SL.NO:1353 **SUBJECT CODE:17MABS06**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO BME ,ECE & EEE

DIFFERENTIAL EQUATIONS AND TRANSFORMS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Solve $(D^2-1)(D+2)y=0$

2 Find y given $\frac{d^2y}{dx^2}-4y=6e^{5x}$

3 Define the Laplace transform of Periodic function

4 Find $L^{-1}\left[\frac{1}{s-3}+\frac{1}{s}+\frac{s}{s^2-4}\right]$

5 Find the constant a_0 of the Fourier series for function $f(x)=x$ in $0\le x\le 2\pi$

6 If $f(x)=|x|$ expanded as a Fourier series in $-\pi<x<\pi$. Find a_0

7 State Parseval's identity for Fourier transforms

8 Find the Fourier sine transform of $\frac{1}{x}$

9 Define Unit impulsive function of Z transforms

10 Find $Z\left[\frac{a^n}{n!}\right]$

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Solve $(D^3+3D^2+3D+1)y=5+\cos 2x$

OR

b. Solve $\left(x^2D^2+3xD+1\right)y=\dfrac{\sin(\log x)}{x^2}$

12 a.

(i) Find $L\left(\mathrm{t}\cos^3 t\right)$

(ii) Find the Laplace transform of $\dfrac{\sin at}{t}$

OR

b.

(i) Find $L^{-1}\left[\log\dfrac{s-a}{s^2+a^2}\right]$

(ii) Find $L^{-1}\left[\dfrac{s}{\left(s^2-a^2\right)^2}\right]$

13 a.

Solve $y''+y=2e^t$ Where $y(0)=1,\ y'(0)=2$ using Laplace transform

OR

b.

Express $f(x)=(\pi-x)^2$ as a Fourier series of period 2π in the Interval $0<x<2\pi$

14 a.

Obtain the cosine series for the function $f(x)=\cos x$ in $(0,\ \pi)$.

OR

b. Find the Fourier Sine series for the function $f(x) = x$ in $0 < x < \pi$ and hence deduce that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$

15 a. Find the Fourier Transform of $f(x)$ given by

$$f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a > 0 \end{cases}$$

Hence evaluate the value of the integral $\int_0^{\infty} \frac{\sin x}{x} dx$

OR

b. (i) Find Fourier cosine transform of $f(x) = \begin{cases} \cos x & if\ 0 < x < 1 \\ 0 & otherwise \end{cases}$

(ii) Find the Fourier sine transform of $3e^{-4x} + 4e^{-3x}$

16 a. Find the Fourier Sine transform of the function $f(x) = \frac{e^{-ax}}{x}$

OR

b. (i) Find the inverse Z-transform of $F(z) = \frac{1}{1 - az^{-1}}, |z| > |a|$ using power series method.

(ii) Find $Z^{-1}\left[\frac{Z-4}{(Z+2)(Z+3)}\right]$

17 a. Find $Z^{-1}\left[\frac{z^2}{z^2+4}\right]$ using Residue theorem

OR

b. Find $Z^{-1}\left[\frac{3z^2-18z+26}{(z-2)(z-3)(z-4)}\right]$ by the method of partial fraction.

18 a. Solve the equation $(D^3+2D^2+D)y = e^{2x}+\sin x$

OR

b. (i) Find $L\left[t^2e^{3t}\sinh t\right]$ (ii) Find $L\left[\frac{1-\cos t}{t}\right]$

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. (i) Solve $\frac{d^2y}{dx^2}+4\frac{dy}{dx}+4y = e^{-x}\sin 2x$

(ii) Solve $(D^3-3D^2+3D-1)y = x^2e^x$

OR

b. Find the Laplace transform of $f(t)=\begin{cases}\sin \omega t, & 0<t<\frac{\pi}{\omega}\\ 0, & \frac{\pi}{\omega}<t<\frac{2\pi}{\omega}\end{cases}$

with $f\left(t+\frac{2\pi}{\omega}\right)=f(t)$

20 a. Find the Fourier series expansion of period 2π for the function $y = f(x)$ which is defined in $(0, 2\pi)$ by means of the table of value given below. Find the series up to the third harmonic

x	0	$\frac{\pi}{3}$	$\frac{2\pi}{3}$	π	$\frac{4\pi}{3}$	$\frac{5\pi}{3}$	2π
y	1.0	1.4	1.9	1.7	1.5	1.2	1.0

OR

b.

Using Parseval's identity calculate

(i) $\int_0^\infty \frac{dx}{\left(x^2+a^2\right)^2}$

(ii) $\int_0^\infty \frac{x^2 dx}{\left(x^2+a^2\right)^2}$ if $a>0$

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SL.NO:1353

SL.NO:1360 **SUBJECT CODE:17BMCC05**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

PATHOLOGY AND MICROBIOLOGY

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Classify the culture media based on physical state.

2 What is an ulcer?

3 List out the etiology of tumors.

4 What is hemophilia?

5 Name the factors that affect bacterial growth.

6 Define generation time.

7 Define immunodeficiency.

8 Define immediate and delayed hypersensitivity

9 List out applications of sterilization by irradiation.

10 What are the different filter used for sterilization?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Illustrate the morphologic patterns of acute inflammation**.**

OR

b. Tabulate the difference between the benign and malignant tumors.

12 a. Predict the routes for the spread of tumors.

OR

b. Categorize the bleeding disorders.

13 a. Outline the types and biological effects of leukemia.

OR

b. Draw and outline the internal structure of bacteria.

P.T.O

14 a. Classify the types of innate immunity and its barriers.

OR

b. Outline the bacterial diseases with suitable example.

15 a. Outline the immunofluorescence techniques.

OR

b. Outline the stages, general features of antigen-antibody reaction and lattice hypothesis.

16 a. Illustrate the types of cell injury and cellular response to stress.

OR

b. Illustrate the type III and type IV hypersensitivity.

17 a. Illustrate the fungal diseases with suitable example.

OR

b. Explain the different morphological evidence and types of necrosis.

18 a. Discuss in detail about the infarction.

OR

b. Write short note on precipitation reactions in gels.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Categorize the etiology of tumors.

OR

b. Draw and outline the basic structure of immunoglobulin.

20 a. Classify the various types of precipitation reactions.

OR

b. Illustrate the general structural organization of typical bacterial cell.

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SL.NO:1356 **SUBJECT CODE:17MABS12**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

STOCHASTIC PROCESS AND NUMERICAL METHODS

(Candidates admitted under 2017 Regulations-SCBCS)

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 State Newton's Forward Interpolation Formula.

2 State the second order divided difference formula.

3 State Taylor series algorithm for the first order differential equation.

4 What is the error term in Milne's corrector formula?

5 Define covariance.

6 When a die is thrown, 'X' denotes the number that turns up. Find E(X).

7 What is a stochastic matrix? When it will be regular?

8 When a Poisson process is said to be homogenous?

9 List any two properties of cross power spectrum.

10 The auto correlation function of the random telegraph signal process is given by $R(\tau) = a^2 e^{-2\gamma|\tau|}$. Determine the power spectral density.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Apply Newton's Forward Interpolation Formula, find the value of Sin 47° given that Sin 45° = 0.7071; Sin 50° = 0.7660; Sin 55° = 0.8192; and Sin 60° = 0.8660.

OR

b. Find the value of y(5) by applying Bessel's formula.

x	0	4	8	12
f(x)	143	158	177	199

P.T.O

12 a. Apply Lagrange's formula to find $f(x)$ from the following data:

x	0	1	4	5
$f(x)$	4	3	24	39

OR

b. Using Euler's method find $y(0.2), y(0.4)$ and $y(0.6)$ from $\frac{dy}{dx} = x + y$, $y(0) = 1, h = 0.2$

13 a. Solve $\frac{dy}{dx} = x + y$, given $y(1) = 0$, Find $y(1.1)$ *and* $y(1.2)$ by Taylor's Series method.

OR

b. Apply Runge – Kutta method of order 4 find y for $x = 0.1, 0.2$ given that $\frac{dy}{dx} = xy + y^2$, $y(0) = 1$.

14 a. The first four moments of a distribution about X=4 are 1,4,10 and 45 respectively. Show that the Mean is 5, Variance is 3 , $\mu_3 = 0$ *and* $\mu_4 = 26$.

OR

b. Let 'X' be a random variable with p.d.f $f(x) = \begin{cases} \frac{1}{3}e^{\frac{-x}{3}}, & x > 0 \\ 0, & otherwise \end{cases}$

Calculate (i) P(X>3) (ii) m.g.f of 'X' (iii) E(X) and Var(X).

15 a. Calculate the M.G.F of the distribution given by $f(x) = \begin{cases} \lambda e^{-\lambda x}, & x > 0 \\ 0, & otherwise \end{cases}$ and hence find M_4 (Fourth Moment).

OR

b. Show that the random process X(t) = A sint + B cost where A and B are independent random variables with zero means and equal standard deviations is stationary of the second order.

P.T.O

SL.NO:1356

16 a. A man either uses a car or catches a train to go office each day. He never goes 2 days in a row by train but he drives one day, then the next day he is just as likely to drive again as he is to travel by train .Now suppose that on the first day of the week ,the man tossed a fair dice and drove to work if and only if a 6 appeared . Find the probability that he went by a train on the third day and also the probability he went by a car to work in a long run?

OR

b. For the Random process $X(t) = A\sin(\omega t + \varphi)$, where A and ω are constants, φ is a random variable uniformly distributed in $(0, 2\pi)$, Calculate the autocorrelation function of the process.

17 a. Consider the process $X(t) = A\cos\omega t + B\sin\omega t$ where A and B are random variables with E(A)=0=E(B) and E(AB)=0. Examine $\{X(t)\}$ is mean ergodic or not.

OR

b. Find the mean and variance of the stationary process X(t) whose auto correlation function is $R(\tau) = \dfrac{25\tau^2 + 36}{6.25\tau^2 + 4}$.

18 a. Determine the mean square value of the process whose power density spectrum is $S_{xx}(\omega) = \dfrac{\omega^2 + 9}{\omega^4 + 5\omega^2 + 4}$

OR

b. Determine the power spectral density of a WSS process with auto correlation function is given by $R(\tau) = e^{-\alpha\tau^2}$

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. From the following table values of x and f(x), determine f(0.23) and f(0.29) applying suitable Newton's formula.

x	0.20	0.22	0.24	0.26	0.28	0.30
f(x)	1.6596	1.6698	1.6804	1.691	1.7024	1.7139

OR

P.T.O

b. Apply Rung- Kutta Method of fourth order solve $\frac{dy}{dx}=\frac{y^2-x^2}{y^2+x^2}$ with $y(0)=1, h=0.2,$ *to* find $y(0.2)$

20 a. If the density function of a continuous random variable 'X' is given by $f(x)=\begin{cases} ax, & 0\le x\le 1 \\ a, & 1\le x\le 2 \\ 3a-ax, & 2\le x\le 3 \\ 0, & otherwise \end{cases}$

(i).Determine the value of 'a' (ii) Find the CDF of 'X'.

