ROYAL CIVIL SERVICE COMMISSION
CIVIL SERVICE COMMON EXAMINATION (CSCE) 2008
EXAMINATION CATEGORY: TECHNICAL

PAPER II: GENERAL SUBJECT KNOWLEDGE for ENGINEERING GROUP

Date : **19/12/2008**
Maximum Marks : **100**
Examination Time : **1.5 Hours**
Reading Time : **10 Minutes**

READ THE FOLLOWING GUIDELINES CAREFULLY

1. Do not write for the first **10 minutes**. This time must be spent in reading the question paper and checking whether all questions and pages are correct and intact.

2. The maximum time allotted for writing this paper is **90 minutes**

3. All answers to the questions must be written in a separate **Answer Sheet** provided.

4. This paper consists of **TWO Parts**, **Part I** and **Part II**. Part I consists of **70 Multiple Choice questions** and Part II consists of **10 Short Answer questions. All questions** are compulsory.

5. Every correct answer for the questions in Part I shall be awarded with ONE (1) mark each while correct answers to questions in Part-II shall be awarded THREE (3) marks each.

6. While answering the multiple choice questions, write only the letter of the correct answer chosen against the question number, clearly & legibly. Any double writing or smudgy answers shall not be evaluated. E.g.: Q1 – a; Q2 - d

7. This paper contains **TEN** (10) printed pages in all, including the Instruction page

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PART I – MULTIPLE CHOICE

Choose the Correct Answer and write down the letter of the correct answer chosen in the Answer Sheet provided against the question number.

SECTION A: Mathematics

1. In an equation, $\sqrt{96} \div \sqrt{k} = 2\sqrt{6}$; what value of k will satisfy the equation?

   a) 2   b) 4   c) 6   d) 8

2. If Bhutan's Population grows at an annual rate of 1.3% and there were 0.65 million people in the year 2005, then in which year will the population of Bhutan become more than 1.3 million?

   a) 2057   b) 2058   c) 2059   d) 2060

3. To the correct number of significant figures, $(5.0 \times 10^{-5}) \div (2.00 \times 10^{-2})$ is?

   a) 2.5×10^{-7} b) 2.5×10^{-3} c) 2.50×10^{-3} d) None of these

4. Sonam invested Nu. 120,000 for buying 1000 BNB shares which were sold at a premium of 20%. What is the face value of the share?

   a) 100   b) 120   c) 144   d) 96

5. The product of 3x2 matrix and 2x3 matrix will result in what order matrix?

   a) 3 x 2   b) 2 x 2   c) 2 x 3   d) 3 x 3

6. Tshewang pays 60% of his salary as house rent, 15% of salary as loan installment and he still saves Nu. 900 after spending Nu. 1,800 on other household goods. What is his salary?

   a) Nu. 2,700   b) Nu. 8,100   c) Nu. 10,800   d) Nu. 13,500

7. An investor owns 49% of the shares in a multinational company who declared 30% dividend on its stock for the fiscal year 2007. If the company's face value of the share is Nu. 100 and the company's stock consist of 100,000 shares, what would be the dividend income for the investor?

   a) Nu. 3.47 million   b) Nu. 2.47 million   c) Nu. 1.47 million   d) 0.47 million

8. The relationship between °F and °C temperatures in terms of °C is?

   a) °F = 9/5°C + 32   b) °C = 5/9(°F-32)
   c) °F = 9/5°C - 32   d) °C = 5/9(°F+32)

9. The ratio of a km to mile is?

   a) 1:1.0   b) 1:1.1   c) 1:1.4   d) 1:1.6

10. The mean of the following frequency distribution of 400 light bulbs tested in a factory is?

Life span (Hrs)	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1100	1100-1200
Freq (# of light bulbs)	20	40	56	75	78	55	50	18	8

   a) 710.50   b) 711.50   c) 712.50   d) 713.50

11. When a die is rolled, the probability of landing with 2 is?

   a) 3/6   b) 1/6   c) 2/6   d) 5/6

12. In a box containing 8 marbles having equal number of black and white marbles, a black marble has been drawn in the first round. The probability of drawing a white marble in the second round is?

   a) 1/7   b) 3/7   c) 5/7   d) 4/7

13. Sin (90° - x) equals?

   a) Sin x   b) 1 – Sin x   c) Cos x   d) Cosec x

14. The angle 'x' at which the values of Sin x and Cos x becomes equal is?

   a) 90°   b) 60°   c) 45°   d) 30°

15. In a right triangle with vertices at (0,0), (1,0) and (1,2), the angle extended from the x-axis is?

   a) 60°   b) 62°   c) 63.43°   d) 64°

16. Six times a number reduced by ten equals 50. What is the number?

   a) 8   b) 9   c) 10   d) 11

17. The second derivative (y") of the function, $y = 2x^5 + 4x^3 + x – 5$ is?

   a) $10x^4 + 12x^2$ b) $40x^3 + 24x^2$ c) $40x^2 + 24x$ d) $80x + 24$

18. 40% of 210 is same as one third of?

