Code. No: 2004

FACULTY OF ENGINEERING

B.E. I-Year (Backlog) Examination, December 2019

Subject : Engineering Chemistry

Time: 3 Hours **Max. Marks: 75**

Note : Answer all questions from part – A and any five questions from Part-B

PART– A (25 Marks)

1. Calculate the electrode potential of zinc electrode at 25^{o} C., if it is in $ZnSO_4$ =.001M (Given $E^{o}_{Zn+2/Zn}$ = -0.760V). (2)
2. Write the Methanol- Oxygen fuel cell reactions. (3)
3. Explain the pitting corrosion. (2)
4. Write any three factors affecting the rate of corrosion. (3)
5. What are the constituents of paint? Give their function. (2)
6. Explain the compounding of rubber. (3)
7. Write the Dulong's formula for the calculation of calorific value. (2)
8. What are the requirements for the good fuel? (3)
9. Explain the saponification number? (2)
10. Define terms i) component ii) degrees of freedom. (3)

PART –B (50 Marks)

11. a) What is redox electrode ? Represent the electrode and write the electrode reaction and electrode potential equation for the reduction process. (5)
    b) Explain the construction and working of Ni-Cd battery. (5)

12. a) What is cathodic protection? Explain the impressed current cathodic protection. Method. (5)
    b) Explain the determination of hardness of water by EDTA method. (5)

13. a) Write the different polymerization types and give one example each. (5)
    b) Classify the conducting polymers and explain the conduction in polyacetylene. (5)

14. a) Explain the ultimate analysis of coal and give its importance. (5)
    b) What is knocking?. Explain the terms i), Octane number ii), Cetane number. (5)

15. a) Explain the mechanism of lubrication and give functions of lubricants. (5)
    b) Explain the application of phase rule equation to water system. (5)

16. a) Describe the construction and representation of Saturated Calomel electrode and its electrode reactions in reduction and Oxidation processes. (5)
    b) What are the different types of metal coatings and explain with one example each. (5)

17. a) Differentiate thermoplastics and thermosetting resins (5)
    b) Calculate the volume of air required for complete combustion of $1m^3$ of gaseous fuel having the composition; CO = 46%, CH_4 = 10%, H_2 = 4%, C_2H_2 =2%, N_2 = 1% and remaining being CO_2. (5)

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Code No:2405

FACULTY OF ENGINEERING

B.E./B.Tech. (Bridge Course) II-Semester (Backlog) Examination, December 2019

Subject: Mathematics

Time: 3 hours **Max. Marks: 75**

Note: ***Answer all questions from Part-A, & answer any five questions from Part-B.***

Part – A (25 Marks)

1. Define the following (i) Random experiment (ii) sample space, and (iii) event. (3)
2. What is distribution function of a discrete variate X? (2)
3. State Cauchy's mean value theorem. (2)
4. Find the evolutes of the parabola = $4ax$. (3)
5. State first and second fundamental theorem of integrals. (3)
6. Sketch the area of the region enclosed between the curve $f(x), y = g(x)$ and the lines $a, x = b$. (2)
7. If $x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, find the value of . (2)
8. If $x + y + z$, $v = x^2 + y^2 + z^2$, $w = yz + zx + xy$, Prove that $grad\,u, grad\,v, gradw$ are co-planer. (3)
9. Define Beta function and its relation with Gamma function. (2)
10. Show that) = $\int_0^1 (log\frac{1}{y})^{n-1} dy, (n > 0)$. (3)

Part – B (50 Marks)

11. The odds that a book will be reviewed favorably by three independent critics are 5 to 2, 4 to 3, and 3 to 4. What is the probability that of the three reviews, a majority will be favorable? (10)
12. Expand x in powers $-1)$ and hence evaluate (1.1) correct to 4 decimal places. (10)
13. The cross sections of a certain solid made by planes perpendicular to the x-axis are circles with diameters extending from the curve $3x^2$ to the curve $16 - x^2$. Find the value of the solid which lies between the points of intersection of these curves. (10)
14. If is the distance of a point $y, z)$ from the origin prove that $curl\left(\hat{k} \times grad\frac{1}{r}\right) + grad\left(\hat{k} \cdot grad\frac{1}{r}\right) = 0,$ where is the unit vector in the direction of **oz.** (10)
15. State Gauss divergence theorem. Evaluate $\bar{F} \cdot d\bar{s}$ where $4x\hat{\imath} - 2y^2\hat{\jmath} + z^2\hat{k}$ and is the surface bounding the region $+ y^2 = 4, z = 0\ and\ z = 3.$ (10)
16. Prove that (i) $n, \frac{1}{2}\Big) = 2^{2m-1}\beta(m, m)$, (5)

    (ii) $n)\Gamma\left(m + \frac{1}{2}\right) = \frac{\sqrt{\pi}}{2^{2m-1}}\Gamma(2m).$ (5)

17. Express $x^m(1 - x^p)^n\ dx$ in terms of Beta function and hence evaluate the integral $\int_0^1 x^{3/2}(1 - \sqrt{x})^{1/2}\ dx$.

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Code No: 2504/CBCS

FACULTY OF ENGINEERING

B.E. I – Semester (CBCS) (Backlog) Examination, December 2019

Subject: Engineering Physics – I

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part A & any Five questions from Part B.

PART – A (10x2 = 20 Marks)

1) Explain the relation between path and phase difference.
2) What is the difference between Fresnel and Fraunhoffer diffraction?
3) Explain law of Malus.
4) Define pumping and population inversion.
5) Explain the structure of optical fiber.
6) What mean by piezoelectric effect?
7) Explain about phase space.
8) State Wein's law of Radiation.
9) Write any four properties of Wave function.
10) Explain displacement current density.

PART – B (50 Marks)

11. Explain Newton's Rings experiment to find wave length of sodium light. 10

12. (i) Explain the double regraction. 4
    (ii) Discuss the production of Ruby laser. 6

13. (i) Explain different types of Optical fibers. 4
    (ii) Explain production of ultrasonic waves by piezoelectric method. 6

14. Explain the Planck's theory of black body radiation. 5
15. (i) Find the Debrogile's of wave length of ${}_8O^{16}$ molecule (1 amu + 1.6 x 10-27 kg).
    (ii) Show that S = K 10 gw. 5

16. (i) Write the Max Well's equation in integral form. 5
    (ii) Derive the time independent Schrodinger equation. 5

17. (i) Define electron Volt? Find the wave length of electron in 100 v Potential difference. [me = 9.11 x 10-31 kg] [e = 1.6 x 10^{-19}] 4
    (ii) State and prove Poynting theorem. 6

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