OR

b. The cross power spectrum of real random processes $\{X(t)\}and\{Y(t)\}$ is given by; $S_{XY}(\omega)=\begin{cases} a+jb\omega, & |\omega|<1 \\ 0, & elsewhere \end{cases}$ .Calculate the Cross-correlation function.

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SL.NO:1356

SL.NO:1351 **SUBJECT CODE:17BMCC09**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

DIAGNOSTIC AND THERAPEUTIC EQUIPMENTS - II

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Define Characteristic impedance.
2 What are the different types of B-scan techniques?
3 Explain about the frequency allotment in telemetry.
4 Draw the block diagram of ultrasonic therapy unit.
5 Draw the circuit diagram of short wave diathermy unit.
6 Define thermography.
7 What are the physiological effects of macro shock?
8 What are the different types of leakage current?
9 Write about micro wave diathermy.
10 How to perform the test in bio medical equipment?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Analyse how bio signals can be transmitted over telephone lines? What are the pre-processing units required?

OR

b. Enumerate the essentialities of the various earthing schemes provided in hospitals for patient safety.

12 a. With block diagram explain linear B-scan techniques used in obstetrics and Gynacology.

OR

b. Explain difference between A-scan and B-scan displays.

13 a. Explain in detail about patient monitoring system.

OR

b. Explain working of patient monitoring system which can monitor six bedded ICU with block diagram.

14 a. Discuss the process of humidification in anaesthesia machine.

OR

p.t.o

b. Describe in detail about central monitors.

15 a. Explain the principle of surgical diathermy unit with neat diagram.

OR

b. Explain about surgical diathermy analysers.

16 a. Discuss the types of waveforms required for electro diagnosis.

OR

b. Explain microwave thermography briefly.

17 a. Explain various clinical use of cryotechniques.

OR

b. With schematic diagram explain the working of endoscopic laser coagulator.

18 a. Explain in detail about the sources of leakage current.

OR

b. Explain in detail about leakage current in patient leads.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Outline the function of ultrasonic therapy unit with block diagram.

OR

b. Distinguish between central monitoring system and bed side monitoring system.

20 a. Elaborate the physics of thermography in detail.

OR

b. Explain the precautions to minimize electric shock hazards.

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SL.NO:1351

SL.NO:1354 **SUBJECT CODE:17MABS10**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO EEE,ECE AND MECT

PARTIAL DIFFERENTIAL EQUATIONS & LINEAR ALGEBRA

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Find the partial differential equation by eliminating arbitrary constants a and b from $(x-a)^2+(y-b)^2+z^2=1$

2 Solve $\left(D^2-6DD'+9D'^2\right)z=0$

3 List the laws assumed to derive the one dimensional heat flow equation

4 Classify the partial differential equation $u_{xx}+xu_{xy}=0$

5 Define Linear independence

6 Prove that (1,1,1),(0,1,1) and (0,1,-1) generate $R^3(F)$

7 State Cauchy-Schwarz inequality

8 Let V be an inner product space. Let $u,v\in V$ be arbitrary and 'a' any scalar. Prove that $\|u\|>0, if\ u\neq 0$

9 State the dimension of $L(U,V)$

10 Find the Eigen values of the matrix $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

p.t.o

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Find the partial differential equation by eliminating the arbitrary function 'f' from $z = f\left(\frac{xy}{z}\right)$

OR

b. Find the partial differential equation by eliminating the arbitrary function 'f' from $z = f\left(x^2+y^2+z^2\right)$

12 a. (i) Solve $z = p^2 + q^2$

(ii) Solve $p^2 + q^2 = x^2 + y^2$

OR

b. A string is stretched and fastened to two points l apart. Motion is started by displacing the string into the form $y = k\sin\left(\frac{\pi x}{l}\right)$ from which it is released at time t=0. Determine the displacement of the point of the string at a distance x from one end at time t.

13 a. A taut string of length 20 cms fastened at both ends is displaced from its position of equilibrium , by imparting to each of its points an initial velocity given by $v = \begin{cases} x & in \quad 0 < x < 10 \\ 20 - x & in \quad 10 < x < 20 \end{cases}$ .Determine the displacement function $y(x, t)$

OR

b. A square plate is bounded by the lines x=0, y=0, x=l and y=l. Its faces are insulated and $u(l, y) = ly - y^2$, $0 < y < 1$ while the other three edges are kept at $0°C$. Determine the steady state temperature distribution in the plate.

14 a. Show that the vector $(1,2,1),(2,1,0)$ and $(1,-1,2)$ form a basis for R^3

OR

b. Prove that the intersection of any number to subspace of a vector space $V(F)$ is a subspace $V(F)$.

15 a. For each of the following lists of vectors in R^3 ,determine whether the first vector can be expressed as a linear combination of the other two

(i) $(-2,0,3),(1,3,0),(2,4,-1)$

(ii) $(3,4,1),(1,-2,1),(-2,-1,1)$

OR

b. Suppose T is a linear operators on an inner product space V(F).Then show that adjoint T^* of T exists such that $TT^* = T^*T = I$ iff T is unitary

16 a. Let V be an inner product space. Let $u, v \in V$ be am arbitrary and 'a' any scalar. Prove that

$(i)\ \|u\| > 0\ if\ u \neq 0$

$(ii)\ \|au\| = |a|\|u\|$

$(iii)\ |\langle u, v\rangle| \leq \|u\|\|v\|$

$(iv)\ \|u+v\| \leq \|u\| + \|v\|$

OR

b. A linear operator on R^2 is defined by $T(x,y) = (x+2y, x-y)$ Find the adjoint T^* if the inner product is standard one.

17 a. Show that the mapping $T: V_2(R) \to V_3(R)$ defined as

T(a,b)=(a+b,a-b,b) is a linear transformation from $V_2(R)$ into $V_3(R)$ .Determine the range, rank, null space and nullity of T.

OR

b. If A is a linear transformation on a vector space V such that $A^2 - A + I = 0$ then prove that A is invertible

18 a. Let V be an n-dimensional vector space over the F and let T be a linear transformation from V into V such the range and null space of T are identical prove that n is even. Give an example of such a linear transformation

OR

b. Prove that the intersection of two subspace W_1 and W_2 of a vector space $V(F)$ is also a subspace of $V(F)$.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Determine whether the following vectors is in the span of S

$(i)\ (2,-1,1) \qquad S=\{(1,0,2),(-1,1,1)\}$

$(ii)\ 2x^3-x^2+x+3 \qquad S=\{x^3+x^2+x+1, x^2+x+1, x+1\}$

$(iii)\begin{pmatrix}1 & 2\\ -3 & 4\end{pmatrix} \qquad S=\left\{\begin{pmatrix}1 & 0\\ -1 & 0\end{pmatrix},\begin{pmatrix}0 & 1\\ 0 & 1\end{pmatrix},\begin{pmatrix}1 & 1\\ 0 & 0\end{pmatrix}\right\}$

OR

b. A rod of length l has its ends A and B kept at $0^\circ C$ and $100^\circ C$ until steady state conditions prevail. If the temperature at B is reduced suddenly to $0^\circ C$ and kept so while that of A is maintained, Determine the temperature $u(x, t)$ at a distance x from A and at time t.

20 a. Solve the system of equations $x+3y=80,\ 2x+5y=100,$ $5x-2y=60,\ -x+8y=130,\ 10x-y=150$ by using least square method

OR

b. Identify the Eigen values of the matrix $\begin{bmatrix}1 & 1 & 1\\ 0 & 1 & 1\\ 0 & 0 & 1\end{bmatrix}$ and also find eigen vectors

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SL.NO:1365 **SUBJECT CODE:17BMCC01**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

BIOMEDICAL CIRCUITS AND NETWORKS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Differentiate mesh and nodal method.

2 Explain planner and non-planner circuit.

3 Differentiate free response and forced response.

4 Mention the hybrid parameters of a two port network.

5 Summarize the cases involved in R-L-C transients.

6 Define pass band.

7 Define cut-off frequency.

8 Define rise time and delay time in transient response of LPF.

9 The Z parameters for a two port network are $Z_{11} = 40\Omega$, $Z_{22} = 30\Omega$, $Z_{12} = Z_{21} = 20\Omega$. Compute the transmission parameters A and D.

10 Sketch the current given by $i(t)=5-e^{-20t}$

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. i. Summarize and derive the total resistance formula for two resistances are connected in parallel and three resistances are connected in parallel.
ii. Explain in detail about current division and voltage division method.

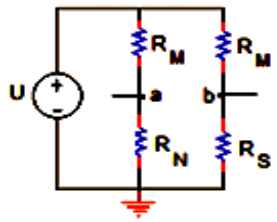
OR

b. A 60Hz alternating voltage a 230V (Vm) is applied independently to the
i) Resistance of 50Ω
ii) Inductance 20mH
iii) Capacitance of 100μF.
Illustrate the expression of the instantaneous current in each case and draw a phasor diagram in each case.

(P.T.O)

OR

12 a. i. Show that the output of a Wheatstone Bridge for a single resistive RTD sensor of the form R(x)=RN(1+ax) is nonlinear function of the Measurand x, where RN is the nominal resistance of the sensor and a is a material constant, (a < 1).



. (a) In a Wheatstone Bridge circuit shown in figure, Pt-100 type RTD element is used for temperature measurement. R1 = R3 = 100 Ω. R2 is a variable resistor, Rmax = 220Ω, with a linear tape. At some temperature, RTD resistance is measured to be 120Ω. What fraction of the full slider range of the adjustable resistor travel for this (balanced) condition?

(b) What will be this fraction at 0 °C?

OR

b. i. Summarize the steps involved in the superposition theorems. Explain with example.
ii. Differentiate Thevenin's and Norton's theorem.

13 a. Differentiate series and parallel resonance circuits

OR

b. Explain the single tuned and double tuned circuit.

14 a. A coil having a resistance of 50Ω and an inductor of 0.2H is connected in series with a variable capacitor across a 60V, 50Hz supply. Calculate the capacitance required to produce resonance and the corresponding values of current, voltage across the coil and the capacitor, the power factor and Q-factor.

OR

b. One RLC circuit has R=30Ω, L=40mH and C=50μF. Find the resonant frequency. Under resonant conditions, calculate the current and voltage drops across the R, L, and C if applied voltage is 120V.

(P.T.O)

SL.NO:1365

15 a.

The coil having a resistance of 6Ω and an inductance of 0.03H is connected across a 100V, 50Hz supply. Calculate

i. The current

ii. The phase angle between the current and the voltage

iii. Power factor

iv. power

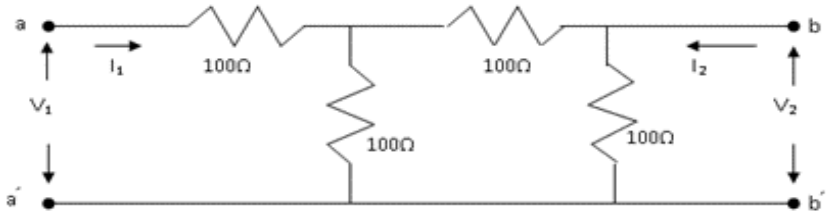
OR

b. Draw the DC response of R-L-C circuit and derive the equation of over damped, under damped and critically damped.

