

DU PhD in Electronics

Topic:- ELEC PHD

1) Which of the following is a scalar quantity?[Question ID = 762]

1. Electric field intensity [Option ID = 3045]
2. Electric potential [Option ID = 3046]
3. Electric flux density [Option ID = 3047]
4. Electric force [Option ID = 3048]

2) Evaluate j^{23} (where $j = \sqrt{-1}$)

[Question ID = 763]

1. -1
[Option ID = 3049]
2. 1
[Option ID = 3050]
3. -j
[Option ID = 3051]
4. j
[Option ID = 3052]

3) When BCC iron is heated, it changes to FCC iron resulting in[Question ID = 764]

1. Crock in the material [Option ID = 3053]
2. Increase in volume [Option ID = 3054]
3. Contraction in volume [Option ID = 3055]
4. No change in volume [Option ID = 3056]

4) In an intrinsic semiconductor, the mobility of an electron in the conduction band is ____ [Question ID = 765]

1. Zero [Option ID = 3057]
2. smaller than the mobility of holes in the valence band [Option ID = 3058]
3. greater than the mobility of holes in the valence band [Option ID = 3059]
4. equal to the mobility of holes in the valence band [Option ID = 3060]

5) How many valence electrons does silver has to make it a best conductor?[Question ID = 766]

1. 4 [Option ID = 3061]
2. 8 [Option ID = 3062]
3. 1 [Option ID = 3063]
4. 0 [Option ID = 3064]

6) When reverse biased, a P-N junction diode acts as a[Question ID = 767]

1. a rectifier [Option ID = 3065]
2. an amplifier [Option ID = 3066]
3. an open circuit [Option ID = 3067]
4. a short circuit [Option ID = 3068]

7) Teflon has dielectric constant $\epsilon_r = 2.08$. Its permittivity is

[Question ID = 768]

1. $18.41 \times 10^{-12} \text{ F/m}$
[Option ID = 3069]
2. $2.08 \times 10^{-12} \text{ F/m}$
[Option ID = 3070]
3. $4.25 \times 10^{-12} \text{ F/m}$
[Option ID = 3071]
4. $0.23 \times 10^{-12} \text{ F/m}$
[Option ID = 3072]

8) An n- channel JFET has $I_{DSS} = 2 \text{ mA}$, and $V_P = -4 \text{ V}$. Its transconductance (g_m in mA/V) for an applied gate to source voltage

$V_{GS} = -2 \text{ V}$ is

[Question ID = 769]

1. 0.5

[Option ID = 3073]

2. 0.25

[Option ID = 3074]

3. 0.75

[Option ID = 3075]

4. 1

[Option ID = 3076]

9) If $Z_1 = 1 - j3$ and $Z_2 = -2 + j5$, the ratio $\frac{Z_1 Z_2}{Z_1 + Z_2}$ in $a + jb$ form is

[Question ID = 770]

1. $-1 + j2.8$

[Option ID = 3077]

2. $-2.1 - j$

[Option ID = 3078]

3. $2.4 - j1.7$

[Option ID = 3079]

4. $1.8 - j7.4$

[Option ID = 3080]

10) A power transistor dissipates 5 W. If ambient temperature is 30° and case to air thermal resistance is 10°C/W , the case temperature is [Question ID = 771]

1. 80°C [Option ID = 3081]

2. 20°C [Option ID = 3082]

3. 32°C [Option ID = 3083]

4. 305°C [Option ID = 3084]

11) In a flash Analog to Digital convertor (ADC), the output of each comparator is connected to an input of

[Question ID = 772]

1. Priority Encoder

[Option ID = 3085]

2. Multiplexer

[Option ID = 3086]

3. Demultiplexer

[Option ID = 3087]

4. Decoder

[Option ID = 3088]

12) Find x and y for $\begin{bmatrix} 3 & -1 \\ 2 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ -3 \end{bmatrix}$

[Question ID = 773]

1. $x = 3, y = -1$

[Option ID = 3089]

2. $x = 2, y = 5$

[Option ID = 3090]

3. $x = 1, y = -1$

[Option ID = 3091]

