Nepal Engineering College

Changunarayan Bhaktapur

***nec* BDH Program, Satdobato, Lalitpur**

Model Question

BE Civil [for Diploma Holders] **F.M: 200** **Time: 2 Hours**

……

Choose the one lettered choice that is best in each case and then fill in the corresponding circle in the answer sheet provided. Each question carries equal mark.

MATHEMATICS **[16x2.5=40]**

1. The distance between the parallel lines $y = 2x + 4$ and $6x - 3y = 5$ is

(a) 17 (b) $\frac{17}{\sqrt{45}}$ (c) $\sqrt{\frac{17}{45}}$ (d) does not exists.

2. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$, then the value of $A^2 - 2A - 5I$ is equals to

(a) $\begin{bmatrix} -6 & 0 \\ 0 & -6 \end{bmatrix}$ (b) $\begin{bmatrix} 6 & 0 \\ 0 & -6 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 6 & 0 \\ 0 & 6 \end{bmatrix}$

3. The value of the complex number $(1+i)^8$ is equals to

(a) 2 (b) $\sqrt{2}$ (c) 81 (d) 16

4. If α and β are the roots of the equation $x^2 - x - 6 = 0$, then the equation whose roots are $\alpha + \frac{1}{\beta}$ and $\beta + \frac{1}{\alpha}$ is

(a) $x^2 + x - 6 = 0$ (b) $6x^2 - 5x - 6 = 0$ (c) $6x^2 - 5x - 52 = 0$ (d) $6x^2 - 5x - 25 = 0$

5. If the lines $y = x + 1$, $y = 2x + 2$ and $y = \lambda x + 3$ are concurrent , then the value of λ is

(a) 3 (b) 2 (c) $\frac{1}{2}$ (d) 1

6. The angle between the planes $x + 2y + z + 7 = 0$ and $2x + y - z + 13 = 0$ is

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

7. The value of the integral $\int \frac{dx}{x[\log x]^2}$ is equals to

(a) $2\log[\log(x)]+C$ (b) $\frac{1}{\log x}+C$ (c) $\frac{1}{x}+C$ (d) $-\frac{1}{\log x}+C$

8. If the area of the triangle formed by coordinate axes and the line $\frac{x}{2}+\frac{y}{k}=1$ is equals to 1, then the value of ' k' is

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

9. The value of $\lim_{x\to 0}\left[\frac{\sqrt{a+x}-\sqrt{a}}{x}\right]$, is equals to

(a) 0 (b) $\frac{1}{\sqrt{a}}$ (c) $\frac{1}{2\sqrt{a}}$ (d) Does not exists.

10. The value of $|2x+5|<3$, is same as

(a) $-3<x<3$ (b) $-4<x<-1$ (c) $1<x<4$ (d) $-5<x<3$

11. The value of the integral $\int \frac{dx}{x^2+x}$ is equals to

(a) $\log(x^2+x)+C$ (b) $[\log x][\log(x+1)]+C$

(c) $\log(2x+1)+C$ (d) $\log\left[\frac{x}{x+1}\right]+C$

12. The value of the determinant $\begin{vmatrix}1 & a & b+c\\ 1 & b & c+a\\ 1 & c & a+b\end{vmatrix}$ is equals to

(a) 0 (b) a + b + c (c) 1 (d) abc

13. The direction cosines of the line perpendicular to the plane $x-2y+2z=1$ is

(a) 1, -2, 2 (b) 1, $\frac{1}{2},\frac{-1}{2}$ (c) 3, -2, 2 (d) $\frac{1}{3},\frac{-2}{3},\frac{2}{3}$

14. The function $y=f(x)$ has maximum value at x = a if

(a) $\frac{dy}{dx}=0$ and $\frac{d^2y}{dx^2}>0$ (b) $\frac{dy}{dx}=0$ and $\frac{d^2y}{dx^2}<0$

(c) $\frac{dy}{dx}>0$ and $\frac{d^2y}{dx^2}<0$ (d) $\frac{dy}{dx}<0$ and $\frac{d^2y}{dx^2}=0$