16 a. Derive the Y- parameter in terms of Z - parameter of two port networks.

OR

b. Determine the h – parameters of the given network.



17 a. The circuit consisting of a series RL elements with R=50Ω and L=0.5H has an applied voltage is $V=100e^{-50t}$ volts. If the switch is closed at the time t=0. Determine the resulting current and initial rate of change of current.

OR

b. Examine whether the given polynominal is Hurwitz or not.

(i) $P(s)=s^4+s^2+s+1$

(ii) $P(s)=s^4+s^3+5s^2+3s+4$

(iii) $F(s)=s^4+s^3+2s^2+3s+2$

(iv) $y(s)=s^3+4s^2+5s+2$

(P.T.O)

SL.NO:1364

18 a. Determine the transfer function of Chebyshev filter of order n=2 and error Є=0.75.

OR

b. Obtain the transfer function H(s) which gives Butterworth response of n=3.

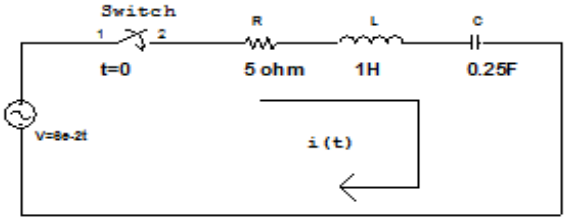
Answer ALL questions
PART-C (2 x 15 = 30)

19 a. i) In a series fed doubly tuned transformer circuit both the primary and the secondary are tuned to the same resonant angular frequency of 105rad/sec. the maximum output voltage across the capacitor is 24volts and is obtained by varying K. If the inductance and the resistance of the primary circuit are 40μH and 0.1Ω respectively, and the secondary circuits are 50μH and 1Ω respectively, calculate the supply voltage.

ii) Two coupled coils with L1=0.02H, L2=0.01H and K=0.5 are connected in four different ways, series aiding, series opposing and parallel with both arrangements of the winding sense. What are the four equivalent inductances?

OR

b. A series RLC circuit shown in figure (V=6e-2t volts, R=5Ω, L=1H and C=0.25F), the switch is closed at time t=0. Obtain i(t). Assume zero current through inductor L and zero charge across C before closing the switch.



20 a. Realise the network in both Cauer forms. Given $Z(s) = \frac{s(s^2+4)}{(s^2+1)(s^2+9)}$

OR

b. Design a 'm' derived low pass filter for Rk=600Ω, fc=1800Hz and fα=3600Hz.

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SL.NO:1365

SL.NO:1342 **SUBJECT CODE:17BMCC10**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

MEDICAL IMAGE PROCESSING AND ANALYSIS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 List the elements of DIP system.
2 Draw the two types of roof edge
3 Define mach band effect.
4 List the categories of digital storage.
5 What do you mean by Mask or Kernels?
6 What is pattern class?
7 Define huffman coding.
8 Define the degradation
9 What are the types of noise models?
10 Explain about the concept algebraic approach.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Illustrate the components of digital image processing.

OR

b. Outline the pseudo colour image processing

12 a. Outline the modified huffman coding.

OR

b. Explain various types of image blur.

13 a. Model the color CMY and CMYK.

OR

b. Show the image enhancement in frequency domain using low pass filter

14 a. Discuss the pattern recognition approach based on matching techniques

OR

b. Examine the noise reduction using frequency domain filtering.

15 a. How is a monochrome image enhanced by histogram equalization

(P.T.O)

OR

b. Describe linear image restoration techniques.

16 a. Discuss the image formation model in detail.

OR

b. Explain histogram processing.

17 a. Explain the various sharpening filters used in spatial domain.

OR

b. Explain watershed transformation segmentation algorithm

18 a. Explain the need for image compression. How run length encoding approach is used for compression?

OR

b. Explain the CT image reconstruction from projections.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate the image sampling and quantization.

OR

b. Outline the image restoration using filtered back projection algorithm.

20 a. Show the region based segmentation

OR

b. Discuss in detail about the image enhancement in spatial domain

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SL.NO:1342

SL.NO:1335 **SUBJECT CODE:17BMCC02**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

HUMAN ANATOMY AND PHYSIOLOGY

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Classify the human nervous system.
2 Define selectively permeable.
3 List out characteristics of first heart sound.
4 List the functions of nose.
5 List out parts of adult brain.
6 List out functions of cerebrospinal fluid.
7 Mention the content of gastric juice.
8 Define photoreceptor.
9 Define accommodation.
10 Distinguish active transport and facilitated diffusion.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Outline the basic terminologies in human anatomy and physiology.

OR

b. Outline the properties, composition and functions of blood.

12 a. Outline the regulation of blood pressure.

OR

b. Outline the lung volumes and capacities.

13 a. Classify the types of joints with suitable example.

OR

b. Draw and outline the structure of pharynx, esophagus and stomach.

14 a. Outline the structure, types and functions of salivary glands.

OR

b. Outline the visual nerve pathways.

(P.T.O)

OR

b. Illustrate the conducting system of heart.

16 a. Examine the somatic nervous system.

OR

b. Illustrate the reflex action with suitable example.

17 a. Predict the processes involved in image formation.

OR

b. Illustrate the adrenal gland and their hormones

18 a. Explain the layers of meninges.

OR

b. Explain structre and functions of parathyroid hormone.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Outline the physiology of cardiac muscle.

OR

b. Draw and outline the anatomy of lower digestive system.

20 a. Illustrate the mechanasum involved in regulations of bloud glucose.

OR

b. Illustrate the mechanism involved in the urine formation.

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SL.NO:1329 **SUBJECT CODE:17BMPI04**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

TROUBLESHOOTING OF MEDICAL INSTRUMENTS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Classify digital test instruments

2 Model the photo-cell amplifier.

3 Show the common problems in nebulizer.

4 What are the differences between various grounding systems?

5 Mention the possible faults which normally occurs in the inductor.

6 What are common autoclavable materials other that Stainless steel?

7 Identify the logical steps in troubleshooting.

8 Mention the various causes of equipment failures.

9 Explain the handling procedures of ICs.

10 What are the common problems in pulse oximeter?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Illustrate the symbolic representation, circuit configurations and performance functions of op-amps.

OR

b. Outline the common problems in pulse oximeter.

12 a. Show the troubleshooting of sphygmomanometer.

OR

b. Show the various grounding systems in electronics equipments.

13 a. Predict the steps involved in failure analysis.

OR

(P.T.O)

b. Show the testing method for PN Junction diode.

14 a. Examine value of the voltage across a resistor is 80V. However, the measurement gives a value of 79V. calculate (i) absolute error, ii) % error iii) relative accuracy iv) % of accuracy.

OR

b. Draw the block diagram of anesthesia machine and explain the working.

15 a. Draw the flowchart and identify the fault diagnosis in baby incubator.

OR

b. Test the fault diagnosis of suction machine.

16 a. Compare in detail about the operation of clinical services and supportive services.

OR

b. Explain in detail about faulty finding aids.

17 a. Explain briefly about troubleshooting of resistors.

OR

b. Write the testing procedure of semiconductor devices.

18 a. Draw the block diagram of ECG machine & explain

OR

b. Describe the methods of medical equipment maintenance in the hospital.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Outline the troubleshooting problems in logic current tracer.

OR

b. Show the testing of semiconductor devices with examples.

20 a. Examine the circuits diagram of following amplifier i) Instrumentation amplifier ii) Precision wide range logarithmic amplifier iii) Current-to-voltage amplifier iv) Voltage- to- Current amplifier

OR

b. Test the troubleshooting in oxygen concentrators, oxygen cylinders & flow meters.

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SL.NO:1330 **SUBJECT CODE:17BMES02**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

MEDICAL INSTRUMENTATION

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1 Draw the basic block diagram of photometer
2 Show the characteristics of operational amplifier.
3 Describe the process of Sodium Pump.
4 State the applications of medical instrumentation system.
5 List the effects of artefacts on ECG recordings.
6 List the methods of cell counting.
7 Define electromagnetic flowmeters.
8 Define Ph and PcO2
9 Summarize the various Bioelectric Potentials.
10 Discuss the two electrode impedance pneumograph.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a. Draw and explain the standard bipolar limb leads.

OR

b. With neat diagram explain the PCG recording setup.

12 a. Outline the rheographic method in blood pressure

OR

b. Draw and explain the types of ultrasonic blood flow meters.

13 a. Draw and explain the process of single channel telemetry system

OR

b. Determine the motion artifact in practical aspects of ECG recording.

14 a. Demonstrate the operational amplifier characteristics.

OR

b. Explain about temperature measurement system.

(P.T.O)

15 a. Illustrate proportioning pump and dialyzer.

OR

b. Describe types of blood cells, number of cells and mean cells volume.

16 a. Explain about the Polarization and motion artifacts.

OR

b. Explain about the carrier amplifier with suitable circuit diagram

17 a. Describe the block diagram of a typical set up for EMG recording.

OR

b. Discuss about the direct methods of measuring the blood pressure.

18 a. Define MCH, MCHC, MPV, RDW and PDW

OR

b. Discuss the process of PCo2 and PO2

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain about the types of electrode with suitable diagram.

OR

b. Draw the block diagram explain the bedside patient monitoring system

20 a. Show the cardiac output using indicator dilution methods

OR

b. Describe about the measurement of pulse rate and heart rate with suitable diagram.

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SL.NO:1330

SL.NO:1306 **SUBJECT CODE:17BMSE28**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELECTIVE- NANO TECHNOLOGY IN MEDICINE

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 What is a thin film?
2 List out the synthesis methods adopted for CNT.
3 What are the two-basic approach for the synthesis of nanomaterials?
4 What is the main application of CVD Process?
5 Give Moore's I law & II law?
6 Define MEMS.
7 What are the types in photolithography?
8 List out the features of nanomedicine
9 What are the applications in neuro electronic interface.
10 What are all the Challenges in nanobiotechnology?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Elaborate briefly about mechanical property of nanomaterials.

OR

b. Explain in detail about semiconducting nanoparticles and list its types.

12 a. Give one example each of zero, one- and two-dimensional Nano materials.

OR

b. Explain in detail about drug tracking system.

13 a. Discuss about colloids and its types.

OR

b. What are the challenges faced by researchers in nanotechnology?

14 a. Explain the structure of the C60molecule and its stability.

OR

b. Explain in detail about quantum dots and its applications.

15 a. Explain the working of scanning electron microscopy (SEM) with a neat sketch. p.t.o

OR

b. Explain PVD method for MEMS fabrication.

16 a. Briefly explain about Photolithography, and etching processes.

OR

b. Write a short note on microfabrication.

17 a. Explain un detail on a neuro interface application.

OR

b. List out applications of Nanomaterials and neatly explain them

18 a. Explain with a suitable diagram of Optical biosensors and their application.