4. $x = 4, y = 2$

[Option ID = 3092]

13) The degree of the following differential equation is $\left(1 + \frac{dy}{dx}\right)^3 = \left(\frac{d^2y}{dx^2}\right)^2$

[Question ID = 774]

1. 1

[Option ID = 3093]

2. 3

[Option ID = 3094]

3. 4

[Option ID = 3095]

4. 2

[Option ID = 3096]

14) What will be the output of the following C code?

```
#include
```

```
int main()
```

```
{
```

```
int c = 6 ^ 2;
```

```
printf("%d\n", c);
```

```
}
```

[Question ID = 775]

1. 36

[Option ID = 3097]

2. Error

[Option ID = 3098]

3. 1

[Option ID = 3099]

4. 12

[Option ID = 3100]

15) In MATLAB, which command is used to clear a command window?[Question ID = 776]

1. clc [Option ID = 3101]

2. clear [Option ID = 3102]

3. close all [Option ID = 3103]

4. clear all [Option ID = 3104]

16) In MATLAB, what is the basic difference between M-files and MAT-files?[Question ID = 777]

1. M files are binary data files while MAT-files are ASCII text files [Option ID = 3105]

2. MAT files are binary data files while m-files are ASCII text files [Option ID = 3106]

3. There is no difference [Option ID = 3107]

4. There is no such thing as MAT files [Option ID = 3108]

17) Circuits fabricated from GaAs or AlGaAs operate in wavelength region of _____[Question ID = 778]

1. 0.1 and 0.2 μm [Option ID = 3109]

2. 0.8 and 0.9 μm [Option ID = 3110]

3. 0.4 and 0.6 μm [Option ID = 3111]

4. 0.6 and 0.7 μm [Option ID = 3112]

18) In 8086 microprocessors, the instruction, MOV AX, 0005H belongs to the address mode[Question ID = 779]

1. register [Option ID = 3113]

2. direct [Option ID = 3114]

3. register relative [Option ID = 3115]

4. immediate [Option ID = 3116]

19) The 8051 microcontroller is of ____pin package as a _____ processor.[Question ID = 780]

1. 40, 8 bit [Option ID = 3117]

2. 40, 8 byte [Option ID = 3118]

3. 20, 1 byte [Option ID = 3119]

4. 40, 1 byte [Option ID = 3120]

20) In 8096 we have _____interrupt sources and _____ interrupt vectors.[Question ID = 781]

1. 16, 8 [Option ID = 3121]

2. 21, 6 [Option ID = 3122]

3. 18, 8 [Option ID = 3123]

4. 21, 8 [Option ID = 3124]

21) Match List I with List II

List I	List II
Property	Technique
A. Lattice strain	I. Differential Scanning Calorimetry
B. Surface topography	II. Optical Absorption Spectroscopy
C. Specific heat	III. X-ray diffraction
D. band gap	IV. Scanning electron microscope

Choose the correct answer from the options given below:

[Question ID = 782]

1. A - II, B - IV, C - I, D - III

[Option ID = 3125]

2. A - IV, B - II, C - I, D - III

[Option ID = 3126]

3. A - III, B - IV, C - I, D - II

[Option ID = 3127]

4. A - III, B - IV, C - II, D - I

[Option ID = 3128]

22) The inverse Laplace transform of $\frac{s}{(s+2)^2} = \underline{\hspace{2cm}}$

[Question ID = 783]

1. $e^{2t}(1+2t)$

[Option ID = 3129]

2. $e^{-2t}(1-2t)$

[Option ID = 3130]

3. e^{2t}

[Option ID = 3131]

4. $\frac{e^{2t}}{1+2t}$

[Option ID = 3132]

23) In class C amplifier the input signal has a frequency of 250 KHz. If the collector current pulses are 0.1 μ s wide, the duty cycle of current waveform is[Question ID = 784]

1. 2.5 % [Option ID = 3133]

2. 50 % [Option ID = 3134]

3. 0.25 % [Option ID = 3135]

4. 0.50 % [Option ID = 3136]