 a) 840 b) 280 c) 252 d) 84

19. If p, q and r are the three consecutive odd integers, which of the following statements is NOT true?

 a) p + q is an even integer b) p + q + r is an odd integer
 c) (p + r)/2 is an even integer d) (p + q)/2 is an even integer

20. The point of intersection of lines, x + 3y = 8 and 3x = 2 + 2y is

 a) (0,0) b) (8,0) c) (2,2) d) (2/3,0)

SECTION B: Chemistry

21. Which of the following is the formula for hydrosulfuric acid?

 a) H_2S b) H_2SO_3 c) H_2SO_4 d) HSO_4

22. Which of the following measurements are equivalent?

 a) 10 micrograms and 0.1 milligrams b) 10 nL and 1000 pL
 c) 0.01 mm and 1×10^{-3} cm d) None of these

23. Brass is an alloy made of?

 a) Cu, Fe b) Cu, Sn c) Cu, Ni d) Cu, Zn

24. 99.9% pure copper can be achieved through?

 a) Dialysis b) Electrolysis c) Hydrolysis d) Pyrolysis

25. Those balloons released during the coronation day on November 6th were filled with ?

 a) Oxygen b) Carbon dioxide c) Hydrogen d) Helium

26. Which statement is true about Halogens?

 a) Good conductors of electricity b) Electropositive non metals
 c) non conductors of electricity d) commonly exists as gases

27. HCL, H_2SO_4 and HNO_3 are considered as?

 a) Strong solvents b) Strong acids
 c) Weak acids d) Basic in nature

28. The gas which causes global warming is?

a) O_2 b) CO_2 c) N_2 d) He

29. Pure water has a pH value of?

   a) 6.5   b) 5.5   c) 7.0   d) 12

30. The atomic weight of Nitrogen is?

   a) 10   b) 12   c) 14   d) 16

31. The molecular weight of oxygen is?

   a) 12   b) 16   c) 32   d) 64

32. The relative atomic mass of an element is the result of comparing mass of one atom of the element to the …………… of the mass of carbon atom?

   a) 1/12   b) 1/10   c) 1/16   d) 1/14

33. The relative strengths of acids and alkalis can be determined with the help of a?

   a) Litmus paper   b) Methyl orange
   c) pH paper   d) Phenolphthalein

34. …………… is used in the manufacture of ice and as a refrigerant.

   a) HCL   b) Liquid ammonia
   c) Water   d) Chlorine

35. The chemical used for the sterilization of drinking water and swimming pool water is?

   a) Iodine   b) Chlorine   c) Ammonia   d) Calcium

36. The acid which dissolves silver and is also known as *Aqua Fortis* (Strong water) is?

   a) Hydrochloric acid   b) Sulphuric acid
   c) Citric acid   d) Nitric Acid

37. All of the following is used as raw materials in the production of cement, except?

   a) Limestone   b) Clay   c) Sand   d) Dolomite

38. A mineral acid used in the manufacture of soft drinks is?

   a) Citric Acid   b) Acetic acid   c) Carbonic acid   d) Boric acid

39. Which of the following would weigh most?

a) 1 mole of H_2O b) 1 mole of CO_2
c) 1 mole of NH_3 d) 1 mole of CO

40. In the refining of metals, followings processes are involved, except?

    a) Distillation   b) Liquation   c) Oxidation   d) Galvanization

SECTION C – Physics

41. Increasing the wavelength of visible light

    a) Shifts its color towards the red end of the spectrum
    b) Increases its brightness
    c) Causes it to grow dimmer
    d) Shifts its color towards the blue end of the spectrum

42. X-Rays was discovered by?

    a) Roentgen   b) Henry Cavendish   c) Ritter   d) Marconi

43. For which of the following substances, resistance decreases with temperature?

    a) Copper   b) Mercury   c) Carbon   d) Platinum

44. The unit of resistivity is?

    a) Ohm   b) Ohm/m   c) Ohm-m   d) Mho

45. A car is running at a speed of 15 km/hr while a similar car is moving at a speed of 30 km/hr. Their kinetic energies are in the ratio of?

    a) 1:2   b) 2:1   c) 1:4   d) 4:1

46. Pressure at a certain depth in fresh water is P1 and at the same depth in sea water is P2. Then?

    a) P1 = P2   b) P1 > P2
    c) P1 < P2   d) P1-P2 = Atmospheric pressure

47. The relative density of silver is 10.8. What is its density?

    a) 10.8   b) 10.8 kg/m^3
    c) 10.8 x 10^3 kg/m^3 d) 10.8 x 10^3 g/cm^3

48. Which of the following has the highest refractive index?

    a) Glass   b) Water   c) Diamond   d) Ruby

49. Nose bleeding may occur at high altitude because?

    a) The value of gravity decreases
    b) The atmospheric pressure decreases
    c) The O_2 content of the atmosphere decreases
    d) There are strong currents in the upper atmosphere