OR

b. Describe about physical and chemical synthesis methods and explain any one method in detail with required images.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain with examples the bottom-up and top-down techniques. What are their merits and demerits?

OR

b. Explain in detail how melting point and optical properties of nanomaterials depend on the size of NPs.

20 a. Briefly explain about Nanotechnology used in Medicine Application.

OR

b. Explain the biology basded synthesis of nanomaterials & List the advantages.

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SL.NO:1306

SL.NO:1295 **SUBJECT CODE:17BMSE12**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELE -ASSIST DEVICES

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 List the hemodynamic effects of ECP.
2 Define cardioplegia.
3 What is Ultrafiltration?
4 State the functions of kidney.
5 List the components of body powered upper extremity prostheses.
6 List out the components of FES system.
7 Define air conduction.
8 State the reason for increasing the volume of thoracic cavity during inspiration.
9 Define anatomical dead phase.
10 Define artificial humidification.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Classify the types of oxygenators.

OR

b. Draw and outline the basic circuit of DC defibrillator.

12 a. Draw and explain the dialysate circuit.

OR

b. Draw and outline the blood leak detector.

13 a. Classify the common types of prosthetic limb.

OR

b. How will you analyze the audiometer for calibration.

14 a. How will you analyze the audiogram.

OR

b. Categorize the types of mechanical ventilation.

15 a. Describe the patient breathing system in anaesthesia machine.

p.t.o

OR

b. Explain the wearable artificial kidney with functional parameters.

16 a. Illustrate the body powered prosthesis.

OR

b. Describe the types and fabrication of below Knee prosthesis.

17 a. Illustrate the vapourizer in anaesthesia machine.

OR

b. Explain the triggering and timing in IABP.

18 a. Describe the advanced control options in haemodialysis apparatus.

OR

b. Describe the humidification of anaesthetic gases.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Describe the techniques of insertion, instrument operation and control of IABP.

OR

b. Write the notes on the audiometer system bekesy.

20 a. Draw the block diagram of modern ventilators and explain in detail.

OR

b. Illustrate the mechanism of urine formation.

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SL.NO:1295

SL.NO: 1294 **SUBJECT CODE:17BMSE21**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELECTIVE - QUALITY CONTROL IN BIOMEDICAL ENGINEERING

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Calculate 4 photo diode are put under testing to find the mean time to found of these. After few times, the photo diode finally fail are 65 hours, 75 hours, 90 hours and 100hours respectively, find the mean time to fail of these diode.

2 Show the peak detector circuits.

3 Show the organizational aspects in QMS.

4 List the trouble shooting techniques.

5 Define fogging.

6 Define quality assurance.

7 Define design verification.

8 Mention the various causes of equipment failures.

9 Reveal the voltage regulator circuit.

10 State the global harmonization task force.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Examine the essence of quality with example.

OR

b. Outline the logic pulser with selectable output patterns.

12 a. Illustrate about the failures in x-ray machine.

OR

b. Illustrate about the design, measure and analyze step the medical device.

13 a. Illustrate about preparation & Precautions before troubleshooting.

OR

b. Discuses indetail about the core themes of business excellence.

(p.t.o)

14 a. Demonstrate the health care quality.

OR

b. Summarize the basic electrical & electronics components.

15 a. Compare the integrator and differentiator.

OR

b. Compare the interpretations of quality and measurable characteristics of a medical device.

16 a. Compare the various types of standards in detail.

OR

b. Explain briefly about troubleshooting of resistors.

17 a. Discuss about procedure and steps involved in troubleshooting.

OR

b. Explain about the fault diagnosis in op-amp circuits.

18 a. Draw and explain the design process with medical device design control.

OR

b. Explain in detail about the quality operating system.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Justify with the give examples of suction machine and sphygmomanometer faults and troubleshooting in detail.

OR

b. Illustrate the ISO 9001:2001 process model approaches.

20 a. Illustrate the business excellence with a value proposition.

OR

b. Justify the troubleshooting in defibrillator.

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SL.NO: 1294

SL.NO:1287 **SUBJECT CODE:17BMSE16**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELECTIVE - WEARABLE TECHNOLOGY

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Categorize the requirements of design Identification.

2 Show the electronics textiles in milllitry application.

3 Draw the wi-fi architecture of wearable devices.

4 Draw the thermoelectric circuit.

5 What is Smart Clothing?

6 What is meant by conductive polymer textiles?

7 State the piezo-capacitive load cells.

8 Define remote cloud storage.

9 Write the details about garments interaction.

10 Mention the Tempeature and humudity sesitivity.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Discuss and compare the resistive, capacitive & inductive with its function.

OR

b. Compare the polymer yarns with metallic and ICP coatings.

12 a. Outline the carbon nano tubes yarn spinning methods.

OR

b. Categorize the various sensors used in sports application.

13 a. Explain in detail about wearable technology in watches, glass, contact lens and jewelry.

OR

b. Show the modern construction of wearable technologies.

(p.t.o)

14 a. Discuss the optial sensor used for sports application.

OR

b. Compare the CLCC and CLNC storage system.

15 a. Design smart clothing healthcare for a specific.

OR

b. Justify 3D fabrics for smart wearables.

16 a. Test the inertial sensor used for sports application.

OR

b. Describe about physical principles of sensors.

17 a. Discuss about the wearable electronics.

OR

b. Describe about the Fluid Mechanic and its measures.

18 a. Discuss in detail about the embroidered antenna.

OR

b. Explain in detail about pressure measurement sensor.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Outline the two tier storage system for wearable platforms encryption based on flash memory and cloud storage.

OR

b. Illustrate the Market forecast and current trends of wearable technology with examples.

20 a. Evaluate angle & displacement sensor used for sports application.

OR

b. Illustrate piezoelectric with necessary diagrams.

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SL.NO:1281 **SUBJECT CODE:17BMSE15**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELECTIVE - BIOMATERIALS AND ARTIFICIAL ORGANS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Classify the heart valve prostheses.

2 What are the limitations of engineered natural materials?

3 Define viscoelasticity.

4 What are the elements used to stabilize the α and β phase of titanium?

5 Write the structure of polymethyl methacrylate.

6 Define tissue adhesives.

7 State the types of bone screws.

8 Describe in brief about pathways of blood coagulation.

9 Name the mechanisms of corrosion.

10 Name any four eye implants.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Categorize the mechanical failure of materials.

OR

b. Outline the surface coatings methods.

12 a. Outline the structure, properties, preparation and applications of silicone.

OR

b. Categorize the tissue adhesives.

13 a. Categorize the wound dressings.

OR

b. Outline any one lower extremity joint replacements.

(P.T.O)

14 a. Predict the biodegradation of biodegradable polymer.

OR

b. Outline the blood coagulation process.

15 a. Outline the intra ocular lens.

OR

b. Illustrate the surface properties of materials.

16 a. Illustrate the ear implants in detail.

OR

b. Illustrate the normal wound-healing process.

17 a. Illustrate the components and types of artificial pancreas.

OR

b. Describein brief about aluminum oxide.

18 a. Explain the oxidative degradation of polymer in detail.

OR

b. Give an account on Perfluorochemicals as blood substitutes.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Outline the structure of crystalline solids and crystal imperfections.

OR

b. Categorize the internal fracture fixation devices.

20 a. Outline the components of artificial lung.

OR

b. Illustrate the component, types, properties and manufacturing of surgical sutures.

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SL.NO:1273 **SUBJECT CODE:17BMSE14**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELECTIVE - NEURAL ENGINEERING

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Give the uses of EEG.
2 What is meant by absolute refractory period?
3 List the components of human–instrument system.
4 Define epilepsy.
5 How long do evoked potential results take?
6 Define auscultation.
7 Explain the classification of action potentials.
8 Which of the following is NOT a sleep disorder?
9 What contains the receptors for hearing ?
10 Which step is not involved in the hearing process?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Elaborate in detail about point process in system modeling.

OR

b. Explain in detail about the use of adaptive filters for segmentation.

12 a. Illustrate briefly about the electrodes placement of EEG.

OR

b. Explain about the VEP working condition and its applications.

13 a. Define Visual recognition techniques.

OR

b. What's the difference between fMRI and MRI?

14 a. Discuss about analysis of EMG Signal rate variability.

OR

(P.T.O)

b. Describe the advantages of computerized EEG.

15 a. Describe the EEG bio feedback instrumentation with neat diagram.

OR

b. Which neuro imaging techniques can only be used for structural neuro imaging?

16 a. What are the different types of neuro imaging?

OR

b. Can MRI detect neuro toxicity?

17 a. What are functional brain imaging techniques used .

OR

b. Explain genesis of EEG briefly

18 a. Discuss the block diagram of a typical setup for EMG recording.

OR

b. Describe about the Vestibular laboratory testing methods?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Writeshortnoteson
i. Detectionofalpha,betaandgammawaves.
ii. Polynomialmodelling.

OR

b. Illustrate the stages of Diagnostic and therapeutic role of Magnetic stimulation inneurology.

20 a. Give an overview of functional neuroimaging techniques.

OR

b. Explain in detail about Episodic memory and Working memory.

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SL.NO:1260 **SUBJECT CODE:17BMSE03**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELE-TELEMEDICINE AND PACS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Select the limitations of telemedicine.
2 Outline of the Planning phase of tele-ECG service.
3 Mention the steps involved in compression
4 Show the basic parts of a Teleradiography System.
5 Calculate two types of gateways in PACS
6 Give the network configuration.
7 What is consent form?
8 Define telemonitoring.
9 Define Communication.
10 Identify the data and image acquisition gateway.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Classify the various types of wireless communication.

OR

b. Categorize the techniques used in Telecardiology.

12 a. Categorize the types of communication.

OR

b. Determine in detail about the components of video conferencing system.

13 a. Illustrate the data security and standards.

OR

b. Illustrate the Telepathlogy and its applications.

14 a. Demonstrate the Planning phase of tele-ECG service.

OR

b. Show the care home based applications in Telehome.

15 a. Summarize the overview of PSTN and POTS. p.t.o

OR

b. Summarize the Teleoncology and its application

16 a. Explain in detail about the hospital information system

OR

b. Discuss about the ISDN and asynchronous transfer mode.

17 a. Describe the ethical and legal aspects of telemedicine.

OR

b. Explain the Planning phase of tele-ECG service.

18 a. Discuss about the techniques and application used in Telepsychiatry.

OR

b. Differentiate the types of image formats.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Categorize the history of Telemedicine.

OR

b. Illustrate the Tele-surgery and its application.

20 a. Demonstrate the Standards for DICOM.

OR

b. Describe the image compression methods

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SL.NO:1260

SL.NO:1249 **SUBJECT CODE:17PHBS04**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

MEDICAL PHYSICS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Differentiate ionizing and non-ionizing radiation.

2 List down the type of particles of radiation emitted in radioactivity.

3 Mention the types of non-lethal changes observed in cell due to radiation dose.

4 Define the term LD50/30.

5 List down the gene controlled hereditary diseases.

6 Underline the characteristics of laser.

7 With suitable examples identify isotopes and isobars.

8 Distinguish the two types of somatic effects of radiation.

9 Report the effects of lethal dose on endocrinal glands.

10 Restate the principle of photo dynamic therapy (PDT).

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Analyze various radiation damages occurred in chromosome.