24) The minimized form of the logical expression $(\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + \bar{A}BC + AB\bar{C})$ is

[Question ID = 785]

1. $\bar{A}\bar{B} + A\bar{C} + \bar{A}B$

[Option ID = 3137]

2. $\bar{A}\bar{C} + B\bar{C} + \bar{A}B$

[Option ID = 3138]

3. $B\bar{C} + A\bar{C} + \bar{A}C$

[Option ID = 3139]

4. $\bar{A}\bar{C} + B\bar{C} + AC$

[Option ID = 3140]

25) Find the particular solution of $\frac{dy}{dx} = \frac{9x^2}{y^2-4y}$, given $y(1) = 3$

[Question ID = 786]

1. $\frac{1}{3}y^3 - 2y^2 = 3x^3 + 12$

[Option ID = 3141]

2. $\frac{1}{3}y^3 - 2y^2 = 3x^3 - 12$

[Option ID = 3142]

3. $y^3 - 4y^2 = 3x^3 - 18$

[Option ID = 3143]

4. $y^3 - 4y^2 = 3x^3 + 18$

[Option ID = 3144]

26) In C language, what is the output of the following code

```
#include<studio.h>
```

```
void f()
```

```
{
```

```
    static int i;
```

```
    ++i;
```

```
    printf("%d", i);
```

```
}
```

```
int main()
```

```
{  
    f();  
    f();  
}
```

[Question ID = 787]

1. 12
[Option ID = 3145]
2. 11
[Option ID = 3146]
3. 00
[Option ID = 3147]
4. error
[Option ID = 3148]

27) What will be the output of the following C code?

```
#include<studio.h>  
  
int main()  
{  
    int i = 5;  
    i = i / 3;  
    printf("%d\n", i);  
    return 0;  
}
```

[Question ID = 788]

1. 2
[Option ID = 3149]
2. error
[Option ID = 3150]
3. 1
[Option ID = 3151]
4. 3
[Option ID = 3152]

28) A multimode fiber with a core diameter of 100 μ m, core refractive index of 1.475 and cladding refractive index of 1.455. Consider operating the fiber at 850 nm. The V-number for this fiber is[Question ID = 789]

1. 89.4 [Option ID = 3153]
2. 79.4 [Option ID = 3154]
3. 69.4 [Option ID = 3155]
4. 99.4 [Option ID = 3156]

29) A force of 4N is inclined at an angle of 45° to a second force of 7N, both facing at a point. The magnitude of resultant of these two forces is[Question ID = 790]

1. 30.25 N [Option ID = 3157]
2. 10.23 N [Option ID = 3158]
3. 11 N [Option ID = 3159]
4. 5.5 N [Option ID = 3160]

30) A wire of diameter 1 mm has conductivity of 4×10^7 S/m. If an electric field of 10 mV/m is applied then, the current in the wire is[Question ID = 791]

1. 1.257 A [Option ID = 3161]
2. 3.141 A [Option ID = 3162]
3. 0.314 A [Option ID = 3163]
4. 0.126 A [Option ID = 3164]

31) An FM broadcasting radio station transmits signals of frequency 100 MHz with a power of 10 KW. The bandwidth of the modulation signal is from 100 Hz to 1.5 KHz. If the maximum deviation set by the FCC, (δ) is 75 KHz, the range of the modulation index is[Question ID = 792]

1. 100 to 750 [Option ID = 3165]
2. 50 to 750 [Option ID = 3166]
3. 100 to 250 [Option ID = 3167]

4. 50 to 250 [Option ID = 3168]

32)

A transmission line operating at 300 MHz has $Z_0 = 75 \Omega$, $\alpha = 0.05$ Np/m, $\beta = 1.5$ rad/m. The line parameters R and L are respectively,

[Question ID = 793]

1. $1.5 \Omega/\text{m}$ and 59.6 nH/m

[Option ID = 3169]

2. $3.75 \Omega/\text{m}$ and 59.6 nH/m

[Option ID = 3170]

3. $1.5 \Omega/\text{m}$ and 13.5 nH/m

[Option ID = 3171]

4. $3.75 \Omega/\text{m}$ and 13.5 nH/m

[Option ID = 3172]

