?"

Mary: "Usually I watch TV or read a book."

- (a). you doing
- (b). you do
- (c). do you do
- (d). are you doing

**Q No:42** Jane \_\_\_\_\_ her blue jeans today, but usually she wears a skirt or a dress.

- (a). wears
- (b). wearing
- (c). wear
- (d). is wearing

**Q No:43** Let's meet \_\_\_\_\_ 7'o clock.

- (a). by
- (b). for
- (c). at
- (d). to

**Q No:44** I lived in Holland \_\_\_\_\_ 1990s.

- (a). for
- (b). in
- (c). at
- (d). by

**Q No:45** What did you do \_\_\_\_\_ you were in Karachi.

- (a). when
- (b). through
- (c). during
- (d). While

**Q No:46** They visited \_\_\_\_\_ England last summer.

- (a). to
- (b). into
- (c). at
- (d). nothing

**Q No:47** I am going to see Hania \_\_\_\_\_ Murree this summer.

- (a). to
- (b). in
- (c). for
- (d). at

**Choose SYNONYMS for the following**

**Q No:48** There was no ACCESS to the large garden of the house except a well-hidden gate.

- (a). attack
- (b). seizure
- (c). entrance
- (d). turn

**Q No:49** I hope you are not going to ABANDON your project.

- (a). modify slightly
- (b). change
- (c). give up completely
- (d). postpone

**Q No:50** Larry was so ABSORBED in his novel that he forgot about his dinner cooking in the oven.

- (a). excelled
- (b). enlivened
- (c). obliged
- (d). Engrossed

**Section: C Physics (15 questions)**

**Q No:51.** A moving ball stops due to the action of

- (a). Nuclear force
- (b). Frictional force
- (c). Electric force
- (d). Magnetic force

**Q No:52** Echo is the effect produced due to

- (a). Absorption of sound
- (b). Dispersion of sound
- (c). Reflection of sound
- (d). Refraction of sound

**Q No:53** The speed of sound is maximum through which of the following?

- (a). Air
- (b). Glass
- (c). Water
- (d). wood

**Q No:54** Surface tension in a liquid is due to

- (a). Adhesive force between molecules
- (b). Cohesive force between molecules
- (c). Gravitational force between molecules
- (d). Electrical force between molecules

**Q No:55** A person climbing a hill bends forward in order to

- (a). Avoid slipping
- (b). Increase speed
- (c). Reduce fatigue
- (d). Increase stability

**Q No:56** Semi-conductor is such a substance, whose ability to conduct current lies in Between

- (a). Conductor and insulators
- (b). Conductors and superconductors
- (c). Insulators and super conductors
- (d). Wood and plastic

**Q No:57** The hydraulic brakes used in automobiles is a direct application of:

- (a). Archimedes' principle
- (b). Toricellian law
- (c). Bernoulli's theorem
- (d). Pascal's law

**Q No:58** Metals are good conductors of electricity because

- (a). They contain free electrons
- (b). The atoms are lightly packed
- (c). They have high melting point
- (d). All of above

**Q No:59** Water cannot be used to extinguish fire caused by an electric current because

- (a). It may cause another short circuit
- (b). It may cause hydrolysis
- (c). It may cause electrocution
- (d). It will spoil the wiring



**Q No:60** The resistance of a bulb rated 60 watts/220 volts is approximately

- (a).  $4\Omega$
- (b).  $40\Omega$
- (c).  $400\Omega$
- (d).  $800\Omega$

**Q No:61** Which one of the following colours has the longest wavelength?

- (a). Green
- (b). Yellow
- (c). Blue
- (d). Red

**Q No:62** A football player will throw a football a maximum distance if the angle of projection is:

- (a).  $30^\circ$
- (b).  $45^\circ$
- (c).  $60^\circ$
- (d).  $90^\circ$

**Q No:63** Motion of projectile is \_\_\_\_\_ dimensional.

- (a). One
- (b). Two
- (c). Three
- (d). Four

**Q No:64** Slope of work time graph is equal to.

- (a). Displacement
- (b). Acceleration
- (c). Power
- (d). Energy

**Q No:65** Which of the following is not conservative force?

- (a). Friction
- (b). Electric
- (c). Gravitational
- (d). Magnetic

**Attempt Either Section “D” OR Section “E” OR Section “F”**

**Section: D Computer Sciences (10 questions)**

**Q No:66** The process of a computer receiving information from a server on the Internet is known as:

- (a). pulling
- (b). pushing
- (c). downloading
- (d). transferring

**Q No:67** Which of the following groups consist of only output devices?

- (a). Scanner, Printer, Monitor
- (b). Keyboard, Printer, Monitor
- (c). Mouse, Printer, Monitor
- (d). Plotter, Printer, Monitor