OR

b. Analyze the different kinds of DNA damage due to radiations.

12 a. Compare Genetic and somatic effects on nuclear radiation.

OR

b. Demonstrate the construction and working of any one of the particle accelerators

13 a. Demonstrate the depression of macromolecular synthesis due to radiation exposure.

OR

b. Illustrate the effect of nuclear radiation on living cells.

P.T.O

14 a. Display the types of radiation dose and effects applied in somatic cells.

OR

b. Interpret the consequences of radiation damage to the somatic cells.

15 a. State and demonstrate the genetic effect of radiation.

OR

b. Illustrate various methods for limiting internal and external exposure of radiation.

16 a. Demonstrate the concept and procedure of photo chemotherapy in detail.

OR

b. Demonstrate the biological effects of laser in eye damage and skin damage.

17 a. Explain the properties of an atom in detail.

OR

b. Explain the different types of decay with one example in each.

18 a. Discuss the mechanism and assumptions of single hit on multi target model of tissue.

OR

b. Explain the principles of working of a LASER.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Interpret in detail about the production and applications of artificial radioisotopes.

OR

b. Demonstrate the effect of LD50/30 radiation on embryo and fetus.

20 a. Relate various factors with the frequency of radiation in induced mutations.

OR

b. With suitable diagrams, explain the various types of dose-response curves.

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SL.NO:1222 **SUBJECT CODE:17BMEC03**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

ELECTIVE - BIOMETRIC SYSTEMS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 What is contextual filtering?

2 Define Identification.

3 What is Minutiae?

4 What are the factors that affect iris Image segmentation and processing phases?

5 Define statistical methods in face recognition.

6 Give shortnotes on the task of speaker tasking.

7 What is False match rate?

8 What are the features of Iris?

9 What were the earlier methods of face detection?

10 List any two measures of performance of aspeaker verification system.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. What are the parameters that define the accuracy of a biometric system? Explain in detail.

OR

b. Explain with examples the Criminal Applications of finger print biometrics?

12 a. Explain with examples the Civil Applications of finger print biometrics.

OR

b. Write shortnotes on localization and representation in IRIS recognition systems.

13 a. Brief on the methods for assessing progress in face recognition.

OR

b. Discuss about the multi modal evaluation of the NIST speaker recognition evaluation program.

(p.t.o)

14 a. Describe the system model of ageneric biometric system.

OR

b. Illustrate the Feature extraction and Classification steps in fingerprint biometrics.

15 a. Explain briefly about on IRIS signature representation.

OR

b. With a block diagram explain the overall face recognition system.

16 a. Elucidate the face recognition steps with emphasison the Classification techniques.

OR

b. Discuss about the performance measure of theNIST speaker recognition evaluation program.

17 a. Discuss indetail about Biometric System Integration.

OR

b. Briefly explain about the early biometric efforts and applications of fingerprints?

18 a. Brief on the face detection techniques and also the representation techniques for face recognition.

OR

b. Write on the approaches for improving the speaker verification process.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain in detail about the acquisition environment effect onmatching accuracy in facial scan technology.

OR

b. Explain different biometric standard for finger prints.

20 a. Write in detail about the effect of lighting, eye glasses,facial hair,expression on facial scan technology with examples.

OR

b. How image is processed in finger scan technology?Explain in detail.

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SL.NO:1222

SL.NO:1202 **SUBJECT CODE:17BMSE18**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELECTIVE-ROBOTICS AND AUTOMATION IN MEDICINE

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Where pneumatic drives are used?
2 Define robotics.
3 State Asimov's second law of robotics.
4 Who coined the word 'robotics' & when?
5 Write short notes on preprocessor.
6 What is reverse transformation?
7 List any foun the advantages of magnetic grippers?
8 Write some of the applications of robot
9 What is machine loading/unloading?
10 What is meant by 'hand' or 'T' matrix?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Derive an expression for determination of gear ratio & torque.

OR

b. Derive an expression for determination of power of a dc motor

12 a. Explain about dynamic stabilization of robots.

OR

b. Explain the various generations of robots with neat sketch.

13 a. Explain briefly about the electric drive system & hydraulic drive system

OR

b. Elucidate briefly about fiber optic sensor

14 a. Discusss briefly about acoustic sensor & range sensor.

OR

b. Describe briefly about the force control technique in manipulator

p.t.o

15 a. Explain the construction of manipulator

OR

b. Explain any two types of grippers

16 a. Explain about the solution of inverse kinematic problem.

OR

b. Explain about the multiple jacobian work envelop.

17 a. Explain any two solutions for inverse kinematic problem.

OR

b. Explain about inverse kinematic problem & its solutions.

18 a. Explain about application of robot in welding.

OR

b. Explain about any two manufacturing application of robots

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Describe the various inputs to an inverse kinematics algorithm. Explain the functioning of an inverse kinematic algorithm

OR

b. Enumerate the non-manufacturing areas where robots are expected to be used. Discuss robot application for welding and machine loading.

20 a. What do you understand by degree of freedom(DOF)? How many DOFs are required to position an end effector at any point in 3-D space?

OR

b. How is a robot end-effector specified? Discuss the design considerations in the robot end-of-the-arm tooling.

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SL.NO:1196 **SUBJECT CODE:17BMES01**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

BIOSENSORS & MEASUREMENT DEVICES

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Illustrate the classification of transducers.
2 Model the basic differential amplifier.
3 Define the mean arterial pressure.
4 Define sensitivity.
5 Define Adsorption.
6 List the types of electrodes used for EMG.
7 List the methods used for the detection of pulse changes due to blood flow.
8 Explain signal conditioning element.
9 List the different types of ECG lead configuration.
10 Paraphrase the methods used for measuring indirect blood pressure.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Demonstrate the mechanical, electrical and optical strain gauge with examples.

OR

b. Calculate the gauge factor with diagram.

12 a. Describe the flow transducer and list its applications.

OR

b. Determine the bioelectric potential of a particular cell.

13 a. Demonstrate the inverting and non inverting amplifier.

OR

b. Illustrate the origin, amplitude and duration of physiology nature of ECG waveform.

14 a. Describe the block diagram for processing plythysmographic signal.

OR

b. List some of the biomedical application of transducers.

15 a. Explain the types, principles of operation and application of transducers. p.t.o

OR

b. Describe variable permeability and variable reluctance inductive transducers.

16 a. Discuss about the inductive transducers based on change in self inductance.

OR

b. Discuss in detail about the optical transducer.

17 a. Describe on operational amplifier characteristics.

OR

b. Explain about the types of electrode with suitable diagram.

18 a. Discuss the block diagram of a typical set up for EMG recording.

OR

b. Discuss the types of electromagnetic flowmeters.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Differentiate the three types of temperature transducers with diagram

OR

b. Show the basic block diagram of an EEG machine.

20 a. Explain the enzyme biosensors with examples.

OR

b. Explain the basic block diagram of an ECG machine.

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SL.NO:1196

SL.NO:1187 **SUBJECT CODE:17BMCC11**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

REHABILITATION ENGINEERING

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1	Differentiate between impairment and disability.
2	Define ergonomics
3	Define Gait Analysis
4	Name the different stages of gait
5	Define sensory substitution
6	Define aphasia
7	Define myoelectric prosthesis
8	Mention the importance of psychiatry in functional diagnosis
9	Write about virtual reality based rehabilitation
10	Give the difference between KAFO and HKAFO

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Outline the psychologist & social workers helps in rehabilitation process.

OR

b. Give the classification of visual impairment

12 a. Explain deafness and different types of hearing aids

OR

b. Discuss the role of biomedical engineer and rehabilitation nurse in medical team

13 a. Explain mobilization exercise and endurance exercise in the field of rehabilitation engineering

OR

b. Explain different types of contractions

14 a. Explain the parts of body power edprosthesis

OR

b. Explain the role and need of speech pathologist

15 a. Explain the role and need of rehabilitation nurse

p.t.o

OR

b. Explain the information processing model of the human operator of assistive technologies

16 a. Give a brief note on Pathological Gait.

OR

b. Explain about the therapeutic exercise used to improve coordination.

17 a. Discuss about the different types of hearing aids.

OR

b. Give short notes on prosthesis for wrist articulations.

18 a. Write short note KAFO.

OR

b. Explain in detail about the functional electrical stimulation system

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Describe the roles of rehabilitation engineering practitioner

OR

b. Explain in detail about the auditory augmentation and describe the concept of cochlear implantation

20 a. Explain in detail about the practice rehabilitation.

OR

b. Explain in detail about the Frenkel'sexercise

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SL.NO:1187

SL.NO:1179 **SUBJECT CODE:17BMSE01**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELECTIVE-QUALITY MANAGEMENT IN HEALTHCARE

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Write the classification of instruments.
2 List out medical devices regulatory activities.
3 Define safety policy.
4 Mention the precautions to avoid the accident in manhandling.
5 List out Some Electrical Safety Tips.
6 What is FDA Basics for Industry?
7 How can the hospital avoid costly technology mistakes?
8 What kinds of injuries result from electrical currents?
9 How is health care quality measured?
10 How does evidence become a quality measure?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Discuss about the obstacles to assessing healthcare technology .

OR

b. Discuss the significance of health policy.

12 a. Explain safe work practice requirements for Non-Electrical Workers.

OR

b. Briefly explain the basic seven tools and New seven tools

13 a. Explain about International standardization.

OR

b. Briefly explain about classification of equipment.

14 a. Write details Major Health Care Trends and Directions.

OR

b. Briefly explain roles & responsibilities of FDA.

15 a. Discuss about Joint Commissions p.t.o

OR

b. Describe the salient features of national health policy

16 a. Discuss the factors influencing the hospital utilisation.

OR

b. How will ensure safety in the laboratory of a hospital? Explain.

17 a. What are some general safety tips for working with or near electricity?

OR

b. Explain how electrical current adversely affects the human body.

18 a. Elaborate Glossary of Key Terms in Quality Measurement.

OR

b. Discuss the factors affecting pricing of hospital services.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Specify the necessary steps to avoid avoidance of electrical shock

OR

b. Define Medical Audit. Discuss the pre-requisite and steps to conduct Medical Audit.

20 a. Explain the various dimensions of quality with examples.

OR

b. Explain the process involved in the delivery of hospital services.

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SL.NO:1179

SL.NO:1171 **SUBJECT CODE:17BMCC03**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

BIOSENSORS AND TRANSDUCERS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 What is meant by POT?
2 List the biomedical applications of capacitive and inductive transducers.
3 What is a Thermistor?
4 What is the principle of photo emissive cell?
5 What is the purpose of electrode paste?
6 Define micropipette.
7 What is the use of antibodies in Biological elements?
8 Write a short note on ISFET.
9 Write a short note on fermentation process control.
10 List the three general types of analysis are needed in environmental monitoring.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Illustrate about the parallel plate capacitive transducer briefly

OR

b. Give the outline of nucleic acid and its approaches.