15. If $A=\{1,2,3,4\}$ and $B=\{3,4,5,6\}$, then $n(A\cup B)$ is equals to

(a) 6 (b) 8 (c) 4 (d) 16

16. If $\sin^{-1}x+\sin^{-1}y=\frac{2\pi}{3}$, then the value of $\cos^{-1}x+\cos^{-1}y$ is equals to

(a) π (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{3}$ (d) 3π

PHYSICS **[12x2.5=30]**

17. The radius of gyration of a solid sphere about a tangent is given by

(a) $\sqrt{\frac{2}{3}}R$ (b) $\sqrt{\frac{5}{3}}R$ (c) $\sqrt{\frac{2}{5}}R$ (d) $\sqrt{\frac{7}{5}}R$.

18. A particle of mass 10g is executing S.H.M with an amplitude 0.5 m and time period $\pi/5$ second. The maximum value of the force acting on the particle is

(a) 25 N (b) 5 N (c) 2.5N (d) 0.5 N

19. In an interference experiment, the spacing between successive maxima (or minima) is [all symbols have their usual meanings

(a) $\frac{\lambda d}{D}$ (b) $\frac{\lambda D}{d}$ (c) $\frac{dD}{\lambda}$ (d) $\lambda d/4$

20. What is the force required to take away a flat circular plate of radius 5cm on the surface of water. S.T. of water = $75\times10^{-3}N/m$

(a) 3.75 x 10^{3}N (b) 7.5 x 10^{-3}N (c) 7.5x10^{-3}N (d) 3N

21. The ratio of charge to potential of a body is known as

(a) Capacitance (b) Conductance (c) Inductance (d) Resistance

22. If LCR circuit contains L=8 Henry, C=0.5 Farad, R= 100 Ω in series, then the resonant frequency will be

(a) 600 radian/sec (b) 500 radian/sec (c) 600 Hz (d) 500 Hz

23. The resonant frequency of an LCR series circuit is

(a) $2\pi\sqrt{LC}$ (b) 2π RC (c) $\frac{R}{2\pi\sqrt{LC}}$ (d) $\frac{1}{2\pi\sqrt{LC}}$

24. The displacement X (in meter) of a particle performing simple harmonic motion is related to time t (second) as x = 0.05 cos $(4t\pi+\frac{\pi}{4})$, the frequency of motion is

(a) 0.5 Hz (b) 1 Hz (c) 1.5 Hz (d) 2 Hz

25. The dimensional formula of pressure is

(a) $[M^1L^{-3}T^0]$ (b) $[M^1L^2T^{-3}]$ (c) $[M^0L^2T^0]$ (d) $[M^1L^{-1}T^{-2}]$

26. The magnitude of a force which have x component 40 N and y component 60 N is

(a) 72 N (b) 50 N. (c) 30 N (d) 100N

27. The work done on a body with displacement 10 m due to force 50 N is

(a) 100 J (b) 50 J (c) 500 J (d) 1000J

28. The distance between an object and its real image formed by a lens is D. If the magnification is m, then the focal length of the lens used is

(a) $f = \frac{mD}{m-1}$ (b) $f = \frac{mD}{m+1}$ (c) $f = \frac{mD}{(m+1)^2}$ (d) $f = (\frac{m-1}{m+1})D$

CHEMISTRY **[6x2.5=15]**

29. Natural rubber is polymer of

(a) Butadine (b) ethylene (c) propylene (d) Isopreme

30. The weight of hydrogen required to obtain 36 gms water in

(a) 4 gm (b) 3 gm (c) 2 gm (d) 1 gm

31. Potassium ferrocyanide on heating with conc. H_2So_4 forms

(a) CO (b) SO_2 (c) SO_3 (d) HCN

32. If electron is to exist in nucleus then the uncertainty in the velocity of electron will be

(a) $3\times10^8 m/s$ (b) $5.7\times10^{10} m/s$ (c) $3\times10^6 m/s$ (d) $5.7\times10^9 m/s$