50. $F = ma$ is related to which order of Newton's Law?

    a) 1st Law   b) 2nd Law   c) 3rd law   d) All of the above

51. One Horse Power is equal to?

    a) 1000 W   b) 500 W   c) 764 W   d) 746 W

52. The value of 'g' is maximum at the ……….. and minimum at the ………….?

    a) Equator, poles   b) Poles, Equator
    c) Equator, Greenland   d) Poles, Sahara

53. The correct relationship between *kgf* and N is?

    a) 1 kgf = 1 N   b) 1 kgf = 10 N   c) 10 kgf = 1 N   d) 1 kgf = 1000 N

54. A mass weighs 100N on moon. If the value of 'g' on the moon is one-sixth that on earth, what would be the weight on earth?

    a) 100 N   b) 106 N   c) 400 N   d) 600 N

55. All are different forms of energy, except?

    a) Light Energy   b) Mechanical energy
    c) Renewable energy   d) Chemical energy

56. A watt is a unit of?

    a) Work   b) Mass   c) Force   d) Power

57. When a light ray passes through the optical fibre, which of the following holds true?

    a) Light signal is transferred without any loss of energy
    b) Light signal is transferred with some loss of energy
    c) Light signal transfers with 50% loss of energy
    d) None of the above

58. Which of the following has its working based on electromagnetic induction?

    a) Ammeter   b) Voltmeter

c) Transformer   d) Galvanometer

59. The equivalent resistance between the points A and B in the circuit is?

a) 4 Ω   b) 6 Ω   c) 8 Ω   d) 10 Ω

60. The number of protons and neutrons in a nucleus of $_{92}U^{238}$ are?

a) 92 and 238   b) 92 and 330
c) 92 and 146   d) 146 and 238

SECTION D – General IT Knowledge

61. What type of connector is used to plug a telephone line into a modem?

a) COM1   b) RJ-45   c) RJ-11   d) RJ-10

62. Which of the following retains the information it's storing when the power to the system is turned off?

a) CPU   b) ROM   c) RAM   d) DIMM

63. Which of the following is NOT a type of computer hard drive?

a) IDE   b) FDD   c) SCSI   d) EIDE

64. A network of computers and other devices that is confined to a relatively small space is called?

a) Wide Area Network   b) Local Area Network
c) Global Network   d) Peer-to-Peer Network

65. In a computer network which device acts as a traffic cop?

a) Router   b) Hub   c) Switch   d) Modem

66. The computer you are controlling or working via a network is called?

a) Remote computer   b) Local computer
c) Host computer   d) Personal Computer

67. WYSIWYG is an acronym for what?

    a) What You Saw Is What You Got   b) What You See Is What You Get
    c) What You Seen Is What You Gotten   d) What You Sow Is What You Get

68. Which protocol sends electronic mail?

    a) Outlook Express   b) POP3   c) FTP   d) SMTP

69. The word BHUTANESE will require how many bytes of computer memory storage?

    a) 8 bytes   b) 9 bytes   c) 10 bytes   d) 0.5 KB

70. The manufacturers have a set of common colors used to label the various holes, connectors, and ports on the computer's console. What is the color used to label monitors?

    a) Pink   b) Grey   c) Blue   d) Green

PART I I– SHORT ANSWER TYPE

Answer all questions (Each question is valid for 3 marks)

1. Transform the linear equation, $3x - 4y = 12$ into its slope and y-intercept form. Also, provide the values of slope and y-intercept of this equation?

2. Calculate the area of a regular hexagon whose side is 6 cm long?

3. Simplify:

   $-\sqrt{(27x^6)} + \sqrt{(4x)} - \sqrt{(12x^2)} + \sqrt{x^5}$

4. What is internet? Explain.

5. The half-life of a radioactive substance is 16 years. After how much time, 1/8 th part of the substance will remain undisintegrated in a sample?

6. Sucrose (table sugar) has empirical formula CH_2O and molecular weight 360. The atomic weights of C, H and O are 12, 1, and 16 respectively. Find the molecular formula of sucrose?

7. A typical house uses two bulbs of 100 watts each and two fans of 60 watts each for ten hours each day. Calculate the electrical energy consumed in the month of November by this household. Also calculate the bill for the month if one unit of electricity costs Nu. 2.10?

8. Explain why NAND gate is also known as the universal gate?

9. Two lamps, one rated 50W, 220V and the other rated 220V, 100W are connected in series with 220V mains. Which bulb will consume more energy, calculate and show?

10. Explain why ordinary common salt gets wet during the rainy season?