12 a. Outline the working principles of electrochemical sensor.

OR

b. Illustrate the types, principles of operation and application of transducers.

13 a. Illustrate the function of ISFET.

OR

b. Illustrate the biomedical applications of biosensor.

14 a. List the Factor to be considered while selecting transducer:

OR

b. Write a summary on biological elements.

P.T.O

15 a. Describe variable permeability and variable reluctance inductive transducers.

OR

b. Describe the function of potentiometer and its types.

16 a. Describe principle of piezo resistive transducer.

OR

b. Show and explain the graph of voltage current characteristics and current time characteristics of thermistor.

17 a. Describe the silver-silver chloride Electrodes.

OR

b. Discuss the polarizable and non-polarizable electrodes.

18 a. Describe the examples of enzyme biosensors.

OR

b. How biosensor useful in food and drink analysis.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate in detail the silver-silver chloride Electrodes.

OR

b. Explain about the types of Strain Gauges in detail & derive the expression for guage factor?

20 a. Describe about Photo Electric Transducers in detail.

OR

b. Explain about biological elements.

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SL.NO:1165 **SUBJECT CODE:17MABS01**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
HUMANITIES & SCIENCES

ENGINEERING MATHEMATICS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Obtain the characteristic equation of $\begin{pmatrix} 2 & -3 & 1 \\ 3 & 1 & 3 \\ -5 & 2 & -4 \end{pmatrix}$

2 Define orthogonal matrices.

3 Define evolute.

4 Find the centre of curvature of the curve $y = x^2$ at the origin.

5 If $u = x^2y^3$ where $x = \log t$ and $y = e^t$ Find $\frac{du}{dt}$

6 Examine the maximum and minimum values of $3x^2 - y^2 + x^3$

7 Integrate $\int_0^1 \int_1^2 x(x+y)dydx.$

8 Integrate $\int_0^{\pi/2} \int_0^{\pi/2} \sin(\theta+\phi)d\theta d\phi$

9 Prove that $\nabla\left(r^n\right) = nr^{n-2}\vec{r}$

10 State Stoke's theorem

(p.t.o)

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Find the Eigen values and Eigenvectors of the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$.

OR

b. Obtain the Eigen values and Eigenvector of the matrix $\begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{pmatrix}$

12 a. Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c).

OR

b. Prove that the radius of curvature at any point of the cycloid $x = a(\theta + \sin\theta); y = a(1 - \cos\theta)$ is $4a\cos\frac{\theta}{2}$

13 a. Find the maximum and minimum values of the function $x^3y^2(1-x-y)$

OR

b. (i) If $u = \sin^{-1}\frac{x}{y} + \tan^{-1}\frac{x}{y}$, then find the value of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$

(ii) Find $\frac{du}{dt}$ as a total derivative and verify the result by the direct substitution of $u = x^2 + y^2 + z^2$ when $x = e^{2t}, y = e^{2t}\cos 3t$, and $z = e^{2t}\sin 3t$

14 a. Integrate $\int_0^a \int_0^{\sqrt{a^2-x^2}} \int_0^{\sqrt{a^2-x^2-y^2}} \frac{dz\,dy\,dx}{\sqrt{a^2-x^2-y^2-z^2}}$

OR

b. Obtain the area enclosed by the parabola $y^2 = 4ax$, $x-$axis and the latus rectum of the parabola.

15 a. If $\vec{F} = x^2\vec{i} + xy\vec{j}$ evaluate $\int \vec{F}.d\vec{r}$ from (0, 0) to (1, 1) along the line y=x

OR

b. Obtain the values of a and b so that the surfaces $ax^3 - by^2z = (a+3)x^2$ and $4x^2y - z^3 = 11$ may cut orthogonally at $(2,-1,-3)$

16 a. Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ and $z = 0$.

OR

b. For the given curve $x = a\cos\theta, y = b\sin\theta$ Find ρ at $\left(\frac{a}{\sqrt{2}}, \frac{b}{\sqrt{2}}\right)$

17 a. Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c).

OR

b. Prove that the radius of curvature at any point of the cycloid $x = a(\theta + \sin\theta); y = a(1-\cos\theta)$ is $4a\cos\frac{\theta}{2}$

18 a. Prove that $\nabla^2(r^n) = n(n+1)r^{n-2}$ where $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ and $r = |\vec{r}|$

OR

b. For the curve $x^3 + y^3 = 2$ find the co-ordinates of the centre of curvature at the point (1, 1)

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Diagonalise the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ and hence find A^5

OR

b. Obtain the equation of the evolute of the curve $x^{2/3} + y^{2/3} = a^{2/3}$

20 a. Determine the value of $\int_0^1 \int_0^{x^2} (x^2 + y^2)\, dydx$

OR

b. Change the order of integration in $\int_0^a \int_y^a \frac{x^2}{\sqrt{x^2 + y^2}} dxdy$ and then evaluate it.

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SL.NO:1165

SL.NO:1154 **SUBJECT CODE:17BMCC08**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

BIOMEDICAL SIGNAL PROCESSING

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1	Outline the differences and similarities between DIF and DIT algorithms.
2	List the major functions involved in digital signal processing.
3	List the steps involved in the design of FIR filters using windows.
4	What is meant by pitch of speech signal?
5	Define repolarization.
6	Mention the types of ADC.
7	Mention the various types of signals.
8	What is the need of multi-level wavelet decomposition?
9	What is homomorphic system?
10	What is action potential?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Find the cross-correlation of two finite length sequences x(n)= {1,2,1,1}; y(n)= {1,1,2,1}

OR

b. Derive bilinear transformation for an analog filter with system function:
H(s) =b / (s+a)

12 a. Derive the equation for designing IIR filter using bilinear transformation.

OR

b. Compute the following sequences Convolution as matrix multiplication
$x_1(n) = \{1, 2, -1, 2\}$ and $x_2(n) = \{1, 2, 3\}$

13 a. Determine the 8 point DFT of the sequence x(n)= {1,1,1,1,1,1,0,0} using direct computtion.

OR

b. Briefly explain about Discretization of the Continuous Wavelet Transform.

14 a. Propose a homomorphic filter to separate two signals that have been combined through the convolution operation.

P.t.o

OR

b. Design an algorithm to detect P wave in the ECG signal.

15 a. Describe articular cartilage and knee-joint vibrations with suitable diagram.

OR

b. Write in detail about the nature of biomedical signals.

16 a. Draw all structures of IIR filters.

OR

b. Why wavelets are needed? What are the required conditions for a function to be a wavelet function?

17 a. What is the condition for perfect reconstruction of wavelets? Its applications.

OR

b. Narrate in detail about the envelope extraction.

18 a. Elaborate in detail about point process in system modeling.

OR

b. Explain the method of design of IIR filters using bilinear transform method.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Outline the importance and how to detect alpha, beta and gamma waves.

OR

b. Illustrate the multi resolution signal analysis by the wavelet analysis.

20 a. Examine various QRS detection techniques in ECG.

OR

b. Determine 8 point DFT of x (n)=1for $-3 \leq n \leq 3$ using DIT-FFT algorithm.

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SL.NO:1154

SL.NO:1144 **SUBJECT CODE:17BMCC07**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

DIAGNOSTIC AND THERAPEUTIC EQUIPMENTS - I

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 What are the methods of Stimulation Pacemaker?

2 What are the peak amplitude and frequency response for ECG?

3 What is a referential montage?

4 Define BAEP.

5 Draw the block diagram of ultrasonic therapy unit.

6 Which type of membrane used in membrane oxygenator?

7 What are the three basic types of shock-wave sources used in lithotripsy?

8 What are the lung volumes and capacities?

9 Explain the somato sensory evoked potential.

10 Differentiate electrotherapy from electrocuting.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Explain about external pacemaker briefly.

OR

b. Illustrate the function of membrane oxygenators.

12 a. Illustrate the measurement of respiratory volume of lung.

OR

b. Illustrate briefly about the electrodes placement of EEG.

13 a. What is pacemaker and what is the need for pacemaker?

OR

b. Define various dynamic respiratory parameters.

P.T.O

14 a. With suitable block diagram explain the function of ventricular synchronized demand pacemaker.

OR

b. Discuss the different types of implantable pacemaker.

15 a. Explain the computerized analysis of EEG.

OR

b. Describe the EEG biofeedback instrumentation with neat diagram.

16 a. Explain the methods of applying electrodes in short wave diathermy.

OR

b. Discuss the electrodes used in surgical diathermy.

17 a. Describe briefly bubble type oxygenator.

OR

b. Explain the working of peritoneal dialysis with suitable diagram.

18 a. Explain with diagram the function of wedge spirometer with neat diagram

OR

b. Write a brief notes on humidifier, Nebulizer and Aspirator.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Outline briefly the Visual, Auditory and Somatosensory evoked potential.

OR

b. Grade the different modes of operation of Pacemaker in detail.

20 a. Describe with suitable diagrams the working of implantable Defibrillator.

OR

b. Describe the mechanics of natural respiration in detail.

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SL.NO:1136 **SUBJECT CODE:17BMEC04**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

ELECTIVE - MEMS AND ITS BIOMEDICAL APPLICATIONS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 What is controlled drug delivery system?

2 List out at least four distinct advantages of miniaturization of machines and devices.

3 What is microfluidic PCR?

4 What is surface tension gradient?

5 How are magnetic nanoparticles used as MRI contrast agents?

6 How CNT is used in cancer treatment?

7 Reveal optical applications of MEMS devices.

8 Write note on Micro-filter permeable membrane

9 Stat the working of DNA biosensor.

10 Define the working of scanning electron microscope.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Illustrate on wet etching process in MEMS fabrication

OR

b. Explain in detail about electrostatic sensors and actuators

12 a. Illustrate the Fabrication of Microlens Array and Its Applications

OR

b. Elaborate on Biopolymer micro-needles

13 a. Investigate on the reaction of Immobilization of DNA Probe onto Transducer Surface

OR

b. Elaborate on the drug delivery system using micro-needles and micro pumps

14 a. Explain the concept miniaturization of MEMS. Distinguish between micro actuator and micro accelerometer

OR

b. Discuss about the Optical MEMS from micro mirrors to complex systems.

15 a. Explain the integration challenges of microwave MEMS devices in to waveguides

OR

b. Write in detail about the dynamic process of electrowetting

16 a. Elucidate on Micro Gear Pump

OR

b. Illustrate on the working principle of carbon nanotube biosensors

17 a. Explain the Photolithography technique used in MEMS design

OR

b. Elaborate on the various materials used for microfluidic application

18 a. Illustrate on the concept "Biochips for disease detection"

OR

b. Elaborate on the working principle of Atomic Force Microscope

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Analyse on electo-osmosis process and illustrate the same.

OR

b. Investigate the working principle of XRD analysis in Nanomaterial characterization.

20 a. Elaborate on Electrophoresis on its Overview, Principles and Types.

OR

b. Design a micro actuator with a mems micro accelerometer suitable for an engineering application.