33) In a lossless air line, two adjacent maximas are found at 12.5 cm and 27.5 cm. The operating frequency is [Question ID = 794]

1. 1.6 GHz [Option ID = 3173]

2. 1.2 GHz [Option ID = 3174]

3. 2.0 GHz [Option ID = 3175]

4. 800 MHz [Option ID = 3176]

34) Find $L \left[\int_0^t \frac{\sin u}{u} du \right] =$ _____

[Question ID = 795]

1. $s \cot^{-1} \frac{1}{s}$

[Option ID = 3177]

2. $\frac{1}{s} \cot^{-1} s$

[Option ID = 3178]

3. $\cot^{-1} s$

[Option ID = 3179]

4. $s \cot^{-1} s$

[Option ID = 3180]

35) The Fourier sine transform of $\frac{1}{x}$ is

[Question ID = 796]

1. $\sqrt{\frac{2}{\pi}}$

[Option ID = 3181]

2. $2\sqrt{\pi}$

[Option ID = 3182]

3. $\frac{\sqrt{2}}{\pi}$

[Option ID = 3183]

4. $\sqrt{\frac{\pi}{2}}$

[Option ID = 3184]

36) Laplace transform of $f(t) = \begin{cases} 0 & \text{where } 0 < t < 2 \\ 3 & \text{where } t > 2 \end{cases}$ is

[Question ID = 797]

1. $\frac{e^{-2s}}{s}$

[Option ID = 3185]

2. e^{-2s}

[Option ID = 3186]

3. $\frac{e^{2s}}{s}$

[Option ID = 3187]

4. $\frac{3e^{-2s}}{s}$

[Option ID = 3188]

37) Match List I with List II

List I	List II
Numerical Integration Scheme	Order of fitting Polynomial
A. Simpson's 3/8 Rule	I. First
B. Trapezodial Rule	II. Second
C. Simpson's 1/3 Rule	III. Third

Choose the correct answer from the options given below:

[Question ID = 798]

1. A - II, B - I, C - III

[Option ID = 3189]

2. A - III, B - II, C - I

[Option ID = 3190]

3. A - III, B - I, C - II

[Option ID = 3191]

4. A - I, B - II, C - III

[Option ID = 3192]

38) For the given matrix A, which of the following result is true?

$$A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$$

[Question ID = 799]

1. $A^2 = I$

[Option ID = 3193]

2. $A^2 = -I$

[Option ID = 3194]

3. $A^2 = 2I$

[Option ID = 3195]

4. $A^2 = 0$

[Option ID = 3196]

39) What is the residue of the function $(1-e^{2z})/z^4$ at its pole?

[Question ID = 800]

1. $4/3$

[Option ID = 3197]

2. $-2/3$

[Option ID = 3198]

3. $-4/3$

[Option ID = 3199]

4. $2/3$

[Option ID = 3200]

40) What is the value of $(1525)^{0.2}$ to 2 decimal places?[Question ID = 801]

1. 4.33 [Option ID = 3201]

2. 4.36 [Option ID = 3202]

3. 4.38 [Option ID = 3203]

4. 4.30 [Option ID = 3204]

41) The Fourier cosine transform of $e^{-2x} + 3e^{-x}$ is

[Question ID = 802]

1. $\sqrt{\frac{\pi}{2}} \left[\frac{2}{s^2+4} + \frac{3}{s^2+1} \right]$

[Option ID = 3205]

2. $\sqrt{\frac{1}{\pi}} \left[\frac{2}{s^2+4} + \frac{3}{s^2+1} \right]$

[Option ID = 3206]

3. $\sqrt{\frac{1}{\pi}} \left[\frac{2}{s^2+4} + \frac{3}{s^2-1} \right]$

[Option ID = 3207]

4. $\sqrt{\frac{2}{\pi}} \left[\frac{2}{s^2+4} + \frac{3}{s^2+1} \right]$

[Option ID = 3208]

42) Consider a differential equation $dy(x)/dx - y(x) = x$ with the initial condition $y(0)=0$. Using Euler's first order method with a step size of 0.1, the value of $y(0.3)$ is