33. The number of atoms in 1.4 gm N_2 is

(a) 1.2×10^{22} (b) 3.01×10^{22} (c) 6.02×10^{22} (d) 6.02×10^{23}

34. In potassium dichromate , chromium has O.N

(a) + 4 (b) +5 (c) +6 (d) +3

STRENGTH OF MATERIAL AND THEORY OF STRUCTURES **[12x2.5=30]**

35. The angle which an inclined surface makes with the horizontal when a body placed on it is on the point of moving down, is called

(a) angle of repose (b) angle of friction (c) angle of inclination (d) none of these

36. In a bar of large length when held vertically and subjected to a load at its lower end, its own-weight produces additional stress. The maximum stress will be

(a) at the lower cross-section
(b) at the built-in upper cross-section
(c) at the central cross-section
(d) at every point of the bar

37. If Z and I are the section modulus and moment of inertia of the section, the shear force F and bending moment M at a section are related by

(a) $F=\frac{My}{I}$ (b) $F=\frac{M}{Z}$ (c) $F=\frac{dM}{dx}$ (d) $F=\int Mdx$

38. The shape of the bending moment diagram. Over the length of a beam carrying a udl is always

(a) lines (b) parabolic (c) cubical (d) circles

39. A simply supported beam carries two equal concentrated loads W at distances L/3 from either support .The maximum bending moment M is

(a) WL/3 (b) WL/4 (c) 5 WL/8 (d) 3WL/12

40. The shape of the bending moment diagram over the length of a beam, carrying a uniformly-varied load is always

(a) linear (b) parabolic (c) cubical (d) circular

41. A simply supported beam A carries a point load at its mid span. Another identical beam B carries the same load but uniformly distributed over the entire span. The ratio of the maximum deflections of the beams A and B, will be

(a) 2/3 (b) 3/2 (c) 5/8 (d) 8/5

42. When a rectangular beam is loaded transversely, the maximum compressive stress develops on

(a) bottom fibre (b) top fibre (c) neutral axis (d) every cross-section

43. A cantilever of length 2cm and depth 10cm tapers in plan from width 24cm to zero at its free end. If the modulus of elasticity of the material is 0.2x106N/mm2,the deflection of the free end, is