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SL.NO:1122 **SUBJECT CODE:17BMCC06**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

BIOMEDICAL CONTROL SYSTEMS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 List the types of control system.
2 Define absolute stable system.
3 What is meant by frequency response of system?
4 What is the homeostatic system?
5 Explain Chest wall.
6 Recall nervous regulation.
7 What are the basic properties of signal flow graph?
8 Give an application of routh stability criterion.
9 Mention the advantages of frequency response analysis.
10 State knee jerk reflex.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Obtain the response of unity feedback system whose open loop transfer function is G(s)=3/s(s+4) for a unit step input.

OR

b. With a neat diagram outline the
i) circulatory control model ii) neuromuscular reflex model action

12 a. Outline the pupil control system with diagram.

OR

b. By Routh stability criterions determine the characteristic equation
$s^4+8s^3+18s^2+16s+5=0$
Comment on the location of the roots of characteristics equations.

p.t.o

13 a. For the control systems with open loop transfer functions are given below, explain what type of input signal gives rise to a constant steady state error and calculate their values.

a) $G(s)=20/(s+1)(s+4)$
b) $G(s)=10(s+4)/s(s+1)(s+2)$
c) $G(s)=20/s^2(s+1)(s+4)$

OR

b. Derive the expression for frequency domain specifications of resonant frequency, peak resonance and Bandwidth of second order system

14 a. Apply the steady-state model of the chemical regulation of ventilation.

OR

b. Apply the simple models of muscle stretch reflex action.

15 a. Discuss in detail about the types of control system with neat diagram.

OR

b. Discuss in detail about linear models of physiological systems.

16 a. Explain the various steps in the procedure for Bode plot.

OR

b. Write detailed procedure for investigating the stability using Nyquist criterion.

17 a. What is frequency response? Explain briefly about Nyquist stability criterion.

OR

b. Examine the functional scheme for the pupillary light reflex system.

18 a. Discuss in detailed about steady-state characteristics of the muscle stretch reflex model components.

OR

b. Describe an Open-Loop and closed-Loop Transient Responses of first-order lung mechanics model to a unit impulse.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Sketch Bode plot for the following transfer function and determine the system gain K for the gain cross over frequency to be 5 rad/sec. $G(s)=Ks^2/(1+0.2s)(1+0.02s)$.

OR

b. A step input of 3 is applied to unity feedback system with $G(s) = 6/s(s+5)$. Find the response of the system c(t).

20 a. The signal flow graph for a feedback control system is shown in figure. Determine the Closed loop transfer function C(s) /R(s) using Manson's formula.

OR

b. Determine the Gain crossover frequency, phase crossover frequency, gain margin and phase margin of a system with open loop transfer function, $G(s)=1/s(1+2s)(1+s)$.

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SL.NO:1119 **SUBJECT CODE:17PHBS05**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO ALL

SMART MATERIALS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Demonstrate, how the Metallic glasses can be used for transformer core materials?

2 Explain briefly about transformation temperature in SMA.

3 Distinguish between Type I and Type II Superconductors.

4 Interpret unit cell.

5 Demonstrate top-down and bottom-up approach for producing nanoparticles.

6 Interpret any two techniques for the synthesis of nanophase materials.

7 Explain briefly about top-down approach.

8 Describe coercivity and retentivity.

9 Explain briefly about soft magnetic materials.

10 Identify the reason, why the superconductor exhibits the property of diamagnetism?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Categorize metallic glasses? Give examples. Mention the properties of metallic glasses.

OR

b. Draw the unit cells of SC, BCC, FCC and HCP structures

12 a. Examine the effects of temperature, magnetic field and current on the superconductivity.

OR

b. Schedule the following for SC, BCC, FCC and HCP structures

13 a. Explain the properties of diamagnetic materials with neat diagram.

OR

b. Explain two characteristics of SMA with neat diagrams.

14 a. Explain the properties of Ni-Ti alloy.

p.t.o

OR

b. Express the outline of magnetic and electrical properties of metallic glasses. Mention any two applications of metallic glasses.

15 a. Describe the following (i) unit cell (ii) coordination number (iii) nearest neighbour distance (iv) packing factor

OR

b. Explain the advantages, disadvantages and applications of ball milling method.

16 a. Explain Carbon Nano Tubes? How are they classified? Explain.

OR

b. Explain in detail about any one of the methods of fabrication of CNT.

17 a. Differentiate the properties of dia, para and ferromagnetic materials

OR

b. Discuss the properties of superconductors.

18 a. Describe about Type – I super conductor. Write down its characteristics.

OR

b. Discuss Isotope Effect and Meissner effect.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Categorize hard and soft magnetic materials? Mention their applications.

OR

b. Generalize the properties of metallic glasses.

20 a. Illustrate sol-gel method of preparing nanophase materials and mention its advantages.

OR

b. Illustrate hysteresis on the basis of domain theory.

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S.No.1118 **SUB CODE:17PCBS02**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E.DEGREE EXAMINATIONS- FEB - 2022
COMMON TO ALL
PHYSICAL SCIENCES

(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours Maximum Marks:50 Marks

PART A - ENGINEERING PHYSICS

Answer **ALL** questions

Part-A (5 x 2 =10 Marks)

1 Tell about population inversion.
2 Schedule any two applications of laser in industrial field.
3 Report about step index fiber.
4 Tell about the characteristics of graded index multimode fiber.
5 Interpret about X-ray Fluoroscopy.

Answer **Any FIVE** questions

Part-B (2 x12 =24 Marks)

6 a. Predict the applications of laser in communication, military and chemical fields.

OR

b. Recognize the following terms: population inversion, pumping process and laser action.

7 a. Express the various types of fibers based on refractive index profile.

OR

b. Express the characteristics of penetrant.

Answer ALL questions

PART-C (1 x 16 = 16)

8 a. Demonstrate the construction and working of semiconductor laser with necessary diagram.

OR

b. Illustrate the working of X-ray radiography.

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P.T.O

PART A - ENGINEERING CHEMISTRY

(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours Maximum Marks:50 Marks

Answer **ALL** questions

Part-A (5 x 2 =10 Marks)

1 Brief the terms electrolytic and electrochemical cell.
2 What is helmholtz's electrical double layer?
3 Show the structure of EDTA and Ca-EDTA complex.
4 Mention the causes of boiler corrosion
5 Write a note on solar energy

Answer **Any FIVE** questions

Part-B (2 x12 =24 Marks)

6 a. Explain standard electrode potential in detail.

OR

b. Calculate the emf of the cell Mg/Mg^{2+} $//Cd^{2+}$ (aq) /Cd(s) at 25^0C where, $[Cd^{2+}]$=0.7M, $[Mg^{2+}]$ =1.0M and E^0cell =1.97 V.

7 a. Discuss in detail dry corrosion with mechanism.

OR

b. Describe producer gas in detail.

Answer ALL questions

PART-C (1 x 16 = 16)

8 a. Explain the working principle of H_2-O_2 fuel cell with reactions.

OR

b. Elaborate the non-conventional energy sources.

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S.No.1118

SL.NO:1114 **SUBJECT CODE:17BMCC04**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

BIOMEDICAL INSTRUMENTATION & MEASUREMENTS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Categorize the types of microphones used in PCG.
2 Demonstrate about metal-electrolyte interface.
3 Examine some of the errors that may occur in the electronic cell counting techniques.
4 What are micro electrodes?
5 Define preamplifiers.
6 Define heart sound and their sources
7 What is mean by mean arterial pressure?
8 What is spectrophotometry?
9 List the types of blood cells.
10 Interpret the effects of artefacts on ECG recordings.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Draw and explain diffrent needle electrodes.

OR

b. Draw and explain the circuit diagram of transformer isolation amplifier.

12 a. Draw the standard bipolar limb leads and augmented electrodes in ECG.

OR

b. Analyze the transmitter and receiver limit using range gated pulsed Doppler flowmeters.

13 a. Classify the types of optical filters with its properties.

OR

b. Demonstrate the origin of bioelectric potential with suitable diagram.

14 a. Illustrate about the placement of microphone for recording PCG.

OR

b. Show the interaction of radiation with matter.

(p.t.o)

15 a. Discuss the various methods of cell counting.

OR

b. What is bio amplifier? Mention the need for bio amplifier.

16 a. Describe in detail about electrolyte-skin interface.

OR

b. Explain about the polarization and motion artifacts.

17 a. Summarize the basic operational non inverting amplifier.

OR

b. Discuss the block diagram of a typical set up for EMG recording.

18 a. Discuss about the direct methods of monitoring blood pressure.

OR

b. Discuss the automatic recognition and differential counting of cells with diagram.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate use of electrode in EEG and EMG in detail.

OR

b. Outline the methods of cell counting with suitable diagram.

20 a. Describe the basic block diagram of an ECG machine.

OR

b. Discuss diffrent types of isolation amplifier with a neat circuit diagram.

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SL.NO:1114

SL.NO:1104 **SUBJECT CODE:17BMPI07**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

ELECTIVE - OPERATION THEATRE AND ANESTHESIA TECHNOLOGY

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Classify the Inhalational anaesthetics.
2 State the mechanism of action of barbiturates.
3 Why tubocurarine is not used now?
4 Mention the body substances capable of transmitting HBV.
5 List the antigenic structure of HBV.
6 What is the principle of beneficence?
7 Define filling ratio.
8 Mention the parts of face mask.
9 Define intracranial hypertension.
10 Name the components of extracorporeal circulation.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Categorise the antianxiety drugs.

OR

b. Outline the urinary tract Infection.

12 a. Outline the liver disease in brief.

OR

b. Categorize the disorders of metabolism.

13 a. Outline the medical gas pipeline system.

OR

b. Illustrate the geriatric anaesthesia.

14 a. Illustrate the sedative with suitable example.

OR

b. Illustrate the principle and applications of autoclave.

(p.t.o)

15 a. Illustrate the filtration and radiation procedure for sterilization.

OR

b. Outline the medico legal aspects of medical records.

16 a. Illustrate the vaporiser in brief.

OR

b. Outline the one-lung anaesthesia.

17 a. Illustrate the anaesthesia for caesarean section.

OR

b. Explain about emergency drugs.

18 a. Describe the asthma in brief.

OR

b. Explain the anaesthesia for thoracic surgery procedures.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Classify the antiemetic drugs.

OR

b. Outline the basic principles of medical ethics.

20 a. Analyse the anaesthetic technique in cardiac surgery.

OR

b. Outline the kidney and urinary tract diseases.

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SL.NO:1104

SL.NO:1090 **SUBJECT CODE:17MBHS01**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO ECE, EEE,BME ,CSE & MECH

ENGINEERING STARTUPS AND ENTREPRENEURIAL MANAGEMENT

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1	Point out any two features of Risk- reward scale for starrtup.
2	List any three purpose of Stock Ownership Plan.
3	Write on a“ Long Term Disability Insurance”.
4	Write any two roles of management in a company?
5	Define buyer and seller.
6	What is Self-funding?
7	What is a contract?
8	Write on Preferred Stock?
9	Mention any four difficulties faced by the entrepreneur.
10	Point out the factors that affecting Entrepreneurship growth.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. What is the difference between authorized shares and outstanding shares?