**Q No:68** Junk e-mail is also called?

- (a). Spam
- (b). Spoof
- (c). Sniffer
- (d). script

**Q No: 69** In Computer system word BOOT is used for

- (a). To start up a software
- (b). Finished the open software
- (c). Shutdown system
- (d). To start up a computer

**Q No: 70** Software programme that controls a piece of hardware is called?

- (a). Browser
- (b). Messenger
- (c). Driver
- (d). Control panel

**Q No: 71** The term ‘Computer’ is derived from

- (a). Latin
- (b). German
- (c). French
- (d). Arabic

**Q No:72** Which of the following controls the process of interaction between the user and the operating system?

- (a). User interface
- (b). Language translator
- (c). Platform
- (d). Screen saver

**Q No:73** Which device is required for the Internet connection?

- (a). Joystick
- (b). Modem
- (c). CD Drive
- (d). NIC Card

**Q No:74** Spam is also called

- (a). Junk e-mail
- (b). spoof
- (c). sniffer script
- (d). spool

**Q No:75**A computer cannot 'boot' if it does not have the

- (a). Compiler
- (b). Loader
- (c). Operating System
- (d). Assembler

**Section: E Statistics (10 questions)**

**Q No:66** If A & B are mutually disjoint events then  $P(A \cup B) =$  \_\_\_\_\_

- (a)  $P(A) + P(B) - P(A \cap B)$
- (b)  $P(A) - P(B)$
- (c)  $P(A) + P(B)$
- (d) None

**Q No:67** Accepting a false null hypothesis is an example of what?

- (a) Significance testing
- (b) Type 1 error
- (c) Experimenter bias
- (d) Type II error

**Q No:68** Which one is not measure of dispersion.

- (a). The range
- (b). 50<sup>th</sup> percentile
- (c). Variance
- (d). Inter- Quartile range

**Q No:69** If the standard deviation of a population is 9, the population variance is

- (a). 9
- (b). 3
- (c). 21
- (d). 81

**Q No:70** The number of accidents in a city during 2010 is

- (a). Discrete Variable
- (b). Continuous Variable
- (c). Qualitative Variable
- (d). None of these

**Q No:71** In a five number summary, which of the following is not used for data summarization?

- (a). The smallest value
- (b). The largest value
- (c). The 25th percentile
- (d). The median

**Q No:72** The sum of the percent frequencies for all classes will always equal

- (a). One
- (b). The number of classes
- (c). The number of items in the study
- (d). 100

**Q No:73** In statistics out of 100, marks of 21 students in final exams are as 90, 95, 95, 94, 90, 85, 84, 83, 85, 81, 92, 93, 82, 78, 79, 81, 80, 82, 85, 76, 85 then mode of data is

- (a). 85
- (b). 95
- (c). 90
- (d). 81

**Q No:74** Which of the following terms means the spread or dispersion of data (the positive square root of the variance)?

- (a). standard deviation (SD)
- (b). standard error (SE)
- (c). standard error of the estimate
- (d). standard error of the mean (SEM)

**Q No:75** Which of the following terms means the ratio of the standard deviation to the mean?

- (a). coefficient of determination
- (b). coefficient of variation
- (c). correlation coefficient
- (d). criterion standard

**Section: F Chemistry (10 questions)**

**Q No: 66** A molecule having two atoms is called

- (a) monoatomic molecules
- (b) diatomic molecules
- (c) Polyatomic molecules
- (d) homoatomic molecule

**Q No: 67** Nickel has isotopes

- (a) 1
- (b) 3
- (c) 5
- (d) 7

**Q No: 68** A crystalline solid has \_\_\_\_\_.

- (a). long range order
- (b). short range order
- (c). disordered arrangement
- (d). none of these

**Q No: 69** A solid having irregular shape is called \_\_\_\_\_ solid.

- (a). amorphous
- (b). crystalline
- (c). anisotropic
- (d). isomorphs

**Q No: 70** \_\_\_\_\_ solids are also called giant solids or network solids.

- (a). Covalent
- (b). Molecular
- (c). Ionic
- (d). Metallic

**Q No:71** Smallest particle of an element which may or may not have independent existence

- (a). a molecule
- (b). an atom
- (c). an ion
- (d). an electron

**Q No:72**  $\text{CO}^+$  is an example of

- (a). free radical cationic
- (b). molecular ion
- (c). an ionic molecular
- (d). ion stable molecule

**Q No:73** Isotopes are the sister atoms of the same element with similar chemical properties and different

- (a). atomic number
- (b). atomic mass
- (c). atomic volume
- (d). atomic structure

**Q No:74** Percentage of oxygen in  $\text{H}_2\text{O}$  is

- (a). 80%
- (b). 88.8%
- (c). 8.8%
- (d). 9.8%

**Q No:75** A sample of pure matter is

- (a). Element
- (b). Compound
- (c). Substance
- (d). Mixture