[Question ID = 803]

1. 0.01

[Option ID = 3209]

2. 0.0631

[Option ID = 3210]

3. 0.1

[Option ID = 3211]

4. 0.031

[Option ID = 3212]

43) The recursion relation to solve $x=e^{-x}$ using Newton - Raphson method is:

[Question ID = 804]

1. $X_{n+1} = e^{-x_n}$

[Option ID = 3213]

2. $X_{n+1} = x_n - e^{-x_n}$

[Option ID = 3214]

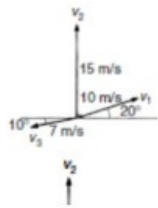
3. $X_{n+1} = (x_n^2 - e^{-x_n}(1+x_n)-1)/(x_n - e^{-x_n})$

[Option ID = 3215]

4. $X_{n+1} = (1+x_n)e^{-x_n}/(1+e^{-x_n})$

[Option ID = 3216]

44) The direction of the resultant velocity of the three velocities shown in the following figure is,



[Question ID = 805]

1. 60°

[Option ID = 3217]

2. 81.72°

[Option ID = 3218]

3. 55.45°

[Option ID = 3219]

4. 90°

[Option ID = 3220]

45) For $y''(x) = \frac{1}{x}$, the solution $y(x)$ has which of the following form

[Question ID = 806]

1. $y = e^{k \ln x} + c$ for all arbitrary constants k and c

[Option ID = 3221]

2. $y = \frac{2}{x^2} + kx + c$ for all arbitrary constants k and c

[Option ID = 3222]

3. $y = x \ln x - kx + c$ for all arbitrary constants k and c

[Option ID = 3223]

4. $y = x^3 + \ln x + c$ for all arbitrary constants k and c

[Option ID = 3224]

46) If given the vectors $v_1 = 22 \angle 140^\circ$, $v_2 = 40 \angle 190^\circ$ and $v_3 = 15 \angle 290^\circ$, then $(v_1 - v_2 + v_3) =$

[Question ID = 807]

1. $28.54 \angle 14.18^\circ$

[Option ID = 3225]

2. $25.67 \angle 14.18^\circ$

[Option ID = 3226]

3. **28.54** $\angle 20.67^\circ$

[Option ID = 3227]

4. **25.67** $\angle 20.67^\circ$

[Option ID = 3228]

47) The sequence of operation in which PCM is done is[Question ID = 808]

1. Quantizing Sampling, Encoding [Option ID = 3229]
2. Sampling, Quantizing, Encoding [Option ID = 3230]
3. Quantizing, Encoding, Sampling [Option ID = 3231]
4. Sampling, Encoding, Quantizing [Option ID = 3232]

48) The r.m.s value of the aerial current before modulation is 12.5 A & during modulation is 14A. the modulation index of the system is:[Question ID = 809]

1. 0.534 [Option ID = 3233]
2. 0.7132 [Option ID = 3234]
3. 0.39 [Option ID = 3235]
4. 0.68 [Option ID = 3236]

49) $c(t)$ and $m(t)$ are used to generate an FM signal. If the peak frequency deviation of the generated FM signal is three times the transmission bandwidth of the AM signal, then the coefficient of the term $\cos[2\pi (1008 \times 10^3 t)]$ in the FM signal (in terms of the Bessel coefficients) is

[Question ID = 810]

1. $5 J_4(6)$

[Option ID = 3237]

2. $5 J_4(3)$

[Option ID = 3238]

3. $(5/2) J_8(3)$

[Option ID = 3239]

4. $(5/2) J_8(4)$

[Option ID = 3240]

50) For speech signal, band-limited to 8 kHz with peak to peak between +20 V to - 20 V (the signals are sampled at Nyquist rate), and the bits 0 and 1 are transmitted using bipolar pulses. Then the minimum bandwidth for distortion-free transmission in KHz?[Question ID = 811]

1. 64 [Option ID = 3241]
2. 98 [Option ID = 3242]
3. 52 [Option ID = 3243]
4. 35 [Option ID = 3244]