OR

b. Explain in detail the violation of intellectual property with few examples.

12 a. Elucidate the sole trader business form of organisation.

OR

b. Enumerate the ten commandments for the beginning entrepreneur.

13 a. “ A clear business plan is key to startup success” comment.

OR

b. Determine how equity form of incentives help motivate employees in a startup?

14 a. How can a business protect its trade secrets?

OR

b. “Successful startups have great management team” Justify.

15 a. Assess the safest investment with highest return in startup employment. p.t.o

OR

b. Explain in detail the roles of entrepreneurship.

16 a. Define market segmentation and discuss its importance.

OR

b. Briefly discuss the steps involved in developing a new product or service.

17 a. Briefly explain the levels of funding for startups with a diagram.

OR

b. Briefly discuss the importance of identifying target customers for a startup.

18 a. Explain in detail the importance and characteristics of entrepreneurship.

OR

b. Explain the importance of intellectual property in start-ups.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss the imperative factors of Social Entrepreneurship.

OR

b. Role of Entrepreneurship in Economic Development – Discuss

20 a. Write an essay on different kinds of partnership.

OR

b. Examine the employees and employers should know about restricted stock awards and taxes.

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SL.NO:1069 **SUBJECT CODE:17BMSE23**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

ELECTIVE - MEDICAL WASTE MANAGEMENT

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 How should BMW be disposed?

2 What are "sharps"?

3 Does biological waste need to be locked in a storage room or is it okay for the door to have a positive latch?

4 What is the threat posed by sewage overflows to the public health and the environment?

5 Once Infectious Waste has been autoclaved, is it still considered infectious waste or can you dispose of it in the regular garbage?

6 Would untreated bulk blood and body fluids be permitted to be discharged to the sanitary sewer?

7 What is anaerobic composting?

8 What dangers are there in building an autoclave for treating medical waste in an area near three schools and homes?

9 Write the principle of Autoclaving?

10 What kind of primary and ancillary fuels can be used in gasification?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Describe what are the impact of infectious diseases & Health hazards in waste management?

OR

b. What is the difference in pyrolysis, gasification and combustion?

12 a. Elabrote all the methods to using treatment/ disposal of BMW?

OR

b. Descuss the reasons for source segregation of biomedical waste in hospitals?

(P.T.O)

13 a. Mention the significance of colour code & How the colour code system helping in medical waste management?

OR

b. Describe the disinfectants commonly used for disinfection of materials contaminated with blood and body fluids?

14 a. What is Genotoxic waste? And explain in detail.

OR

b. Discuss about the composition of Biomedical waste.

15 a. Describe the colour codes and type of containers used for disposal of biomedical waste.

OR

b. How to Dispose of Empty Hazardous Materials Containers discuss in detail?

16 a. Elaborate how to Store and Dispose of Hazardous Chemical Waste.

OR

b. How disinfection is carried out in hospitals to safeguard from medical wastes?

17 a. Justify whether the integrated waste management is reduced on an individual level?

OR

b. Explain in detail about the prevention of nosocomial infections.

18 a. Describe how common hospital instruments sterilized?

OR

b. Elaborate the Best Strategies for Infection Prevention and Control.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss about the segregation of biomedical wastes.

OR

b. Discuss about the main types of chemical waste disposal and treatment.

20 a. Explain in detail about the Gasification systems with neat sketch

OR

b. Elaborate New Technologies in Infection Prevention

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SL.NO:1061 **SUBJECT CODE:17BMSE02**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIOMEDICAL ENGINEERING

ELECTIVE - HOSPITAL ENGINEERING

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 What is the purpose of laboratory services in a hospital?

2 Define nursing service.

3 What are the different types of imaging techniques?

4 Define Manpower planning.

5 Define CSSD. What are the equipment's used in CSSD?

6 Define pharmacy.

7 Whatis meant by disinfection?

8 What is interventional radiography?

9 How computers are useful inmedical records departmentin hospitality out the advantages of medical record maintenance.

10 List out the Responsibilities of adieticianin hospital food services.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Elaborate the factors that influence in the planning and designing of hospitals.

OR

b. Discuss about the common attributes of out patient service facilities.

12 a. Discuss the important of clinical services in hospital.

OR

b. Explain the types of transfer.

13 a. Explain the medical record system in a hospital.

OR

b. Write the causes and control methods of hospital infection.

(p.t.o)

14 a. What is hospital administration?and what are the challenge soccursin hospital administration?

OR

b. Write a brief description on operation theatre suit in hospitals.

15 a. Elaborate the objectives of recruitment.

OR

b. Discuss about the two sources of recruitment.

16 a. Write the importance of central sterilization.

OR

b. Discuss the various safety rules followed by the hospitals.

17 a. Describe in detail about the difference between hospital and industry.

OR

b. Elaborate the medical imaging and radiography.

18 a. Compare the Human resource management and personnel management.

OR

b. Discuss about the various modes of communication.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Briefly explain about the fire-fighting equipment used in hospitals.

OR

b. What are the major services of a 500-bed hospital? Outline the characteristic features of all major ‘‘Line Services’’ of a 50-bed modern hospital.

20 a. Mention the effects of EMI on electromedical equipment’s in a hospital.

OR

b. How staff improvement program is carried out in Hospital?

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SL.NO:1061

SL.NO:1049 **SUBJECT CODE:17BMSE22**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB-2022
BIOMEDICAL ENGINEERING

ELECTIVE - CRITICAL CARE INSTRUMENTS AND THERAPEUTIC EQUIPMENT

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1	Compare Soft coagulation and Spray Coagulation.
2	What is an AC Defibrillator?
3	Draw the circuit diagram of short wave diathermy unit.
4	Define the term fulguration.
5	What is the meaning of extracorporeal circuit?
6	What is spirometer?
7	What are the basic requirements of ventilators?
8	How to decrease mortality and morbidity in patient monitoring system?
9	Explain about micro wave diathermy.
10	Explain the difference between micro wave and short wave diathermy.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Illustrate the various types of electro surgery techniques commonly employed in surgical diathermy.

OR

b. Illustrate the measurement of respiratory volume of lung.

12 a. Illustrate the lung volumes and capacities with necessary graph.

OR

b. Compare different coagulation modes used in diathermy.

13 a. Compare syringe pumps and Peristaltic pumps

OR

b. Define various dynamic respiratory parameters.

14 a. With suitable block diagram explain the function of ventricular synchronized demand pacemaker.

OR

b. Explain the methods of applying electrodes in short wave diathermy.

(p.t.o)

15 a. Draw and explain the different types of waveforms generated in surgical diathermy.

OR

b. Explain the need of heart lung machine.

16 a. Describe briefly arrhythmia monitor with block diagram

OR

b. Differentiate haemodialysis and peritoneal dialysis.

17 a. Draw and explain the functional diagram of positive pressure ventilator.

OR

b. Explain brief notes on humidifier, Nebulizer and Aspirator.

18 a. Explain working of patient monitoring system which can monitor six bedded ICU with block diagram.

OR

b. Describe multichannel patient monitoring telephone telemetry system.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Outline the various terms used in Ventilators.

OR

b. Describe the process of haemodialysis with suitable block diagram.

20 a. Draw the block diagram of ventricular synchronous demand pacemaker and explain each block in detail.

OR

b. Discuss the block diagram of the blood leak detector

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SL.NO:1030 **SUBJECT CODE:17BMEC08**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
BIO MEDICAL ENGINEERING

ELE -EMBEDDED SYSTEM IN MEDICAL APPLICATIONS

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 What is code memory?
2 Classify the processors in embedded system
3 State the concept of Data partitioning in hardware and software duality.
4 What is Semi-Custom ASIC systems
5 Define Flash memory
6 Define GUI
7 Define on single parameter PMS
8 State basic concept of pacing .
9 Compare dual coil vs Single coil leads in pacemaker
10 How many types of Insulation are used in pacemaker circuits .

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Compare between non-RTOS & RTOS execution systems.

OR

b. Comment on Power Management and Debugging capabilities of embedded system processors

12 a. Investigate the types of API protocols

OR

b. Explain about a API protocol built with XML, enabling users to send and receive data through SMTP and HTTP

13 a. Investigate theData Acquisition and Signal Processing in Patient Monitoring system (PMS)

OR

b. Analyse on various types of biosensors used in pacemakers.

14 a. Sketch and explain about typical Bus structure comprising address, data and control signals

OR

b. Describe in detail about optimization Algorithms to Solve Partitioning Problems p.t.o

15 a. Explain detail on how do you Interface External Memory with 8051 Microcontroller

OR

b. Explain about Polling and Interrupts in Timers

16 a. Illustrate the design requirements on patient monitoring system

OR

b. Illustrate on the pulse generator circuit in pacemaker

17 a. Illustrate the battery configuration used in pacemaker

OR

b. Elaborate on principles of co-design methodology

18 a. Describe in detail about the Common memory types in embedded systems

OR

b. Elaborate on Bipolar versus Unipolar Stimulation

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Examine the Processor selection for an embedded system

OR

b. Elaborate on the complete strategy on application programming interface (API) with its need and working principles

20 a. Analyse the sensing and timer circuit used in pacemaker design

OR

b. Illustrate on the complete working nature of Pulse-oximeter with SPO2 sensors Circuit for Measuring Oxygen Saturation in Blood

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SL.NO:1030

SL NO:10002 **SUBJECT CODE:17BMSE04**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB- 2022
BIO MEDICAL ENGINEERING

ELE-HOSPITAL INFORMATION SYSTEM AND ITS MANAGEMENT

Time : Three Hours Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

1 Categorize the medical records in hospital.

2 Show the advantage of grouping OT.

3 List out the benefits of hospital.

4 What are the different zone in OT.

5 List out the three uses of engineering service.

6 Define purchase and procurement system.

7 List out the four functions of HRM.

8 Define mobile health service.

9 Define the hospital administration.

10 What is transport service?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

11 a. Categorize the engineering service in hospital.

OR

b. Categorize in nursing management hospital

12 a. Illustrate the office management in hospital system

OR

b. Categorize the classification of hospital.

13 a. Determine the considerations when we choosing an outpatient facility?

OR

b. Demonstrate the important of clinical services in hospital.

14 a. Illustrate the engineering service in hospital

OR

p.t.o

b. Determine the sources of recruitment in hospital.

15 a. Compare the different types of images services.

OR

b. Summarize the public relation important in hospital

16 a. Describe the experimental medicine services

OR

b. Explain in detail about the man power services in hospital

17 a. Describe the common attributes of outpatient service facilities

OR

b. Explain about medico legal service and public relation.

18 a. Explain the medical record system in a hospital.

OR

b. Explain about the purpose of communication in hospital

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate the energy conservation in hospital

OR

b. Illustrate the mobile health in hospital

20 a. Compare the pharmacy transport and engineering service.

OR

b. Explain about the organisation structure of hospital.

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SL NO:10002