(a) 2mm (b) 3mm (c) 4mm (d) 5mm

44. A truss containing j joints and m members, will be a simple truss if

(a) m=2j-3 (b) j=2m-3 (c) m=3j-2 (d) j=3m-2

45. A compound truss may be formed by connecting two simple rigid frames, by

(a) two bars (b) three bars

(c) three parallel bars (d) three bars intersecting at a point

46. The load on a spring per unit deflection, is called

(a) stiffness (b) proof resilience (c) proof stress (d) proof load

SURVEYING **[12x2.5=30]**

47. Correction for slope is

(a) Always positive (b) Always negative

(c)Either positive or negative (d) None of the above

48. Which instrument is not used for setting out right angles?

(a)Cross staff (b) Optical square

(c)Prism square (d) Abney level

49. If fore bearing of a line is N60 E, its back bearing is

(a) S60˚E (b) S30˚W

(c) N30˚W (d) S60˚W

50. Line joining the points of equal declination is

(a) Isogonic line (b) True meridian

(c) Magnetic meridian (d) Agonic line

51. The sources of error in transit work are

(a) Instrumental (b) Natural

(c) Personal (d) All of the above

52. The method of finding out the position of plane table by the help of points on the sheet is

(a) Intersection (b) Traversing

(c) Radiation (d) Resection

53. Method used for balancing the traverse

(a) Bowditch's method (b) Transit Method

(c) Graphical Method (d) All of the above

54. Reciprocal leveling is used to eliminate the

(a) Instrumental error (b) Effect of earth curvature and refraction

(c) Variation in average refraction (d) All of the above

55. If R is the radius of earth and d is the distance then, curvature correction is

(a) $d^2/2R$ (b) $d^2/14R$

(c) $6d^2/14R$ (d) $d^2/12R$

56. Contour interval of a map doesn't depends on

(a) Nature of ground (b) methods of interpolation

(c) Nature and extent of work (d) Scale of map

57. Method of levelling in which horizontal distance and vertical angle is measured

(a) Spirit levelling (b) Trigonometrical levelling

(c) Cross-section levelling (d) Profile levelling

58. Ideal well-conditioned triangle is a triangle having interior angles

(a) Grater than 30 (b) Grater than 30

(c) Equals to 60° (d) None of the above

BUILDING MATERIAL AND CONSTRUCTION **[12x2.5=30]**

59. Slate is in the forms of tiles are used
(a) for paving (b) as roof covering material
(c) as road metal (d) none of the above

60. The colour of Granite is …
(a) grey (b) green (c) brown (d) all of the above

61. The first class brick should have a minimum crushing strength
(a) 70 Kg/cm^2 (b) 105 Kg/cm^2 (c) 125 Kg/cm^2 (d) none of the above

62. The process of mixing clay, water and other ingredients to make brick , is known as :
(a) Tempering (b) Pugging (c) Kneading (d) moulding

63. Quick lime on reaction with water gives
(a) hydraulic lime (b) slaked lime
(c) hydrated lime (d) non of the above

64. The compressive strength of a Portland cement after 3 days of curing should not be less than
(a) 70 Kg/cm^2 (b) 115 Kg/cm^2 (c) 175 Kg/cm^2 (d) all of the above

65. The initial setting time of ordinary Portland cement should not be more than
(a) 1 hour (b) 2 hours
(c) 45minutes (d) none of the above

66. The central part of a tree is called
(a) heart wood (b) pith (c) sap wood (d) none of the above.

67. The strength of timber is maximum in the direction……to the grain
(a) parallel (b) perpendicular
(c) all of the above (d) none of the above

68. The pigment in paints is mixed to give desired
(a) smoothness (b) colour
(c)appearance (d) none of the above

69. The ability of sub soil to support the load of the structure without yielding is known as
(a) value of soil (b) ultimate power of soil
(c) bearing capacity of soil (d) non of the above

70. In which situation combined footings are used
(a) when two columns are spaced close to each other
(b) when two columns are spaced apart
(c) under set of column
(d) non of the above

ENGLISH **[10x2.5=25]**

71. Which of the following sentence is correct?

(a) When have you been working for her since?

(b) Since have you been working for her when?

(c) When since have you been working for her?

(d) Since when have you been working for her?

72. Choose the correct spelling.

(a) Millennium (b) Milenium (c) Milleniuum (d) Milennium

73. "Flown" is the past participle of…….. .

(a) flee (b) fly (c) flew (d) flied

74. The passive form of "She doesn't like anyone looking at her." is …….. .

(a) She doesn't like people looking at her.

(b) She doesn't like looking at people.

(c) She doesn't like being looked at.

(d) She doesn't like people look at her.

75. I go to the movies <u>once in a blue moon.</u> The underlined idiomatic expression means……..

(a) every month (b) seldom/on rare occasions

(c) biweekly (d) every now and then

76. His boss ……. an explanation of his conduct.

(a) called off (b)called up

(c) called on (d) called for

77. The synonym of the word '<u>Augment</u>' is……..

(a) increase (b) decrease

(c) surrender (d) abandon

78. The antonym of the word '<u>Morose</u>' is…….

(a) pale (b) curse

(c) cheerful (d)gloomy

79. Why are the references included in a research report writing?

(a) To fully identify the source of information and ideas discussed in the report so that others may check for themselves.

(b) It is courtesy to the authors of the works that you have read.

(c) To impress lectures.

(d) To keep a record of everything that you have read in writing the report.

80. The enclosure notation in letter writing represents…… .

(a) The writer of the letter will mail more information at a later date.

(b) The writer of the letter needs you to mail them something.

(c) You do not ever use enclosure notation in a personal-business letter.

(d) The writer of the letter has put other documents inside the envelope with their letter.